

**Dietary intake, attitudinal, and contextual differences by weight status in indulgent snacking occasions of midlife women**

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## **Abstract**

National, cross-sectional data collected over the past 40 years indicate an increase in the average weight of midlife women (40-60 years). Recent trends for more frequent snacking and stress-related eating may increase risk for weight gain, which is associated with risk of chronic diseases. The purpose of this study was to better understand indulgent snacking occasions among midlife women (n=414) and to evaluate if these occasions, including the attitudes and contextual environment surrounding them, differed by weight status (normal, overweight, or obese). Data collected as a part of a larger study included one-day food records and surveys to assess attitudes and contextual environment. This thesis project tested the hypothesis that both macro- and micro-nutrient intake and food group intakes would vary by weight status with normal weight women displaying healthier consumption characteristics compared to overweight and obese women; however, the observed patterns did not fit these expectations. Significant differences were observed between weight status groups for energy intake and several macro- and micro-nutrient intakes, but these differences did not correspond with differences in food group intakes. Normal weight women tried fewer weight maintenance strategies and had higher weight self-efficacy scores than overweight and obese women. Normal weight women were also more likely to have positive attitudes toward food in general, whereas obese women were more likely to have less healthy attitudes, using food as an escape from emotion or as a coping mechanism for boredom. In addition to food intake, the findings suggest that attitudes and motivations surrounding food may also be important with regard to achieving a healthy weight. Health care professionals should consider snacking habits, as well as motivations and attitudes related to food, when advising midlife women on weight status issues.

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# **Chapter 1: Literature Review**

## **Introduction**

Weight gain is a risk factor for many chronic diseases and conditions. This is of particular concern for women, given the trend for weight gain at midlife and menopause. Additionally, women have been found to be more susceptible than men to stress eating, which is also associated with weight gain. Snacking, in particular, has recently been identified as a lifestyle habit that may have a negative effect on health. Together, these factors may put women at increased risk of weight gain and associated chronic disease. This thesis focuses on snacking occasions identified as being indulgent and providing emotional relief for midlife women (age 40-60). The goal of this thesis research is to identify specific aspects of these occasions that may place women at increased risk for weight gain.

## **Weight Gain in Midlife Women**

Overweight, obesity, and the associated rising cost of healthcare are critical public health concerns. Multiple studies and government reports have indicated that the rates of overweight and obesity in the United States (U.S.) have been increasing over the past five decades.<sup>1-4</sup> Using National Health and Nutrition Examination Survey (NHANES) data, Wang et al. predicted future trends for the prevalence of overweight and obesity.<sup>1</sup> By 2030, 86.3% of adults in the U.S. will be overweight or obese and 51.1% of adults will be obese.<sup>1</sup> These projected increases in overweight and obesity rates result in important public health issues with regard to the cost of health care. Wang et al. estimated that by 2030, health care costs related to overweight and obesity would account for 1 in every 6 healthcare dollars spent.<sup>1</sup> The high predicted cost of treating conditions stemming from overweight and obesity will necessitate that clinicians and health care professionals focus their patient care on weight gain prevention.

While overweight and obesity are population-wide trends, there is particular concern for the increase in overweight/obese women. The annual rate of increase of both overweight and obesity was notably higher in women than in men, 0.91% and 0.65%, respectively.<sup>1</sup> More recent evidence based on NHANES trend data suggests that the rate at which the prevalence of obesity is increasing may have plateaued, particularly for women.<sup>5,6</sup> Even with this plateau, 71.7% (95% CI 66.2%-76.6%) of women ages 40-59 are overweight or obese and 39.5% (95% CI 35.1%-44.2%) in this age group are

obese.<sup>6</sup> However, in women older than 60 years of age, an increase in the prevalence of obesity continues. From 2003-2012 the prevalence of obesity in this age group for women increased 6.6% from 31.5% to 38.1% (p=0.006).<sup>6</sup>

Data compiled from the Centers for Disease Control's National Health Examination Survey (NHES) and NHANES between 1960 and 2002 indicate a clear and significant trend of increasing mean weight in women at midlife. The mean weights of women sampled in 1960-62 for NHES I ages 40-49 and 50-59 were 142.8 and 146.6 lb, respectively. The mean weights of women sampled in 1999-2002 for NHANES ages 40-49 and 50-59 were 168.2 and 169.2 lb, respectively.<sup>3</sup> A combined 4-year NHANES dataset (from 2003-06) supports this trend as the mean weights of women 40-49 and 50-59 years of age were 171.3 and 172.1 lb, respectively.<sup>4</sup> Despite the fact that the average height of women 40-49 and 50-59 years of age increased significantly – by nearly an inch – between NHES I and NHANES 1999-2002, a significant increase in body mass index (BMI) over the same time period was also observed.<sup>3</sup> During this time, weight increased at a faster rate than height for women in both age groups.<sup>3</sup>

Studies have shown that a positive association exists between increasing age and prevalence of overweight and obesity.<sup>†,7</sup> The increase in BMI parallels an increase in waist circumference (WC) in women between the ages of 20-69 years of age.<sup>8</sup> Waist circumference is often used as an indicator of abdominal obesity, which is a risk factor for mortality and numerous chronic diseases including cardiovascular disease (CVD) and diabetes.<sup>9</sup> Given the link between WC, BMI, and chronic disease, efforts to prevent weight gain among adults are important to maintain healthy aging.

Studies have shown that over a woman's life span, she is most likely to gain weight at two time points, during pregnancy and at midlife.<sup>3,10,11</sup> Gestational weight gain within the Institute of Medicine's (IOM) guidelines is necessary for the health of the

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<sup>†</sup> BMI has been used as a proxy for weight status or fatness since the use of this index was reported in 1972.<sup>153</sup> BMI cutoffs of  $\geq 25$  and  $\geq 30$  were established to serve as a primary diagnostic tool for obesity and overweight, respectively. From the start, investigators have been wary of the use of this index as a diagnostic tool.<sup>153</sup> BMI is a poor indicator of overweight and obesity in a number of populations.<sup>154</sup> For example, the true body mass of an athlete may contain a higher proportion of muscle than fat, which would cause him or her to be incorrectly classified as overweight or obese even with a healthy proportion of body fat.<sup>154</sup> While BMI may not be an accurate indicator of chronic disease in individuals due to body composition, it is still a good gauge of chronic disease risk in the overall population.

mother and development of the fetus.<sup>12</sup> However, multiple studies have identified weight gain at midlife as a risk factor for both chronic diseases, such as heart disease and diabetes, and chronic conditions, such as loss of physical function and dementia.<sup>13–21</sup> The amount of weight that women gain at midlife and the underlying reasons for this weight gain are important factors that need to be considered in the etiology of associated chronic disease.

Multiple studies have determined that midlife women gain weight at the rate of approximately 0.5 kg per year.<sup>22–25</sup> All of these studies were prospective, ranging in length from two to seven years. For these studies, the frequency of anthropometric data collection varied; some studies collected data at baseline and follow-up only,<sup>23</sup> while others collected these data on a yearly basis.<sup>22</sup> Measurement methods also varied from use of trained clinicians<sup>22,23</sup> to use of self-reported statistics.<sup>24,25</sup> Of note, determination of weight gain was never the primary purpose of these studies.

### ***Reasons for Weight Gain***

Many factors have been suggested to contribute to weight gain for women at midlife. These include physiological factors such as energy expenditure/physical activity,<sup>23,25–30</sup> menopause,<sup>22,23,25,28,31</sup> and hormonal changes;<sup>32,33</sup> and psychological factors,<sup>34,35</sup> including depression, anxiety, and stress. Social factors<sup>36–43</sup> have been implicated, as well as environmental factors. The latter includes the obesogenic environment<sup>44–53</sup> containing a high number of palatable, energy-dense foods, large portion sizes, and the perceived higher cost of healthier, nutrient-dense foods compared to energy-dense food such as fast food. Additionally, situational issues,<sup>54–60</sup> such as the decision to use convenience foods based on perceived time constraints, are thought to be contributing environmental factors.

### **Physiological**

Changes in the balance between energy intake and energy output (physical activity) have been hypothesized to play a role in weight gain in women at midlife. Scarborough et al. showed that energy consumption alone accounted for changes in the body weight of midlife women over a 15 year time period.<sup>26</sup> Several studies evaluated the effects of physical activity on weight gain.<sup>23,25,27–29</sup> Four of the five studies were prospective in nature<sup>23,25,27,28</sup> and all but one<sup>27</sup> found an association between decreased

energy expenditure (decreased physical activity and increased sitting time) and weight gain. This finding was corroborated by a report published by the U.S. Department of Health and Human Services indicating that as women age, they participate in less regular leisure-time physical activity, rendering them increasingly inactive.<sup>30</sup>

Hormonal changes related to menopause are also hypothesized to impact midlife weight gain, but determining that role is complicated. For instance, how menopause status is determined can impact its relationship with weight gain. Of five studies that examined the relationship between menopause and weight gain, four determined menopause status by the reported frequency of menstrual bleeding.<sup>22,23,25,28</sup> None of these studies reported a difference in weight gain based on menopause status. Wen et al. examined baseline survey data from an ongoing prospective study and found that among Chinese women younger than 55 at baseline, those who were premenopausal reported greater weight gain from age 20 to baseline than did postmenopausal women from age 20 to baseline.<sup>31</sup> Postmenopausal women older than age 55 tended to lose weight.<sup>31</sup> Most of the studies looking at the association between weight gain and menopause were prospective studies that used retrospective self-reported weight. Given these findings, considering the stage of menopause based on frequency of menstrual bleeding alone may not be specific enough to determine associations between menopause and weight gain.

Several more recent studies have addressed the issue of changes in hormones and obesity among midlife women. Suttan-Tyrrell and colleagues analyzed data from the Study of Women's Health Across the Nation (SWAN), a prospective study of 3260 women for whom baseline BMI data were available and confirmed that weight gain was not related to menstrual bleeding frequency, as was shown in previous studies.<sup>32</sup> However, their analysis did show that weight gain was associated with levels of unbound testosterone and inversely associated with sex hormone-binding globulin; these associations were independent of age, physical activity level, and diagnosis with chronic disease.<sup>32</sup> Another analysis of baseline and follow-up data from participants in SWAN who had not used hormone replacement therapy, undergone surgical menopause, or missed follow-up appointments (n=1528) showed that weight gain preceded changes in levels of follicle stimulating hormone, testosterone and sex hormone-binding globulin.<sup>33</sup> For estradiol, however, the association with weight gain depended on the stage of

menopause. Waist circumference was more likely to predict future estradiol concentrations than the reverse.<sup>33</sup> Although frequency of menstrual bleeding may not yield conclusive associations between menopause and weight gain, additional consideration should be given to the hormonal changes that occur during the menopause transition as these changing levels may be associated with weight gain at midlife.

## **Psychological**

Multiple studies have found associations between psychological factors such as depression, anxiety, stress, and overall quality of life and change in weight status.<sup>27,34,35,61,62</sup> A study of 268 students at University College in London found that stress was associated with both weight gain and weight loss and that these associations were stronger in women than in men.<sup>61</sup> Sammel and colleagues measured depression, anxiety and stress among midlife women at baseline and determined that all three were associated with future weight gain over the four years of the study.<sup>27</sup> In particular, women who scored a 16 or higher on the Center for Epidemiological Studies' Depression Scale at baseline, indicating they experienced depression, were 1.9 times more likely than their non-depressed peers to gain 10 or more pounds over the course of the four year study (95% CI 1.09-3.31).<sup>27</sup> Stress and anxiety were not associated with weight at baseline and were predictive of weight gain in both normal weight and overweight/obese women over the four-year study period.

Block et al. found associations between weight gain and psychological stress after analysis of BMI and stressor data from 1,355 participants, 722 of whom were women, who were enrolled in the longitudinal Midlife in the United States study.<sup>35</sup> Factors that were examined included work-related stress, relationship stress (including friends, partners, and family), stress related to life outside of work, financial stress, depression, and anxiety. Baseline levels of professional and personal stress, along with financial stress and stress caused by familial relationships were associated with increased BMI over time among women who had a higher BMI at baseline.<sup>35</sup> Among women with higher BMIs at baseline, the presence of anxiety and depression was also associated with increases in BMI over the nine year study duration.

Chronic stress is known to cause increased levels of circulating cortisol, which causes the dysregulation of neuropeptides responsible for hunger/satiety signaling, including leptin, insulin, and neuropeptide Y.<sup>63</sup> The dysregulation of these neuropeptides has been suggested as a means to promote increased food consumption and visceral fat accumulation.<sup>63</sup> In a laboratory study, Epel et al. subjected women to “stress tests” to determine their cortisol reactivity.<sup>62</sup> Women with high waist to hip circumference ratios (WHR) (or those with central adiposity) had higher cortisol reactivity than women with lower WHR, regardless of BMI.<sup>62</sup> When exposed to the same stressor repeatedly, cortisol levels in women with high WHR increased compared to their counterparts with low WHRs, in whom cortisol levels returned to normal after multiple exposures to the stressor. Although this study only shows association and not causation, it provides added evidence that cortisol levels play a role in increasing obesity.

Brunner and colleagues showed that job-related stress, in particular, had a dose effect on risk of obesity.<sup>34</sup> In their 20-year prospective study in London, United Kingdom, this trend was present when the data from the female portion of the cohort were analyzed, but was not significant.<sup>34</sup> However, whereas no statistical differences were observed between genders, when men and women were analyzed together, a statistically significant increase in the risk of obesity was observed with an increasing number of job-related stress incidents. For one incident, two incidents and three or more incidents, odds ratios (95% confidence intervals) were 1.16 (0.89-1.5), 1.22 (0.81-1.83), and 1.70 (1.07-2.71), respectively, with  $p < 0.01$  for the trend over time.<sup>34</sup> This trend remained significant when individuals who were obese at baseline were removed from the dataset.<sup>34</sup>

## **Social**

Several social factors may also make women more susceptible to weight gain. Both Sterns and Huyck and Kim and Moen have noted that at midlife, individuals are likely to experience occupational changes, including a midlife career change or retirement from work.<sup>39,40</sup> As described by the Exchange Theory and Resource Theory, midlife women are more likely to experience changes in monetary resources as they or their spouse advance in their respective careers, change careers, or enter retirement.<sup>36-38</sup> Although the primary function of work is often identified as the provision of monetary income, it can also function as a social outlet, define identity, or provide a sense of



accomplishment.<sup>40</sup> Therefore, a change in occupational status, such as retirement, may also result in a change in social situation.<sup>40</sup> Midlife women are also subject to changes in household composition, including their diminishing role as caregiver to children. However, they may find themselves increasingly taking on the role of caring or making decisions for parents.<sup>38,64</sup> Researchers have termed women in this situation the “sandwich generation”.<sup>41</sup> A report from the American Association of Retired Persons (AARP) estimated that 44% of Americans between the ages of 45-55 have at least one child under the age of 21 and one living parent (or in-law) and that 54% of this population cares for their children, parents/in-laws, or both.<sup>42</sup> While the trend is not particularly new, it is worth noting that women are delaying having children, which means they are more likely to be still raising children at midlife.<sup>64</sup> All of these social factors related to family or occupation are likely to impact diet and weight.

A recent study by Chassin and colleagues examined the effects of caregiving by the sandwich generation on health behaviors, including engaging in vigorous exercise, making food consumption choices based on the healthfulness of food, and using food labels to determine healthfulness when purchasing foods.<sup>43</sup> These researchers focused on differences between those who had no caregiving responsibilities, those who provided care for one generation and those who provided care for two generations; such differences were determined using the most recent data (2005) from the Indiana University Smoking Survey and controlling for demographic characteristics, including employment status and number of hours spent caregiving each week. Non-caregivers and those caring only for parents or in-laws were significantly more likely than sandwich generation caregivers to exercise vigorously at least two times per week (OR 1.45,  $p < 0.001$  and OR 1.28,  $p < 0.01$ , respectively).<sup>43</sup> As for engagement in nutrition-related health behaviors, non-caregivers and individuals who cared for only their children or only their parents (or in-laws) were more likely than the sandwich generation to read the label to determine the healthfulness of foods prior to purchase (ORs ranged from 1.8-1.69 with all  $p < 0.04$ ). A similar trend was apparent in the frequency with which individuals decided what to eat based on the healthfulness of foods. Individuals with no caregiving responsibilities were 1.5 times more likely than those caring for two generations to make food choices based on the healthfulness of food ( $p < 0.001$ ). Similarly, those caring for only one generation were also more likely than the sandwich generation caregivers to

make food choices based on the healthfulness of food (OR 1.15,  $p < 0.10$  and OR 1.24,  $p < 0.10$ , respectively), though the difference between the two groups was not significant ( $p < 0.05$ ). This highlights the importance of the role that others, either children or parents/in-laws, play in the decision-making around food preparation. Although women may be the main individual obtaining and preparing food for the household, other family members, including children, spouses, and even parents or in-laws, still have great influence over what is purchased. Women feel the need to make sure that other family members are satisfied with the meal (and will eat it).<sup>57</sup> As a result, women may sacrifice their own nutrition to ensure the happiness of others.<sup>58</sup>

## **External**

Aside from individual characteristics that contribute to weight gain in midlife women, two categories of external factors put midlife women at risk for weight gain: environmental and situational factors. Over the past several decades, the obesogenic environment has become extraordinarily pervasive.

The U.S. has seen an exponential increase in the number of palatable energy dense foods in the marketplace. Young and Nestle showed large differences between actual portion sizes of ready-to-eat foods and the standard portion sizes as defined by the USDA.<sup>44</sup> Not only has the portion size of items increased, but the number of larger-portioned items introduced to the market has grown as well. Between 1970 and 1974, fewer than 10 larger portion-size items were introduced to the market, compared to between 1995 and 1999 when more than 60 larger portion-size items were introduced.<sup>44</sup> Interestingly, portion sizes have also increased in art. A study by Wansink and Wansink showed that over the past 1000 years, depictions of the main course at the Last Supper have increased in size by 69.2% and the size of plates in these pieces of art has increased by 65.6%.<sup>45</sup> In more recent history (from 1900 to 2010), the diameter of dinner plates manufactured in the U.S. has risen from 9.6 inches to 11.8 inches, or approximately 22%.<sup>46</sup> This increase is problematic because research shows that individuals, including nutrition professionals, tend to portion themselves more food when using larger dinnerware.<sup>47</sup> In one study, when using a 34 oz bowl compared to a 17 oz bowl, nutrition professionals served themselves significantly more ice cream (31%) ( $p < 0.01$ ), amounting to an intake of, on average, an additional 127 calories.<sup>47</sup>

Within the obesogenic environment, there is also the perception that healthy, nutrient-dense foods, such as fruits and vegetables, are more expensive than energy-dense foods. This perception is reflected not only in news media, but also in scholarly journals. Energy-dense foods are those that are high in total fat, saturated fat, and added sugars and therefore, are higher in calories per gram of food, but contain little in the way of micronutrients, including vitamins and minerals.<sup>53</sup> Eikenberry and Smith confirmed this perception in interviews with low-income individuals.<sup>48</sup> The high cost of healthy foods was also a concern expressed by low-income individuals during interviews conducted by Buchholz and colleagues in 2012.<sup>49</sup> This idea has been further promoted by several studies involving market basket comparisons, showing that a market basket that meets the 2005 Dietary Guidelines was 17-19% more expensive than the standard market basket.<sup>50</sup> Drewnowski confirmed that grains and fats and oils were the least expensive per 100 calories compared to fruits and vegetables, which were the most expensive per 100 calories.<sup>51</sup>

A recent study by the U.S. Department of Agriculture (USDA) found that when price per calorie was used as a means to compare cost of energy-dense to nutrient-dense foods, energy-dense foods were less expensive than their nutrient-dense counterparts.<sup>52</sup> Per calorie, fruits and vegetables were more expensive than grains or energy dense foods. While fruits and vegetables are more expensive per calorie, calories are not the sole consideration when judgments are made about nutrition. The 2010 Dietary Guidelines for Americans stress the importance of meeting not only calorie recommendations, but also portion size and nutrient recommendations.<sup>53</sup> This same USDA study concluded that with regard to nutrients, energy-dense foods are actually more expensive than fruits, vegetables, dairy products, grains and proteins. For price per edible weight, which looks only at the weight of the food that would be consumed, (e.g. the weight of an apple excluding the seeds and core), dairy was the least expensive followed by grains and fruits and vegetables.<sup>52</sup> The most expensive foods per edible weight were proteins, followed by mixed dishes (i.e. spaghetti and meat sauce), and energy-dense foods. Energy-dense foods were the second most expensive based on price per portion size.<sup>52</sup> Only mixed dishes were more expensive. This means that fruit, vegetables, dairy, grains and proteins were all less expensive. Although this study has shown that nutrient-dense foods are not as expensive as energy-dense foods,<sup>52</sup> the

consumer notion that healthy foods are more expensive than less healthy foods continues to persist. Bigger plates, larger portion sizes and the perception that healthier foods are more expensive may make individuals more susceptible to becoming overweight and obese.

Many situational factors also affect food intake in midlife women. Situational factors refer to the context surrounding eating occasions and include preparation and clean-up related to the occasion.<sup>54</sup> Many individuals will choose convenience and processed foods due to perceived time constraints.<sup>55</sup> They seek foods and meals that require little preparation and clean up time.<sup>56</sup>

Guthrie et al. noted that between the USDA's 1977-78 Nationwide Food Consumption Survey (NFCS) and the 1994-96 Continuing Survey of Food Intakes by Individuals (CSFII), the number of meals consumed that were prepared away from home increased.<sup>59</sup> Not only did the consumption of these meals increase, but meals away from home were higher in the percentage of calories from total fat and saturated fat and lower in micronutrients including iron and calcium. On the other hand, meals prepared at home were higher in dietary fiber and lower in cholesterol and sodium than meals prepared away from home.<sup>59</sup> The increased number of away from home meals and breakfast and lunch meals being purchased from cars indicates that Americans are looking for foods that are convenient.<sup>56</sup>

As expected, this trend has continued into the 2000s. Using data from nationally-representative, cross-sectional food intake surveys, including the 1965-66 Household Food Consumption Survey (HFCS), NFCS, 1989-91 and 1994-96 CSFII, the 2003-04 and 2007-08 NHANES ,and data from the American Heritage Time Use Study for the corresponding time periods, Smith et al. determined that among women, between 1965-66 and 2007-08, energy intake increased by 738 kJ/day (or approximately 176 kcal) ( $p \leq 0.001$ ).<sup>60</sup> Additionally, the percentage of energy consumed from home sources decreased by 23.9% over the same time period. Of note, between 1994-96 and 2007-08, the percentage of energy consumed from home sources plateaued with no further significant decrease. As for women who spent time cooking, the proportion dropped from 92% in 1965-66 to 68% in 2007-08 ( $p \leq 0.001$ ). Moreover, the amount of time that women spent cooking decreased from 112.8 min/day to 65.6 min/day ( $p \leq 0.001$ ) over the same time period. Unfortunately, because neither study contained both intake and

time-use data, no associations can be drawn. However, the findings are consistent with the conclusions of previous research<sup>54,55</sup> about consumer desires to spend less time on food preparation by opting for convenience and packaged foods.

### ***Weight Gain as a Risk Factor for Chronic Diseases and Conditions***

At midlife, women face many factors that may lead to weight gain. This is problematic given that weight gain has been identified as a major risk factor for a number of chronic diseases and conditions, including cardiovascular disease (CVD), coronary artery disease, hypertension, diabetes, and cancer, as well as other conditions such as dementia and decline in physical function. Overweight and obesity classified by BMI cutoffs are associated with the risk of increased mortality. Manson et al. used 16 years of follow-up data from women who were free of CVD and cancer at baseline from the prospective Nurses' Health Study to determine the relationship between BMI and mortality. In women whose weight had been stable (<4 kg change) for the initial four years of the study (1976 to 1980), relative risk (RR) for mortality was linear; it was twice as high (RR of 2.2) in women with a BMI greater than 32.0 compared to the reference population of women with a BMI of less than 19.0 kg/m<sup>2</sup> (p <0.001). And as noted, obesity increased the relative risk of disease-specific death. Women in the highest BMI category ( $\geq 32.0$  kg/m<sup>2</sup>) were four times as likely to die from CVD and twice as likely to die from cancer compared to the reference population.<sup>65</sup>

Not only do the odds of disease-specific mortality increase with increasing BMI and weight gain, but the odds of what Sun et al. termed "healthy survival" also decrease.<sup>66</sup> With no generally agreed upon prior definition, "healthy survival" was defined by these researchers as being free of chronic diseases, including cancer, diabetes, myocardial infarction, coronary artery bypass graft surgery, congestive heart failure, cardiovascular accident (CVA), kidney failure, chronic obstructive pulmonary disease, Parkinson's disease, multiple sclerosis, and amyotrophic lateral sclerosis; having good cognitive function and mental health; and not having experienced a decline in physical function. To determine the effect of adiposity at midlife on healthy survival after age 70, researchers used data from the Nurses' Health Study. For this analysis, data from 17,065 participants who had reached age 70 in 1995 and who had not been diagnosed with a chronic disease at baseline were included.<sup>66</sup> The mean age of women at baseline was 50 years. Women who were obese (BMI  $\geq 30$ ) at midlife had lower odds

of healthy survival after age 70 compared to women who were lean (BMI 18.5-22.9) at midlife (odds ratio (OR) 0.21, 95% confidence interval (CI) 0.15-0.29).<sup>66</sup>

### **Chronic Conditions**

According to the definition of healthy survival, healthfulness in old age needs to include consideration of physical function and mental status. Research shows a clear relationship between weight and physical abilities.<sup>67,68</sup> Both elevated BMI and an increase in weight have been linked to decreased physical function. Fine et al. determined how change in weight over a four-year period affected change in quality of life during the same period; this analysis was completed using data from the Medical Outcomes Study Short Form (SF)-36 questionnaire collected as a part of the Nurses' Health Study, from 1992 to 1996.<sup>67</sup> The SF questionnaire covers quality of life in eight domains including physical and social function, limitations in daily activities due to physical or emotional difficulties, vitality, pain, mental health, and perceptions of health. Women between the ages of 46-64, who gained greater than 9 kg over the four-year period experienced significant ( $p < 0.001$ ) decline in physical function and vitality and a significant increase in pain. Regardless of BMI status, weight gain was associated with loss of physical function.<sup>67</sup>

The association of weight gain with loss of physical function was further supported by a study using participant data from the Italian Progetto Vento Anziani Study, which sought to determine if weight at age 50 and change in weight since age 50 affected disability status later in life.<sup>68</sup> For women, the odds of disability were significantly higher for those who were obese at either 50 years of age or at the study baseline (mean age 65), 1.78 (95% CI 1.59-2.00,  $p < 0.001$ ) and 1.75 (95% CI 1.56-1.95,  $p < 0.001$ ), respectively.<sup>68</sup> These odds remained significant even when other comorbidities were factored into the analysis. Due to small sample size, a sex-specific analysis of weight gain since age 50 and odds of disability could not be performed, but for men and women who were normal weight or obese at age 50, a 5-10% or greater than 10% increase in body weight significantly increased the odds of disability later in life, an effect which was not attenuated by factoring in comorbidities. Similar significant results were observed with individuals who were overweight at age 50 and gained greater than 10% of their body weight.<sup>68</sup>

The aforementioned studies show that physical function is negatively impacted by weight gain, which effects healthy survival. Mental status must also be considered as a factor in healthy survival, though, and, over the past two decades, the body of research on the associations between weight status and brain function has expanded.<sup>16,17,69</sup> Multiple studies have found an association between weight and dementia or physiological anomalies related to dementia. In the Cardiovascular Health Study- Cognition Study, Fitzpatrick and colleagues found that for women who were obese (BMI  $\geq$  30) at midlife, the risk of developing dementia later in life increased by 40%.<sup>17</sup> Another study examined change in BMI with the onset of menopause and its association with gray matter.<sup>16</sup> Gray matter refers to brain cells that participate in decision making, as opposed to the white matter in the brain which refers to cells that specialize in transporting these decisions. Multiple variables including premenopausal BMI, years since menopause, resting systolic blood pressure, and perceived stress explained 22% of the variance in gray matter volume, but the change (i.e. increase) in BMI, since onset of menopause alone, accounted for an additional 15% of the variability of gray matter brain content.<sup>16</sup> Although the study was not designed to determine a causal effect of BMI on changes in gray matter, an association was observed between weight gain at midlife and gray matter later in life.

A study published in 2012 by Gustafson and associates<sup>69</sup> found what may turn out to be an anomaly, but still needs to be considered. Over a 37 year follow up period, women enrolled in the Prospective Population Study of Women in Sweden progressed along two different BMI trajectories with regard to onset of dementia. Women who developed dementia gained weight (expressed in this study as BMI) at a slower rate than women who did not. Interestingly, from age 70 (the average age of dementia diagnosis) onward, both groups of women lost weight at the same rate. Given this study's robust design, it raises some interesting questions about the relationship between weight gain and risk of dementia. As both this study<sup>69</sup> and the gray matter study<sup>16</sup> suggest, weight gain and weight status are not directly responsible for changes in brain structure and function but may induce pathophysiological processes in the body (such as changes in vascular structure) that would lead to such changes.

## Chronic Disease

Overweight or obese weight status and weight gain are both risk factors for chronic disease. Data from 33,834 women aged 55 to 69 participating in the Iowa Women's Health Study showed that the risk of myocardial infarction, stroke, diabetes, and hip fracture, all increased with increasing variability in weight over time.<sup>70</sup>

Weight gain increases the risk of developing both hypertension and pre-hypertension. Yang et al. studied the effect of weight change between age 20 and current age on risk of pre-hypertension in women age 40 to 70 years old.<sup>71</sup> They used data from 36,075 subjects enrolled in the Shanghai Women's Health Study and conducted follow-up at 2 to 3 years post-baseline. The odds ratio for developing pre-hypertension increased from 1.36 for women who gained 6-10 kg to 3.65 for women who gained greater than 25 kg. In this study, weight gain prior to 50 years of age was more closely associated with development of pre-hypertension than was weight gain after 50 years of age.<sup>71</sup> Analysis of the Nurses' Health Study data by Huang et al.<sup>72</sup> showed that both long-term and medium-term weight gain resulted in increased risk of hypertension. When age was factored into analysis, the association was stronger in younger women (<45 years).<sup>72</sup>

Elevated weight status and weight gain are also known to increase risk for other cardiovascular events, including CVAs. Data from the Japan Public Health Center-based prospective study<sup>13</sup> showed that the hazard ratio (HR) for stroke in women not only increased with increasing BMI at baseline, but also with increases in weight over a five year follow-up period. The trend for the HR of stroke given baseline BMI was significant ( $p < 0.001$ ). Additionally, when HRs were grouped according to BMI and weight change levels, unless women lost greater than 3% of their body weight, the HR for incident stroke increased with increasing BMI level ( $p < 0.001$ ).<sup>13</sup>

In addition to being associated with increased risk of cardiovascular disease, various measures of adiposity are strongly correlated with diabetes risk. Using a cohort of women from the Nurses' Health Study, Colditz explored the relationship between weight gain at midlife and the risk for diabetes following weight gain.<sup>20</sup> A clear relationship was observed between weight loss or gain and relative risk of diabetes. Compared to women whose weight remained stable (lost or gained no more than 3 kg), women who gained more than 10 kg were 1.8 times more likely to be diagnosed with



diabetes (95% CI 1.4-2.3).<sup>20</sup> On the other hand, women who had lost at least 5 kg had a relative risk of only 0.6 (95% CI 0.4-1.0) compared to women whose weight remained stable.<sup>20</sup> The Cardiovascular Health Study, a prospective, cohort study focusing on CVD in individuals 65 years and older, sought to determine the relationship between measures of adiposity and incidence of diabetes.<sup>19</sup> Among women in the highest quintile for current BMI, BMI at age 50, and weight, risk of incident diabetes was 3.7 (95% CI 2.3-6.2), 3.2 (95% CI 1.9-5.5), and 3.5 (95% CI 2.5-5.7), respectively, when compared to women in the lowest quintiles of each category. Additionally, for both men and women, regardless of BMI status at midlife (age 50), any weight gain increased relative risk of diabetes. For those who gained 9 kg or more since midlife, the relative risk of diabetes was 3.2 (95% CI 2.0-5.1) for those who were normal weight, 4.0 (95% CI 2.5-6.4) for those who were overweight, and 5.0 (95% CI 2.5-10.0) for those who were obese.<sup>19</sup>

Finally, weight status and weight gain have also been linked to several types of cancer including breast and endometrial cancer. Friedenreich et al. examined data from a cohort of women (n=223,008) who were enrolled in the European Prospective Investigation into Cancer and Nutrition.<sup>14</sup> During the 6.4 year follow-up, 567 incident cases of endometrial cancer were diagnosed. There was a statistically significant association between both body weight and BMI and the risk for endometrial cancer. Women in the highest quartile for body weight (>72.4 kg) were 1.74 times more likely to be diagnosed than those in the lowest quartile (<58 kg) (95% CI 1.35-2.23,  $p_{\text{trend}} < 0.0001$ ). A multivariate analysis indicated that the relative risks of endometrial cancer for obese and morbidly obese women were 1.78 (95% CI 1.41-2.26) and 3.02 (95% CI 1.66-5.52), respectively ( $p_{\text{trend}} = < 0.0001$ ). When separated by menopause status, the associations between these anthropometric variables and cancer risk were not significant, but the trends appeared to be stronger for postmenopausal women.<sup>14</sup>

Breast cancer risk has a similar trend with regards to weight gain and menopausal status. The Western New York Exposures and Breast Cancer Study was a case-control study conducted from 1996-2001 in which women with confirmed primary breast cancer (n=1,166) were paired with women of the same age, race and county of residence (n=2,105).<sup>73</sup> No association was observed between weight gain and the development of breast cancer in premenopausal women. In postmenopausal women, however, for every 5 kg of weight gained between age 20 and the initiation of the study,

a 4% increase in risk of developing breast cancer was observed (95% CI 1.03-1.05).<sup>73</sup> Similarly, in a prospective cohort from the Nurses' Health Study, for those who gained 25 or more kilograms since age 18, the relative risk of breast cancer diagnosis was 1.45 (95% CI 1.27-1.66).<sup>15</sup> Women who gained more than 10 kilograms since menopause were 18% more likely to be diagnosed with breast cancer than those whose weight remained stable (95% CI 1.03-1.35).<sup>15</sup>

Weight gain in midlife women has detrimental effects on health by increasing risk of chronic disease and decreasing quality of life. For this reason, understanding food consumption habits of midlife women and identifying helpful/harmful characteristics is important so that interventions can be designed to better target problem behaviors.

## **Snacking**

### ***Snacking Definition and Overview***

The Oxford English Dictionary defines the noun snack as “a mere bite or morsel of food, as contrasted with a regular meal; a light or incidental repast” and reports the word was first used in the year 1757.<sup>74</sup> The verb *to snack* is an early nineteenth century derivation of the noun;<sup>75</sup> however, over the course of 150 years, its definition has become no more specific, even when it comes to scientific research. Since becoming a topic of interest for researchers, snacking has been defined in numerous ways. It can be classified by the investigator as falling in a specific time of day,<sup>76</sup> occurring over a specific amount of time,<sup>77</sup> meeting certain energy and nutrient criteria,<sup>78,79</sup> or by being identified as one of a finite set of foods.<sup>80,81</sup> In an age where the distinction between meals and snacks is becoming increasingly blurred, some researchers investigating the larger overall picture of eating habits may wish to avoid the use of labels, such as meal and snack, and instead opt for a more general term, such as eating occasion.<sup>54</sup> Finally, a snack can be self-classified by the participant.<sup>77,82-84</sup> Several reviews have identified the lack of a universal definition of snacking as a factor that complicates the ability to compare results between studies and determine the effects of snacking on health.<sup>85,86</sup>

Each definition presents challenges. For instance, with snacks that have been investigator-defined based on timing, an individual who works second or third shift may not keep to the same “normal” eating schedule. Additionally, numerous cultural

differences exist in eating time. For instance, many in the U.S. may eat around 6 P.M., but the French typically do not eat dinner until after 8 P.M.<sup>87</sup> If, instead of timing, energy and nutrient criteria are used to identify meal and snack occasions, this may include/exclude energy-containing beverages. This lack of consistency is problematic because research shows that liquids are less satiating than solid foods and excessive consumption of liquids may contribute to weight gain.<sup>88,89</sup> Finally, differences in opinion may arise over what foods are considered snack foods.<sup>90</sup> While participant-defined snacks remove investigator bias,<sup>54</sup> this method becomes problematic as each participant has his/her own idea of what constitutes a snack.<sup>91</sup>

Multiple studies have acknowledged the difficulty of differentiating between meals and snacks.<sup>92,93</sup> This arises because eating occasions are defined as such because of historical precedent and sociological norms.<sup>94</sup> They are not defined based on a physiological differentiation, such as the absence or presence of hunger (indicated by a drop in blood glucose and insulin concentrations).<sup>95</sup> Despite the complications faced in defining snacks, the concept of snacking is important to consider when determining the effects of food on health as the prevalence of snacking is increasing. Understanding changes in snack food consumption and snack food choice is critical to identifying the implications of snacking on health and disease.

## **Trends**

The lack of an agreed-upon definition of snacking affects not only research on the health implications of snacking, but also any effort to determine how snacking has changed over time. The most recent analysis of NFCS, CSFII, and NHANES data by Piernas and Popkin took a more liberal approach to the definition of snacking, as the participants self-defined each eating occasion that was recorded.<sup>77</sup> This analysis found that between 1977-78 and 2003-06, the number of adults ( $\geq 19$  years of age) who engaged in snacking during a two-day period significantly increased from 71% to 97%. This trend is paralleled by a significant increase in the number of snacks consumed per day, as well as an increase in the number of calories per snack and the total number of calories from snacks. In the US adult population aged 40-59, the number of snacks consumed per day increased from  $1.34 \pm 0.04$  in 1977-78 to  $2.37 \pm 0.03$  in 2003-06 ( $p < 0.01$ ). Along with this increase, the total number of calories per snack increased from  $134 \pm 4$  to  $219 \pm 5$  ( $p < 0.01$ ). Total energy obtained from snacking also increased

significantly from  $334 \pm 7$  to  $573 \pm 10$  kcal/day ( $p < 0.01$ ). Of note, the energy density of snacks increased significantly from 3.43 to 3.94 kcal/g ( $p < 0.01$ ) among adults ages 40-59 (and across all age groups), but the energy density of meals remained stable.<sup>77</sup>

Conversely, a study by Kant and Graubard found that while energy density of snacks increased, snacking did not occur more frequently. Their study sought to identify trends in American food intake, including snacks, over the course of three decades (1971-2002) using data from NHANES I, II, III and 1999-2002.<sup>82</sup> Whereas the number of women who reported snacking and the number of reported snacking episodes did not change between NHANES I (1971-1975) and NHANES 1999-2002, the number of calories per snack and the percentage of total daily energy consumed from snacks both increased significantly. The energy density of snack foods consumed by women increased significantly from  $0.94 \pm 0.02$  to  $1.37 \pm 0.03$  kcal/gram ( $p < 0.0001$ ). In the study, snacking was respondent-identified, the episode had to be labeled as “between meals” (NHANES I and II) or “snack” (NHANES III and 1999-2002) to be considered a snack for this study. Furthermore, the ability to identify changes in snacking trends may have been hindered by several issues including changes in data collection protocols over time, since the NHANES was first administered (from paper and pencil to computer to the addition of the multiple pass system) and the definition of a snacking episode. However, the authors concluded that there has not been a large increase in American snacking frequency over the past three decades.

A more recent study acted by the same authors acted as an extension of the first by analyzing an additional four NHANES datasets.<sup>83</sup> The authors reevaluated the percentage of individuals reporting snack consumption and the number of snacking episodes, this time over a four-decade time span, but did not arrive at the same conclusions. Although the previous study showed no significant differences, over a four decade timespan, the mean number of snacking episodes reported by women in a 24-hour period increased significantly from  $2.09 \pm 0.04$  to  $2.30 \pm 0.04$  ( $p < 0.0001$ ) as did the percentage of women who reported consuming any snack. There was also a significant increase in the percentage of women who reported consuming two or more snacks during the recall. The percentage of women who reported consuming more than 50% of their daily calories from snacks increased significantly from  $4.8\% \pm 0.3\%$  to  $9.4\% \pm 0.6\%$  ( $p < 0.0001$ ). This study also focused on trends related to when snacking

occurred throughout the day. There was a significant increase in the percentage of women who reported consuming a snack before breakfast, between lunch and dinner, or a snack that replaced a meal, whereas the percentage of women who consumed an after dinner snack decreased. There was no change in the percentage of women who consumed a snack between breakfast and lunch. Finally, for women, there was a significant increase in the total calories provided by snacks consumed during the 24-hour period from  $296 \pm 7$  to  $438 \pm 8$  ( $p < 0.0001$ ) and a subsequent increase in the percent contribution of snacks to total daily caloric intake (from  $18.0 \pm 0.4$  to  $23.0 \pm 0.4$ ).

Popkin and Duffey determined that between 1977-78 and 2003-06, the number of calories consumed as snacks (including beverages only, food only, and beverages and food combined) increased significantly for adults 19 years of age and older.<sup>79</sup> While all NHANES data collections have the participant self-identify snacking occasions, in this particular analysis, the investigators went further by defining a snack as “any food consumed within 15 minutes of a participant-designated snack.” As for trends among demographic groups, data from a cross-sectional population survey in Finland showed that younger women (ages 25-34) As for trends among demographic groups, data from a cross-sectional population survey in Finland showed that younger women (ages 25-34) were more likely to snack than older women (ages 35-64).<sup>96</sup>

### **Snacking food choice**

In addition to the increase in snacking over the past four decades, snack food preferences have shifted with an increased intake of high- and low-fat salty snack items and an overall decrease in intake of dairy/milk drinks, fruit/juice and desserts. Despite this change, desserts and juice/fruit remained in the top five categories of snacks in the U.S. between 2003-2006, along with salty snacks, other snacks, and sweetened beverages.<sup>77</sup> Hampl et al. reported that the most common snack foods for a national cross-sectional sample of US women were coffee (6%), soda (3%), diet soda, apple, banana, unsweetened tea, whole milk, 2% milk, and regular (non-chocolate) ice cream (all 2%).<sup>97</sup> These foods only made up 23% of the total snacks; there were many others that were infrequently reported.

Similar snack food choices have been observed in other countries as well. Ovaskainen and colleagues identified the preferences for a group of Finnish women,

where top food and beverage snack items were coffee/tea, water, and milk products, followed by bread, fresh fruits and vegetables, baked goods, and sweets/chocolate.<sup>96</sup> Furthermore, a study by Bellisle and colleagues of 54 French adults, where all but three were normal weight, reported that foods consumed more often as snacks (as opposed to meals) included biscuits, cereal bars, sweets, and regular sodas.<sup>84</sup> Some foods and beverages were consumed as frequently as snacks as they were consumed as meals (ice cream, bread, rusks, pastries, diet sodas, fruit juice, and toppings such as sugar, honey, and jam). Beverages and foods high in carbohydrates are often popular snack foods, regardless of the country.

### *Effects of Snacking on Health and Diet*

#### **Snacking and Weight Gain**

Just as the definitions of snacking are varied, so are the conclusions regarding the relationship between snacking and weight status and weight gain. Multiple studies have found an association between snacking frequency and weight status.<sup>98,99</sup> Based on findings from a diabetes prevention study in Sweden, Bertéus-Forslund and colleagues concluded that obese women snacked more than women who were normal weight.<sup>98</sup> With an increasing number of snacking occasions that included cakes, cookies, or desserts, obese women also consumed significantly more calories than normal weight women, but did not compensate for this increased energy intake by decreasing their intake at meals. In individuals between 20-59 years of age who took part in CSFII (1994-96) and reported plausible energy intake, snacking frequency was also positively associated with BMI.<sup>99</sup>

Zizza and Xu, conversely, found an inverse association between snacking frequency and BMI in an analysis that combined data from NHANES 1994-2004.<sup>100</sup> Similarly, in a study published by Kant and Graubard, a negative association was observed between both the mention of a snack and the number of snacking episodes and the likelihood of obesity (BMI  $\geq$  30); however, neither variable was significant after taking into consideration under-reporting.<sup>82</sup>

However, several studies that used either cluster solutions or created a snack quality index concluded that there was no association between snacking and weight status.<sup>101-103</sup> Interestingly, in a different analysis of the CSFII (1994-96) survey data,

Hampel and colleagues concluded that snacking, when categorized according to the time of day the snack took place (morning, afternoon, evening, multiple times per day, or never), was not associated with obesity.<sup>97</sup>

Contrary to all previous studies, findings from the Swiss Food Panel of 2010 showed that the BMI of women who snacked the most (were in the highest tertile of snacking frequency) was significantly lower than that of women who snacked modestly or infrequently throughout the week.<sup>102</sup> However, when a regression analysis was performed, there was no association between snacking frequency and BMI. In this same study, researchers also performed a cluster analysis on the data from individuals in the highest tertile of snacking based on six eating behaviors (frequency of the consumption of fruit, vegetables, convenience foods, savorys/sweets, sugar-sweetened beverages, and meat) and found a three cluster solution based on healthiness (healthy, moderately healthy, unhealthy). However, there was no difference in BMI based on healthfulness of eating behaviors.

The one longitudinal study identified during the literature search that specifically examined relationships between snacking and weight gain found a positive association between consumption of snack foods and 5-year differences in WC in a prospective study of Danish women who were 50-64 years of age.<sup>80</sup> Snack foods were researcher-defined as chocolates, sweets, licorices, fruit gums, toffees, pork rind, potato chips, and French fries.

### **Snacking and Diet Quality**

As with other aspects of snacking, conclusive data does not exist regarding the effect of snacking on diet quality. In one study, one quarter of Finnish women had eating patterns in which their energy intake from snacks was higher than that from meals.<sup>96</sup> Compared to meals, snacks were higher in energy density and those with snack-dominant eating patterns had lower micronutrient intakes than individuals with meal-dominant consumption patterns. Additionally, the authors concluded that after 5 P.M., energy intake from snacks was higher than that from meals among women.<sup>96</sup> Hartmann and colleagues found that Swiss women who snacked the most (>7.5/week) had significantly higher intake of sweets, savorys and sugar sweetened beverages than women with moderate and low snacking frequency; however, the women who snacked

the most also ate more fruit.<sup>102</sup> On the other hand, Zizza et al. combined data from NHANES 1994-2004 to determine the effect of snacking on overall diet quality and found that increased snack frequency was positively associated with HEI (Healthy Eating Index)-2005, the measure used as a proxy for diet quality.<sup>100</sup>

Whybrow and Kirk found no correlation between snacking frequency and diet quality.<sup>76</sup> They analyzed the eating patterns of 44 female university students to determine the effect of snacking on nutrient intake, based on data collected from a 7-day weighed food record.<sup>76</sup> The researchers classified the eating occasions as meals or snacks according to the time of each occasion, based on “normal” British eating patterns. They also only included occasions in which at least 50 kcal had been consumed and excluded subjects who were determined to have under-reported their intake. Snacks provided a significantly lower percentage of calories from fat and protein and a significantly higher percentage of calories from non-alcohol carbohydrates than meals provided. Interestingly, as eating frequency increased, the number of snacking occasions also increased, but the number of meal occasions remained the same. Increased frequency of eating was inversely associated with BMI. Although snacks had lower densities of macro- and micro-nutrients, the overall intake of micro- and macro-nutrients did not vary based on eating frequency.

The effect of snacking on diet quality may be mediated by an individual’s overall meal and snack consumption pattern. Kerver and associates analyzed nutrient intake data from NHANES III (1988-94) based on consumption patterns.<sup>104</sup> Those who did not consume any snacks had the lowest energy and carbohydrate intakes along with the highest fat and protein intakes of all consumption patterns, while those who consumed breakfast, lunch, dinner and at least two snacks had the highest energy and carbohydrate intakes. Individuals whose meal/snack consumption pattern did not include breakfast, regardless of the number of snacks consumed, had the lowest micronutrient intake of all patterns.

These energy intake trends with relation to snacking frequency are not universally supported in the literature, though. For example, a study of 54 French adults collected 28 days of food and beverage intake data spread out over four, non-consecutive weeks during a year-long study.<sup>84</sup> Of note, all individuals in this study were considered normal weight (BMI < 25), with the exception of three men, all over the age



of 35. On average, snacks contained 302 calories (an average of 157 calories from carbohydrates, 101 calories from fat and the remaining 31 calories from protein). There was no significant difference in total calorie intake between days on which participants snacked vs. days they did not. This study also asked participants to rate their hunger/satiety before and after each eating occasion. Individuals were significantly less hungry before snacks than they were before meals and significantly less full after snacks than they were after meals.<sup>84</sup>

Another interesting result from this study was the calculation of satiety ratio (the amount of time elapsed until the next eating occasion divided by the amount of energy consumed during the current eating occasion) and deprivation ratio (the amount of energy consumed during the current eating occasion divided by the amount of time elapsed since the last eating occasion). The satiety ratio was significantly higher for snacks than for meals, indicating that subjects remained fuller for a longer time after consuming snacks. On the other hand, meals had a higher mean deprivation ratio than snacks, meaning that if the time since the last eating occasion was held constant, energy intake was higher at meals than it was at snacks. These findings combined with the basic hunger/satiety ratings for meals and snacks point to initiation of eating occasions as a result of more factors than just internal biological hunger/satiety signals.

Based on the studies reviewed, it can be concluded that snacks provide proportionally more energy from carbohydrates and less energy from protein and fat than do meals. Beyond that, no conclusive evidence exists regarding the effect of snacking on diet quality or weight status and weight gain. This issue is likely caused by the lack of consensus on the definition of a snack and a reliance on definitions based on sociological norms and historical customs, instead of one rooted firmly in human physiology.

### ***Motivations for Food Consumption***

Most of the studies described thus far do not address whether there was a true physiological need (i.e. a calorie deficit as indicated by a drop in blood glucose levels) for the snack occasion. This is a particularly important issue because 1) studies have shown that individuals will consume food in the absence of hunger, and 2) after

consuming food in a non-hungry state, individuals do not adjust subsequent intake accordingly.

Multiple studies have shown that individuals consume food in the absence of hunger.<sup>95,105</sup> Further, consumption of food in the absence of hunger may indicate that individuals do not compensate for their increased calorie intake at later eating occasions.<sup>89</sup> Even when the snack is planned, people do not take into account future hunger or needs when selecting a snack.<sup>106</sup> In one study, although a high protein snack delayed requests for dinner by an average of 40 minutes compared to a high carbohydrate snack, neither snack resulted in changes in energy or macronutrient composition at dinner.<sup>107</sup>

A study by the same research group sought to determine if there was a physiological way to differentiate between a meal and a snack by comparing changes in hunger/satiety ratings with changes in blood glucose and insulin levels between two sets of French individuals, those who regularly consume as *goûter* (a traditional late afternoon meal in France) and those who do not.<sup>95</sup> In the experiment, the group of individuals who did not regularly consume a *goûter* were provided the same foods as those who consumed the *goûter* and at approximately the same time as those who had to request their *goûter*. While there was no requirement that non-*goûter* individuals consume this food, all individuals did consume at least some of what they were presented. Unlike those who consumed the *goûter*, those in the non-*goûter* group did not indicate an increase in hunger, nor did they experience a decline in glucose and insulin values just prior to consuming the food. Interestingly, the *goûter*-eaters requested their dinner later and consumed fewer calories than the non-*goûter* eaters who snacked. This study suggests that 1) individuals will snack in an environment that contains food that is easy to access, even if they are not hungry, 2) individuals who eat when hungry may do a better job of balancing daily calorie intake, and 3) it is possible that it is not the difference between “meals” and “snacks” that the healthcare community should be concerned about, but rather if individuals consume food when hungry or if they consume food for reasons other than physiological hunger.

Humans are born with the ability to sense the physical sensations of hunger and satiety cues from their bodies and adjust behaviors based on these cues by requesting food, requesting to eat, or stopping eating. Research has shown that humans can

become more or less cognizant of these physiological cues with changes in circumstances. Individuals who start a low calorie diet,<sup>108</sup> fast during Ramadan,<sup>109</sup> or experience long-term starvation<sup>110</sup> reported no longer “feeling” these internal hunger cues after a period of adjustment. At the opposite end of the spectrum, internal hunger cues can be re-calibrated to a new set point using blood glucose levels as a guide by training individuals to be more cognizant of symptoms associated with low blood glucose and to eat only when these arose.<sup>111</sup> In both diabetic and non-diabetic individuals, this training was associated with consumption of fewer calories, weight loss and improved preprandial blood glucose, hemoglobin A<sub>1c</sub>, and glucose tolerance test measures.

People may instinctively believe that feelings of satiety provide cues to stop eating, but research shows that this may not be the only factor, nor the most influential factor.<sup>112,113</sup> In a study by Zylan et al., 64.4% of individuals indicated that they usually stop eating because of fullness when it was listed as one of several multiple choice options, but when not prompted with this option, individuals chose non-internal factors. In this instance only 26% of respondents chose the “other” option in which they wrote fullness.<sup>112</sup> Among obese women (n=78) provided with lengthy lists of reasons eating was initiated or terminated, only 20.3% indicated that hunger was the primary reason for initiation and only 13.5% indicated fullness was the primary reason for termination.<sup>114</sup> This survey was conducted after the completion of a behavior-based weight control program during which participants were informed about the psychology of eating behaviors. Therefore, the extent to which this information increased awareness of the influence of external factors on initiation and termination of food intake is difficult to determine.

As stated by Bilman and colleagues,<sup>106</sup> “snacking behavior is initiated by feelings of hunger, or at least a desire to eat.” There is a growing body of research indicating that hunger/satiety sensations are often inaccurate as reviewed by Ciampolini.<sup>115</sup> Hunger/satiety sensations of physiological origins are subtle and easily overpowered by stronger, more persuasive stimuli, which Lowe and colleagues termed “hedonic hunger.”<sup>116</sup> This type of hunger can be caused by both psychological pressures and environmental stimuli.<sup>117</sup> These non-physiological cues therefore warrant further examination due to their ability to mute physiological cues with or without the realization that it is occurring.

## **Non-physiological (Emotional Hunger)**

The American Psychological Association reports that adults are under increasingly more stress in this country.<sup>118</sup> One of the common ways individuals control stress is by consuming unhealthy foods. Several factors predispose individuals to increased food consumption under stress. These include being female, overweight, and exhibiting a higher degree of restrained eating.<sup>119</sup> Increased consumption of less healthy foods may occur by two mechanisms, the release of glucocorticoids and reliance on habit and emotional cues rather than executive function.<sup>120</sup>

In the short term, stress results in the release of glucose in to the bloodstream via cortisol production; this process makes energy readily available for use during a fight or flight response.<sup>121</sup> Over the long-term though, protracted elevation of cortisol is known to have negative effects, including increased food intake and low-level inflammation, which can cause insulin resistance and deposition of visceral fat.<sup>122</sup> Glucocorticoids, the class of steroids under which cortisol is classified, have been found to promote the differentiation of adipocytes, particularly in visceral fat.<sup>123</sup> Increased food intake is also a known side effect in patients prescribed corticosteroids. Ultimately, regardless of the endogenous or exogenous source, this pattern of increased food intake can result in weight gain. When weight gain occurs under non-stress conditions, the brain increases sensitivity to satiety cues to return the body to its set point; however, with increased cortisol response under stress, the body becomes resistant to the presence of the anorexigenic hormone, leptin, so the satiety cues are not as effective.<sup>122</sup>

Food choice also changes under stress. Multiple studies have shown that individuals under stress are more likely to consume palatable foods that are high in fat and sugar.<sup>117,124,125</sup> Results from an unaided recall of comfort foods mailed to a random selection of households in the U.S. and Canada showed that 60% of preferred comfort foods for respondents 18 years and older were snack-like items (including potato chips, ice cream, cookies, and candy/chocolate).<sup>126</sup> The other 40% were foods that could be considered part of a meal (e.g., pasta/pizza, steak or beef burgers, casseroles, side dishes, vegetables, salads and soups). Investigators used an unaided recall method, meaning that participants were only provided with the definition of a comfort food, which was, “foods that provide a dimension of psychological and physiological comfort when they are consumed”; they then had to write out what foods came to mind. The comfort

foods compiled in the unaided recall served as a foundation for a second study, which sought to examine how preferences for the various comfort foods differed by age and gender. This study found that females preferred more snack-like foods while males preferred more meal-like foods. Additionally, younger individuals preferred snack-like comfort foods while older individuals favored meal-like comfort foods.

In this same study, researchers also explored feelings of guilt and perceived health benefits from consuming each of the snack foods.<sup>126</sup> Compared to males, females did not identify any comfort foods that made them feel healthy. In fact, they experienced the opposite. Females were more likely than males to feel guilty when they consumed ice cream, cookies, chocolate/candy, and casseroles/side dishes. An earlier study by Wansink also concluded that consumption of energy-dense snack foods among females commonly resulted in guilt.<sup>127</sup>

Stress can also cause changes in appetite, which can impact food choices as well. A study at a Midwestern university found that of the female students who experienced a change in appetite, the majority (63%) had an increase in appetite and were more likely to choose sweet foods and mixed dishes than those who experienced no appetite or a decreased appetite.<sup>128</sup> Researchers also concluded that when under stress, students consumed a decreased variety of foods compared to when they were not under stress. Therefore, reactions to stress may be habitual.

Other mechanisms may drive intake of palatable food while under stress. Stress increases dependence on habits and emotional cues as opposed to executive function.<sup>120</sup> Food, in particular high fat and high sugar items, have been found to exhibit an opioid-like effect on the body by dulling the stress response.<sup>129</sup> Just as with opioids, use of food as a soothing tool can easily become a learned habit. A recently published study has suggested that cortisol may alter taste receptors.<sup>130</sup> While this study was performed in rats, taste preferences are ingrained; therefore, further research is required to determine the mechanism for taste preferences in humans.

### **External Influences**

Individuals are often unaware of the various environmental aspects that subconsciously influence food intake.<sup>131–133</sup> The scope of environmental factors that affect food intake is very broad. People may differentiate meals from snacks based on

food and environmental cues.<sup>134</sup> For example, an eating occasion described as being with family, using ceramic dishes and cloth napkins, or lasting more than 30 minutes was more likely to be viewed as a meal rather than a snack. As for food characteristics, foods that were packaged, presented in smaller quantities, or perceived to be less healthy or lower in quality or cost were more likely to be considered snacks than meals.<sup>134</sup> However, Shimizu and colleagues concluded<sup>135</sup> hunger mediated the effect of environmental cues on intake.<sup>135</sup> Those who were hungry ate more and were more satisfied when they perceived the occasion to be a meal rather than a snack (and participants who were not hungry consumed less and were less satisfied with occasions perceived as a meal).<sup>135</sup>

Both observational<sup>136,137</sup> and intervention<sup>138</sup> studies have concluded that the presence of other people at eating occasions increases an individual's food intake. Vartanian and colleagues performed two experiments related to this phenomenon.<sup>131</sup> The first experiment sought to determine perception of the outside environment on intake by having two people eat together. When people responded freely regarding what most influenced their intake, they frequently cited hunger and the amount of time that had passed since their last meal. However, the amount that people ate was more closely correlated to the amount that the other person in the pair ate. The presence of others was only noted as an influence on food intake by 3 of the 122 study participants. Similar results were observed in the second experiment, in which participants chose influential factors from a given list. Individuals were unable to identify external factors that affected their food intake and were more likely to instead identify internal cues, characteristics of the food, and time properties.<sup>131</sup>

Research also supports the idea that the food environment itself affects intake. Wansink found that increasing portion size was positively associated with intake.<sup>133</sup> Kegler examined the home food environments of overweight and obese women and found that both increased fruit and vegetables in the home and increased frequency of shopping for fruits and vegetables were associated with increased intake.<sup>139</sup> Additionally, having a higher number of more unhealthy food items in the home was associated with higher fat intake. In a study by Gorin and colleagues that compared the home environments of normal weight and overweight individuals, multivariable logistic regression showed that individuals with increased number of high-fat spreads and snack

foods as well as a decreased number of fruits and vegetables were more likely to be overweight. All of these became non-significant, with the exception of high-fat spreads and fruits and vegetables after the addition of intake variables – including total calories and percent calories from fat – and physical activity.<sup>140</sup>

Finally, participating in activities while eating, such as watching TV, has been shown to affect intake. Gore and colleagues found that in overweight and obese women watching TV while snacking was associated with increased intake of calories and calories from fat.<sup>141</sup> In Kegler's study, although TV watching was a common activity during both meals and snacks for overweight and obese women, it was not associated with either fruit and vegetable intake or fat intake.<sup>139</sup>

Regardless of the state of hunger/satiety, because hedonic hunger is primed by an abundance of cues in this obesogenic world, environmental cues play a strong role in determining food intake of individuals. Therefore, when studying factors that influence food intake, the motivations behind the occasion must be considered and analyzed. Given the heterogeneous population in which snacking occurs, segmentation analysis may be an ideal tool to explore the large number of motivations that contribute to food intake.

## **Segmentation Analysis**

Segmentation is an analytical tool used in the marketing world to more easily identify consumer characteristics and better respond to consumer needs. It is based on the premise that smaller, more homogeneous segments can be identified within a larger heterogeneous population.<sup>142</sup> Identification of these groups allows for more targeted marketing or, in the case of public health and nutrition, more targeted messages and interventions.<sup>143</sup> Segmentation uses either quantitative surveys or focus groups to determine individuals' characteristics. These characteristics can fall into one of several categories including descriptive or behavioral.<sup>144</sup> For example, individuals might be segmented by the descriptive characteristics such as gender, age, family lifecycle, race/ethnicity, income, occupation, family size, or religion. They could also be segmented by geographic means, including county, region, urban/suburban/rural, population density, city size, or climate.<sup>144</sup> Market researchers use these variables to identify potential product markets.

When using behavioral segmentation, researchers address psychographic variables, including lifestyle, attitude, or other social/psychological variables such as personality and self-image, or they may address needs and benefits variables.<sup>145</sup> For example, a study by Byrd-Bredbenner and colleagues analyzed food choice influencer constructs among 201 mothers of young children.<sup>146</sup> Researchers assessed seven constructs, including outlook on life, health characteristics, food-related activities, interest in learning about meals, food characteristics, eating/food relationships, and family meals. Four distinct clusters were apparent after analysis:

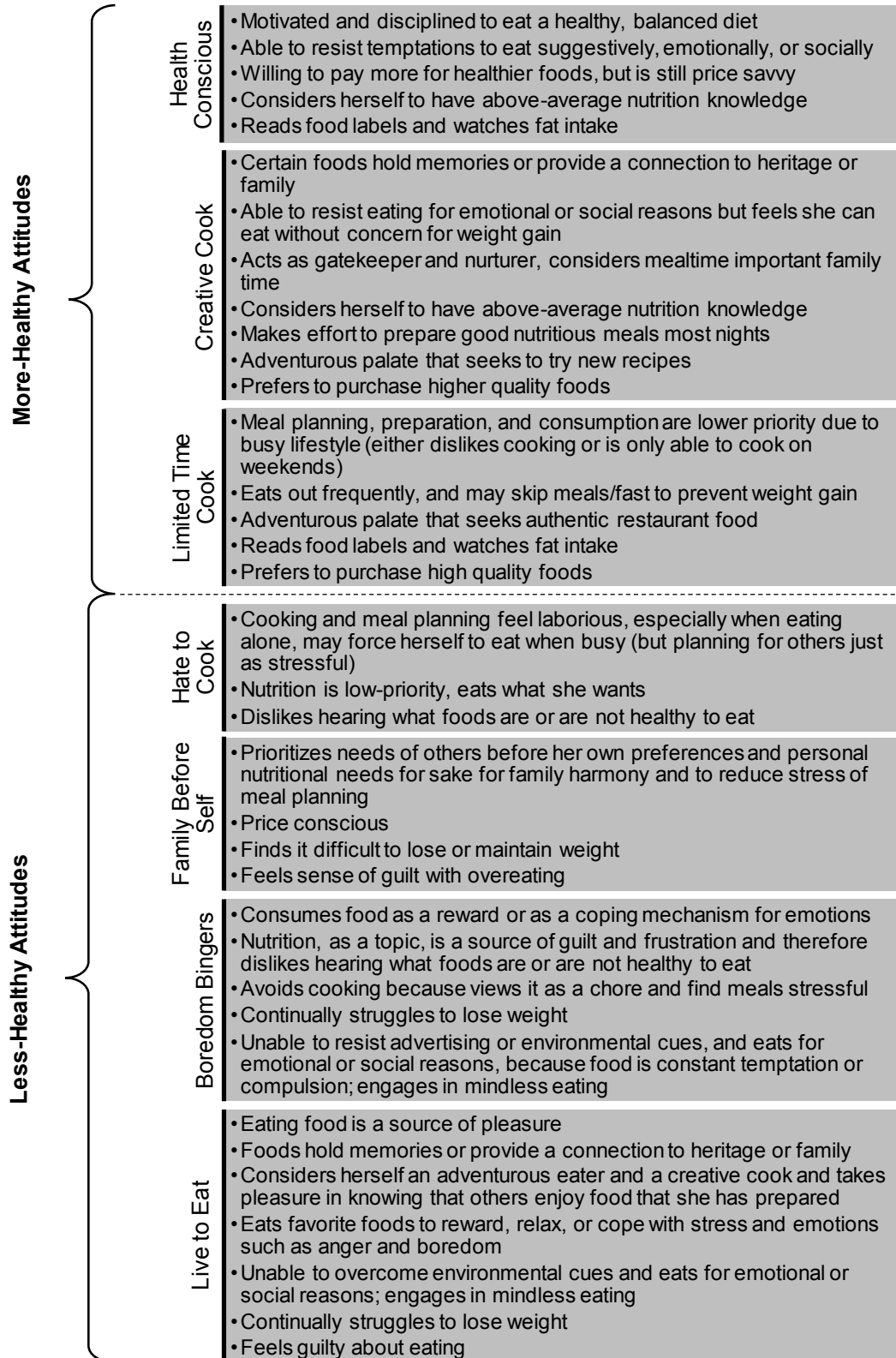
- happy, healthy, food-involved mothers
- working, convenience-driven mothers
- healthy, free of food, price, taste, and advertising effects mothers, and
- stressed, emotional eating, time-conscious mothers.

This cluster analysis identified characteristics that explained nutrient intake, where demographics failed to do so, making this analysis method an important tool that researchers can use to better understand the motivations behind food consumption.<sup>146</sup>

A preliminary study by Sudo et al. tested the concept of attitudinal segmentation to determine the relationship between food attitudes and indicators of obesity among midlife women.<sup>147</sup> Attitudinal statements were created based on themes, including health and nutrition orientation, price and economy orientation, role of cooking, importance of meals, influence of lifestyle, influence of others, personal gratification, personal emotion and experiential desire and variety; these themes developed out of focus group mind mapping exercises and the discussions that followed.<sup>148</sup> Prior to the segmentation, the survey was pretested to ensure test-retest reliability. Cluster analysis identified a five-cluster solution and descriptive names were given to these clusters as follows: concerned about nutrition, creative cooks, busy cooking avoider, guilt-ridden dieters, and impulsive eaters. (A more recent study used the same attitude statement questionnaire and identified a seven-cluster solution.<sup>149</sup> See Figure 1.1 for a description of each of the seven resulting clusters.)



Figure 1.1 Cluster Descriptions



In the study that identified five clusters, researchers determined that indicators of obesity, including BMI, WC, body fat percentage and energy intake varied by cluster. For instance, women classified as impulsive eaters had a BMI significantly higher than all other segments and those concerned about nutrition had a lower BMI than both guilt ridden dieters and impulsive eaters. Additionally, impulsive eaters also had a significantly larger WC and higher percentage of body fat than all other segments. Busy cooking avoiders had significantly higher energy consumption than other segments, with the exception of impulsive eaters. By establishing the existence of a relationship between attitudes toward food and obesity indicators, this research shows that attitudes are yet another factor that differentiates individuals when it comes to food consumption and that attitudes should be considered when developing and implementing tailored interventions.

There are unique applications of segmentation analysis that arise from segmenting individuals based on psychographic characteristics. One study segmented nutrition information usage in Switzerland based on nutrition label usage, sources of nutrition information, health consciousness, and nutrition interest.<sup>150</sup> Researchers identified a four-cluster solution and labeled them: official information users, internet users, moderate users, and uninterested.<sup>150</sup> Based on the differences among these four clusters of individuals, the researchers suggested possible targeted communication methods that would best reach each type of nutrition information user in order to improve healthy eating. Although understanding the psychographic characteristics of an individual as a whole is important in the fields of health and nutrition, even within a single individual, the motivations for eating are not always the same for every eating occasion. Bisogni and colleagues identified eight categories of factors related to eating occasions, including food and drink, physical condition, time, recurrences, location, activities, mental processes and social setting.<sup>54</sup> This is where need state identification plays an important role. The field of marketing defines need states, a form of behavioral segmentation, as internal and external motivators that drive a purchase or consumption choice.<sup>151</sup> The motivations behind food choice and amount of food consumed may be both internal and external as well as rational or emotional. Thus, segmentation of eating occasions based on need states, rather than the individual as a whole, provides an innovative approach to understanding the motivations for consumption of foods and beverages and provides an

opportunity to better tailor health messages and interventions to more homogeneous populations.

Few studies have analyzed need state segmentation of eating occasions. A recent study by Sudo et al. examined eating occasions of midlife women and classified the occasions based on needs women sought to fulfill and benefits they sought to obtain through the eating occasion.<sup>152</sup> Eating occasions differed by time of day, day of week, and individuals present during the eating occasion, as well as nutrient and food group consumption. A woman's snack occasion may be classified as an "indulgent escape" where she seeks a break from the day to have an indulgent treat, and doesn't take into account fat or calorie content of the food she consumes. For these occasions, consumption of both calories and saturated fat was higher. Intake of sweets and calcium-rich foods including dairy was high while fruit and vegetable intake was low. On the other hand, this same woman's dinner occasion may be classified as a "routine family meal" in which she is able to show her love for others and serve foods that her entire family will eat without complaint. At this meal she is likely to put needs and desires of others before her own. Of all needs state occasions, these "routine family meals" were highest in calories, total fat, and cholesterol intake, but fruit and vegetable consumption was also more likely to occur during these occasions than others.

Because needs and desires of individual women may vary from eating occasion to eating occasion and result in different consumption patterns and situational contexts, understanding these needs at the eating occasion level may help to identify differences in eating habits. Understanding needs within eating occasions may also help to individualize education in relation to weight gain prevention and weight maintenance. Because the definition of snacking varies by individual, need state segmentation may be useful to understand this seemingly homogeneous population and to identify key aspects that differentiate healthy snacking from less healthy snacking.

## **Conclusion**

The social construct of snacking is not inherently bad because it means something different to every individual. When approached from this perspective, the evidence for the healthfulness of multiple small meals per day is as valid as the evidence for snacking being harmful and leading to weight gain. Both are valid because it is as

much about the physiological cues and responses as it is the internal psychological motivations and external influences. Thus, the focus of this thesis is to describe these external influences and psychological motivators in women who seek indulgent snacks.

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## **Chapter 2: Characterization of Midlife Women's Indulgent Snacking Occasions**

## **Purpose and Hypothesis**

Women have a tendency to gain weight at midlife, which puts them at risk for chronic diseases. It is important to prevent weight gain in midlife women because prevention is more cost-effective than treatment. Segmenting women by eating occasions allows researchers to better understand situation-based needs and, therefore, create more tailored interventions to address these issues. Although the act of snacking itself may not be problematic, women are susceptible to eating high-fat, high-sugar items to relieve stress. This justifies the need to study women and their eating habits in situational contexts that may lend themselves to increased calorie intake and, as a result, weight gain. The purpose and hypotheses are as follows:

### ***Purpose***

- Explore the demographic characteristics and dietary intake of women who experienced indulgent snacking occasions, as well as the situational characteristics of their particular snacking occasions.

### ***Hypotheses***

Within indulgent escape eating occasions,

- Macro- and micro-nutrient content, as well as food group composition, vary by weight status, with normal weight women displaying healthier consumption characteristics compared to overweight and obese women.
- Demographic and situational characteristics vary by weight status.

This thesis will present methods followed by results, discussion, and implications.

## **Methods**

### ***Study Design***

This study analyzes data collected from midlife women who were part of a larger cross-sectional study which examined needs surrounding eating occasions as well as food attitudes. Both of these components were explored using segmentation analysis.

The current data analysis is based on a study by Perry and colleagues, using segmentation analysis to analyze 5,556 eating occasions from a national sample of

1,663 midlife women (40–60 years).<sup>1</sup> Six distinct situation-based needs based on specific eating occasions were identified and described.<sup>1</sup> Descriptive names were assigned based on the combination of primary needs expressed by the women experiencing the eating occasions: healthy express, comforting interludes, indulgent escapes, nurturing family meals, sensible meals, and fast fueling. Health-oriented eating occasions (healthy express, comforting interludes, and sensible meals) were characterized by lower fat and higher fruit and whole grain intakes, while less-healthy need states (indulgent escapes, fast fueling, and nurturing family meals) were highest in fat intake, and higher in energy, refined grain, and sucrose intakes. The number of less-healthy eating occasions experienced by women was positively associated with BMI. The current study used data only from women who experienced indulgent escape eating occasions that they self-identified as snacks.

### ***Participants and Sampling***

Participant recruitment and survey completion was coordinated by TNS™ Global, a marketing research firm. They maintain a mail panel of 500,000 households with 1.3 million individuals within the U.S. who completed warranty registration cards or subscribed to magazines. From this panel, a nationally representative sample of 8,000 households known to include midlife women (40-60 years) were mailed recruitment letters and consent forms. TNS™ Global created a sample representative of demographic profiles of the U.S. census data<sup>2</sup> across the nine geographic regions of the U.S. metropolitan and micropolitan statistical areas<sup>3</sup> and demographic characteristics including age, race/ethnicity, income, and household size and composition. Prior to data collection, this study was approved by the Human Subjects Protection Committee of the University of Minnesota Institutional Review Board. Participants were compensated monetarily (\$6) by TNS™ Global in return for completing the survey packet.

During the first recruitment block, recruitment letters and consent forms were mailed to 8,000 households, with a response rate of 33.9%. Of the women who expressed interest and were mailed survey packets, 1,634 returned the packet (a 60.2% response rate). In order to increase the study sample size, recruitment letters, consent forms, and survey packets were mailed simultaneously to an additional 1,200 households in a second block of recruitment. Of these women, 292 (24.3%) returned

completed packets. Both recruitment blocks combined yielded 1,926 responses for a total of 7,630 eating occasions.

### ***Data Collection***

The survey packet included general instructions (Appendix A) that asked women to complete a general questionnaire regarding self-reported height and weight, menopause status, physical activity, eating habits, and food attitudes (Appendix B). In addition, four eating occasion questionnaires (EOQ) were included (one each for breakfast, lunch, dinner and snack) (Appendix C) and a food record for one-24 hour period (Appendix D). The general instructions indicated whether women were to complete the food record and corresponding eating occasion questionnaires on either a weekday (Monday-Thursday) or a weekend day (Friday-Sunday). Approximately half (57%) of the returned surveys were those completed on a weekday. All three questionnaires included in the survey packet were pilot tested twice with a total of 120 women prior to this study. Demographic data were obtained from TNS™ Global.

### **General Questionnaire**

The general questionnaire included questions on weight history and current weight and height. A set of previously validated questions ascertained menopause status.<sup>4</sup> Physical activity was assessed using the International Physical Activity Questionnaire (IPAQ) long form, which measures activity in five domains: occupational, transportation, housework and family-related, recreational, and sedentary activity.<sup>5</sup> A set of 13 statements related to weight gain prevention practices were also included in the questionnaire.<sup>6</sup> A single question asked about frequency of restaurant and take-out meals on a weekly basis. Additionally, the previously validated 20-item Weight Efficacy Life-style Questionnaire (WEL) was included to assess self-efficacy in weight management based on sub-scores in five situational factors: negative emotions, availability, social pressure, physical discomfort and positive activities.<sup>7</sup> Finally, statements (n=66) evaluated attitudes about food in general as well as preparation and consumption. Participants were asked to rate their agreement with the attitude statements on a six-point Likert-style scale (from strongly disagree to strongly agree). These statements which were used in a previous segmentation study<sup>8</sup> were developed

from qualitative data and subsequently underwent test-retest evaluation to determine reliability.

### **Eating Occasion Questionnaire**

The eating occasion questionnaire was comprised of 88 need statements and questions regarding the day of the week, time and location of the eating occasion; the amount of time required for preparation, consumption, and clean-up at the eating occasion; the presence of others and engagement in other activities during the occasion; and the amount of time prior to the eating occasion in which the participant decided what she was going to consume. The 88 need statements addressed the needs specific to the eating occasion (“I wanted to...”) and the benefits sought from the foods and beverages consumed during the occasion and addressed topics including taste, convenience, health and comfort (“I wanted something that...”). These statements, which were previously developed<sup>9</sup> and tested in a feasibility study<sup>8</sup>, served as the segmentation variables and were comprised of nine categories of functional needs, including health, convenience, price, portability, nurturance, reward, enjoyment, tradition, and weight concerns. Participants were asked to rate their agreement with the need statements on a six-point, Likert-style scale (from strongly disagree to strongly agree).

### **One-Day Food Record**

The one-day food record contained instructions, based on those previously developed by others<sup>10</sup>, for women to note, immediately after each eating occasion, all foods and beverages and the amount of each consumed. Additionally, women were asked to record the time at which these items were consumed, the type of occasion (breakfast, lunch, dinner, snack), and any preparation methods/recipes. Women also received an 11-minute tutorial DVD on completing the food record to complement the written instructions.

Dietary intake data were collected and analyzed for macro- and micronutrient content using Nutrition Data System for Research (NDSR) software, version 2008, developed by the Nutrition Coordinating Center, University of Minnesota, Minneapolis, MN. Additionally, from the foods identified by the NDSR software, foods groups were created that matched those outlined by the USDA’s MyPyramid program. These included: fruits, vegetables, grains (whole and refined), meats (regular and lean), dairy

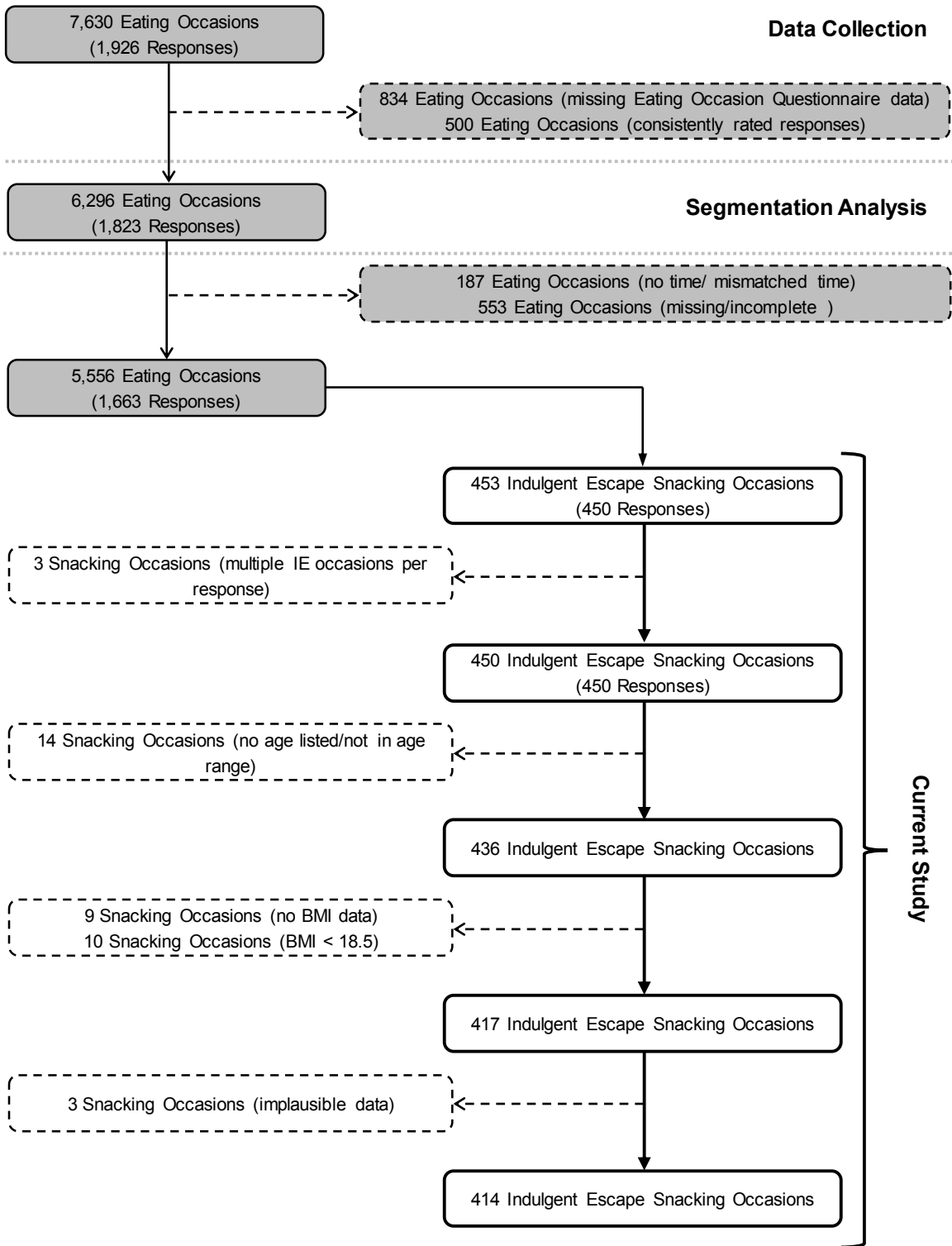
(regular and lean), sweets and fats/oils (regular and lean). Fruit was comprised of citrus and other fruit juices, whole citrus and other whole fruits, and savory fruit snacks. Deep green, dark yellow, and starchy vegetables – as well as tomatoes, legumes, other vegetables, vegetable juice, and savory vegetable snacks – made up the vegetable groups. Both whole and refined grains consisted of breads, rolls, crackers, pasta, cereal, cakes, cookies, pies, snack bars and chips, and popcorn. Meat was divided into regular meat (beef, poultry, fried chicken), and lean meat (lean poultry, fresh and smoked fish, and shellfish). Dairy was also divided into two sub-groups: lean dairy and regular dairy. Lean dairy included reduced-fat, low-fat and fat-free milk, reduced-fat cheese, and low-fat yogurt. Regular dairy was comprised of whole milk, full-fat cheese, pudding, and frozen dairy desserts. Sweets consisted of frozen, non-dairy desserts; chocolate and non-chocolate candy; miscellaneous desserts; and sauces/toppings, including syrup, honey, jams, jellies, preserves, and sweetened sauces (both regular and reduced-fat). Lean fats included reduced-fat cream and margarine, while regular fats consisted of oil, shortening, butter, other animal fats, regular salad dressing, cream, and margarine.

Beverages were categorized into alcoholic and non-alcoholic beverages. Non-alcoholic beverages were further defined to include regular, sweetened beverages (sweetened soft drinks and fruit drinks, and sweetened tea); unsweetened beverages (plain water, unsweetened coffee and tea); and diet beverages (artificially sweetened soft drinks, fruit drinks, and tea). Of note, for this study, only NDSR-identified foods that were consumed by the women in this study were placed into food groups. Thus, some foods may not be represented in the groupings.

### ***Sampling Methods of Current Study***

The current study used data from the general questionnaire and the relevant information from the food record only from women who experienced indulgent escape eating occasions that they self-identified as snacks. Because this research involves secondary analysis, data were previously cleaned post-collection and prior to segmentation analysis resulting in the exclusion of 834 eating occasions due to missing Eating Occasion Questionnaire data, and 500 eating occasions due to consistently rated responses. Refer to Figure 2.1 for a graphical illustration of exclusions. Post-segmentation analysis, an additional 187 eating occasions were discarded when they

Figure 2.1 Data exclusion flow chart





did not have times or could not be matched with a corresponding time on a food record. Another 553 eating occasions were excluded for missing food record data, leaving 5,556 occasions.

Of the 5,556 eating occasions analyzed in the previous study, 860 were identified as “Indulgent Escapes”. These eating occasions can be characterized as indulgent treats or rewards that focus on the taste experience and provide sensory gratification and emotional relief. Women experiencing these occasions sought food that satisfied their cravings, was readily available, easy to eat, and may have provided a nostalgic connection. The majority (52.7% or n=453) of these “Indulgent Escapes” were classified by participants as snacks. Several women (n=3) reported more than one indulgent escape occasions. Only those that corresponded to the exact time on the EOQ were included (n=450). Of the 450 women remaining, 14 reported their age to be less than or greater than 40-60 years and were thus excluded, leaving 436.

This study focused on further examining the characteristics of “Indulgent Escape” snacking occasions to determine if they differed by weight status (normal weight, overweight, or obese). BMI values of 18.5-24.9, 25.0-29.9, and  $\geq 30$  kg/m<sup>2</sup> were used as criteria for normal weight, overweight, and obese categories, respectively. Women who reported BMI less than 18.5 were excluded from the analysis (n=10). An additional nine eating occasion records were removed for lack of BMI data. Once all of the indulgent escape snacking occasions were identified, an additional three eating occasions were excluded, one because of an illegible food record, another because daily totals and some food amounts were implausible, and a third because it had no nutrient or food group data.

### ***Data Analysis***

SAS Enterprise Guide 5.1 was used for all data analyses (SAS Institute Inc., © 2012, Cary, NC, USA). As this analysis was exploratory in nature, no a priori power calculations were made. Differences across weight status categories were determined using analysis of variance (ANOVA) and Duncan’s Multiple Range test or the chi-square test, as appropriate. Where univariate analysis indicated that data were skewed, the Mann-Whitney test, also known as the Wilcoxon Rank Sum Test, was used along with the Kruskal-Wallis procedure to compare continuous variables between weight status

groups. A significance level of 0.05 was used for all analyses and Bonferroni adjustments were made for all post-hoc multiple comparisons. Any p-values explicitly stated in the results section and tables are those that were determined prior performing post-hoc multiple comparisons. Estimated resting energy expenditure (REE) was calculated using the Mifflin-St. Jeor equation.<sup>11</sup> The REE: Intake ratio was calculated by dividing the REE by total energy intake for the day.

## Results

### *Demographic and Physical Characteristics*

Demographic characteristics of the analytic sample as a whole and by weight status are presented in Table 2.1. The mean age of all women was 49.1 years. The majority of women were white (83.3%), not of Spanish origin (88.4%), and currently married (75.1%). Less than half had completed a bachelor's or post-graduate degree (43.5%), whereas more than half worked full time (57.5%) and earned an income of greater than \$75,000 per year (50.2%). Additionally, 19.3% of women worked part-time, while 23.2% were either retired or did not work. About one third lived in a household with two individuals (32.9%) compared to only 8.5% who lived alone and 58.7% who lived in a household with three or more individuals. Overweight and obese women were slightly older than normal weight women ( $p < 0.015$ ). A higher proportion of African American women were likely to be obese compared to those who were white or Asian/Pacific Islanders ( $p < 0.016$ ). Compared to their normal weight counterparts, more obese and overweight women were more likely to be less educated ( $p < 0.033$ ) and have a lower income ( $p < 0.019$ ). No differences in weight status were observed by marital status, Spanish origin, employment status, or household size (data not shown).

Table 2.2 presents information on the physical characteristics of the research sample. The mean weight of the women was 175 lb and mean BMI placed the group at the upper range of the overweight category (BMI = 29.4). As expected, weight and BMI were significantly different by weight status (both  $p < 0.0001$ ), with overweight women having higher weight and BMI than normal weight women and obese women having a higher weight and BMI than both overweight and normal weight women. The mean reported weight change from two years ago and five years ago was 0.78 lb and 5.6 lb, respectively. Overweight and obese women both gained significantly more weight than

normal weight women from two years prior to the start of the study ( $p < 0.001$ ), while a five year weight history showed that obese women gained more than both normal- and overweight women over that time period ( $p < 0.003$ ). The majority of women were premenopausal (53.4%); significantly more premenopausal women were normal weight than obese ( $p < 0.020$ ). Physical activity level did not differ significantly among weight status groups ( $p = 0.289$ ), though, of note, only about 60% of the women had valid physical activity data.

### ***Energy, Food Group and Nutrient Intakes***

The mean energy content of an indulgent snack was 288 kcal, with 12.7 g of fat, 39.5 g of carbohydrates and 5.3 g of protein (Table 2.3). A common trend seen in composition of snacks was that overweight women's snacks contained significantly less total energy ( $p < 0.001$ ), total fat ( $p < 0.0001$ ), total carbohydrate ( $p < 0.018$ ) and sugar ( $p < 0.039$ ) than normal weight and obese women (Table 2.3). Additionally, overweight women consumed significantly less cholesterol ( $p < 0.012$ ), saturated fat ( $p < 0.004$ ), and added sugar ( $p < 0.032$ ) than obese women; however, intake by normal weight women was not significantly different than overweight or obese women. Overweight women consumed significantly less protein than normal weight women but obese women's protein intake did not differ significantly from normal or overweight women ( $p < 0.009$ ).

Micronutrient intake (Table 2.4) was observed to differ by weight status with overweight women consuming significantly less sodium than obese women ( $p < 0.014$ ). The mean sodium intake for all women was 207 mg. Additionally, the mean calcium intake for the group as a whole was 104 mg, with normal weight women consuming significantly more calcium than overweight women ( $p < 0.037$ ). Potassium and Vitamin D intakes did not differ among weight status groups ( $p = 0.060$  and  $p = 0.212$ , respectively).

Table 2.5 illustrates the macro-and micronutrient composition of indulgent escape snacks as a portion of total daily intake. As a whole, from their indulgent snack, women consumed 18%, 24%, and 35% of their day's saturated fat, sugar and added sugar, respectively. As a percentage of daily intake, both energy and total fat consumption followed the same pattern as was seen with the snack alone. The percentage of total calories and fat consumed by overweight women as a part of their snack was significantly less than normal weight and obese women ( $p < 0.011$  and

$p < 0.008$ , respectively), whereas intake by normal and obese women was not significantly different. Saturated fat consumption followed a similar trend, except that the percent of daily intake by normal weight and overweight women was not significantly different ( $p < 0.034$ ). Indulgent escape eating occasions accounted for an average of 12% of daily cholesterol intake and 17% of total carbohydrate intake, but did not differ significantly among weight status groups ( $p = 0.084$  and  $p = 0.086$ , respectively). Percent of daily intake of sodium was significantly lower for overweight women compared to normal weight and obese women, and for normal weight women compared to obese women ( $p < 0.012$ ). Overweight women also consumed a significantly smaller percentage of their daily protein from indulgent escape occasion snacks than their normal weight counterparts ( $p < 0.012$ ). Additionally, as expected, estimated energy requirements (EER) calculated by Mifflin-St. Jeor were significantly different among all weight status groups ( $p < 0.0001$ ). Interestingly, when the ratio of EER to intake was calculated, normal weight women had a mean ratio significantly higher than both overweight and obese women ( $p < 0.0001$ ).

Food group composition of indulgent escape eating occasions did not differ significantly among weight status groups (Table 2.6). Few women were eating fruits, vegetables, meats, or fats and oils; these indulgent snacks consisted mostly of grains, dairy, and sweets. Women consumed mostly regular dairy (0.35 servings) compared to lean dairy (0.10 servings), and, of the 0.65 servings of grains, 0.35 were refined grains and 0.25 servings were whole grains.

Beverage intake for all women was comprised of mostly unsweetened beverages (0.50 servings) and alcoholic beverages accounted for a small fraction of beverages consumed (Table 2.7). The consumption of unsweetened beverages and diet beverages was not significantly different ( $p = 0.066$  and  $p = 0.085$ , respectively) by weight status and no other beverage consumption differed significantly among weight status groups.

### ***Attitude Clusters***

Table 2.8 illustrates the results of the attitude clustering for women who experienced indulgent escapes snacking occasions. The majority of women (52.4%) were assigned to one of three clusters named “Boredom Binger,” “Family before Self” or “Live to Eat,” all of which are considered to be less healthy attitudes towards food. A chi-

square test showed that cluster assignment varied significantly ( $p < 0.0001$ ) by weight status with a greater percentage of obese women likely to display less-healthy attitudes towards foods (such as “Boredom Binger” or “Live to Eat”) and more normal weight women likely to express healthier attitudes towards food (including “Creative Cook” and “Health Conscious”).

### ***Contextual Variables***

Contextual variables related to the snacking occasion (Table 2.9), which included preparation, consumption, and clean-up time as well as whether other individuals were present during the snack did not differ significantly among weight status groups. For these occasions, more women spent either no time (62.3%) or less than 5 minutes (26.8%) preparing the snack. For many women, the snack was consumed in either less than 5 minutes (32.9%) or between 5-10 minutes (30.4%). Clean up time for 93.7% of women was under 5 minutes. Most women (79.7%) decided what they were going to eat immediately prior to consumption, whereas only 15.7% decided a few hours or more (up to two days) prior to the occasion or indicated that someone else decided for them (4.7%) (data not shown). The majority of women (54.6%) indulged in their snack occasion alone, rather than in the company of others. About half (47.7%) of the indulgent snacking occasions occurred while women were watching television, compared to only 7.8% of the snacking occasions which occurred while women did nothing else (Table 2.10). Other activities performed while snacking included using the computer (11.6%) or working (10.7%). The number of women who reported watching television during a snack was not significantly different ( $p = 0.073$ ) by weight status. The number of women who performed no other activities while snacking was not different among weight status groups.

### ***Weight-gain Prevention Practices and Weight Loss Self-efficacy***

Table 2.11 presents information on the weight-gain prevention practices of women experiencing indulgent escape eating occasions. The most common practices were exercise, cutting down on meal size or between-meal snacks, and cutting down on fats and/or sugars, with greater than 84.8% reportedly using these practices. While obese women were significantly more likely to have tried commercial weight loss programs than both normal weight and overweight women ( $p < 0.0001$ ), both obese and

overweight women were more likely to have tried meal replacement or slimming products ( $p < 0.0001$ ), and supplements to burn fat or boost metabolism ( $p < 0.001$ ) than normal weight women. Compared to obese women, significantly fewer normal weight women had tried eating more protein ( $p < 0.001$ ), skipping meals ( $p < 0.0001$ ) or cutting down on meal size or between-meal snacks ( $p < 0.006$ ). The number of women who reported using supplements to feel full or exercise as weight-gain prevention practices was not significantly different ( $p = 0.072$  and  $p = 0.081$ , respectively) by weight status and no other weight-gain prevention practices attempts differed significantly among weight status groups. Although the number of weight-gain prevention strategies attempted in the past 12 months did not differ significantly among weight status groups ( $p = 0.511$ ), obese and overweight women had tried significantly more practices overall ( $p < 0.0001$ ) and in the period of time greater than 12 months prior to data collection ( $p < 0.001$ ) (Table 2.12).

Table 2.13 shows total and subcategory scores for the Weight Efficacy Life-style (WEL) Questionnaire. The mean total WEL score for all women was 5.96. Both normal and overweight women had significantly higher overall WEL scores than obese women ( $p < 0.0001$ ). On average, for the subcategories, women rated themselves as more confident on “physical discomfort” and “positive activities” than they did on “availability”. “Availability” was the only sub-score where all three weight status groups had different scores ( $p < 0.0001$ ). Both normal weight and overweight women had significantly higher “negative emotions” sub-scores than obese women, but they were not significantly different from each other ( $p < 0.0001$ ). Although the “social pressure” sub-score was significantly higher for normal weight women than for overweight and obese women ( $p < 0.0001$ ), the “positive activities” score for normal weight women was only significantly higher than obese women ( $p < 0.019$ ). The “physical discomfort” sub-score did not differ significantly among weight status groups ( $p = 0.060$ ).

## **Discussion**

The objective of this study was to examine demographic and personal characteristics, attitudes towards food, and dietary intake of women experiencing indulgent snacking occasions, as well as situational characteristics of these occasions; these data were also analyzed for differences by weight status. The study found that

although macro- and micro-nutrient intakes and food attitudes varied by weight status, food group intakes and snacking occasion characteristics did not.

Findings regarding the nutrient content of indulgent escape snacks were similar to findings from other studies,<sup>12-14</sup> showing that snacks provide a higher percentage of calories from carbohydrates than from fat and protein. More in-depth comparisons between this study and others are difficult to make because of definitional and methodological differences as reviewed by Johnson and Anderson (2010) and Miller et al. (2013).<sup>15,16</sup> Comparing the results from the current study with others is also problematic as other studies examined all snacks consumed over a 24-hour period. The current study focused on a specific occasion identified by participants as a snack that was segmented as an indulgent escape occasion. Although participants may have consumed more than one snack, they only completed one eating occasion questionnaire for a snack they consumed during the 24-hour period where they recorded food intake.

The indulgent snack contributed 18% and 35% of total saturated fat and added sugar intake, respectively, for the day. This overall pattern of high-fat and high-sugar intake during indulgent snacks is consistent with the current research about stress eating.<sup>17-19</sup> Individuals with a tendency for stress eating tend to consume foods high in fat and sugar. The total energy intake from the indulgent snack for all women (288 kcal) was consistent with a large portion of an indulgent food (1 cup of ice cream or 1 large glazed donut). However, the actual foods and beverages consumed at these snack occasions were not identified in the current study.

Considering the Recommended Daily Allowances established by the Institute of Medicine and the 2010 Dietary Guidelines for Americans, on average, these indulgent escape snacks provided a good source of calcium (> 10% RDA),<sup>20</sup> but did not contribute significantly to the intake of other micronutrients. This is consistent with the literature indicating that snacks do not add significantly to micronutrient intake, compared to the calorie intake.<sup>13,21</sup>

Among all women, the most popular indulgent snack food groups were grains, dairy, and sweets. In a broad sense, this is similar to what Wansink et al.<sup>22</sup> reported as commonly consumed comfort foods and what Hampl et al.<sup>23</sup> and Ovaskainen and colleagues<sup>21</sup> reported as popular snack foods. However, this comparison is limited by the different food group classification methods used in each study and the lack of

knowledge of specific foods consumed by women in the current study. The lack of differences between weight status groups may also be explained in part by the results of the Hampl et al.<sup>23</sup> study in which the top snacks, coffee, soda, diet soda, apple, banana, unsweetened tea, whole milk, 2% milk, and regular (non-chocolate) ice cream, made up only 23% of total snacks consumed by the study population. The remaining 77% consisted of numerous infrequently reported food and beverage items, indicating that definitions of snacking and preferences for snack foods are highly dependent on the individual.

While none of the literature reviewed analyzed differences in snacking habits by weight status, for the current study, macro- and micro-nutrient content as well as food group composition was expected to vary by weight status with normal weight women displaying healthier consumption characteristics compared to overweight and obese women. However, a comparison of intake between weight status groups failed to yield either reasonable or significant differences. Nutrient intake by overweight women was often significantly less than that of normal weight and obese women, whose intakes did not differ significantly from each other. Significant differences in intakes of food groups were also not observed by weight status. The lack of significance and lack of a plausible explanation of the differences in intakes between groups may stem from the phenomenon of underreporting. Underreporting food/energy intake is particularly relevant to this study population for a number of reasons. First, women underreport their food intake more often than men.<sup>24</sup> Studies have also shown that overweight and obese individuals are more likely to underreport consumption of high-fat, high-sugar foods.<sup>24</sup> Finally, underreporting is particularly prevalent for snacking occasions,<sup>25,26</sup> with entire snacking occasions often being omitted, not just reporting smaller amounts than actually consumed.<sup>27</sup> While some studies have identified the percentage of under-reporters and some have omitted data from these individuals, such analysis was beyond the scope of the current study. A large portion of the data would have been excluded because of underreporting, but the potential effect that underreporting might have on study outcomes needs to be considered in the interpretation of results.

While 62% of occasions took “no time” to prepare, the implications that can be drawn from this finding are limited because both healthy foods (i.e. a banana) and less healthy foods (i.e. a bag of chips) require no preparation time. Additionally, 93% of



women indicated that clean-up of their indulgent snack took less than five minutes. These results are similar to findings from both Bava et al. and the NPD Group suggesting that consumers choose convenience and processed foods requiring little preparation and clean-up time due to time constraints.<sup>28,29</sup> The amount of time spent on snack preparation brings up an additional issue to consider. Despite the fact that many women now hold jobs outside of the home, women continue to be the primary individual obtaining and preparing food for the household.<sup>28</sup> Wansink et al. posited that women may prefer comfort foods that require little to no preparation and clean-up because they continue to be tasked with this job and, therefore, do not view cooked meals as a comfort food or stress reliever.<sup>22</sup>

Only 7.8% of all participants were not involved in other activities while consuming their snack. This is consistent with the needs that women were seeking to satisfy with these snacking occasions. Women were looking for an escape from the stresses of life and were unconcerned with calorie intake. Other studies have reported that snacking while watching TV results in increased intake with increasing weight status.<sup>30,31</sup> In a study of 76 women, Gore and colleagues found that watching TV while snacking was associated with increased intake of calories and calories from fat.<sup>30</sup> In the current study, women were looking for a distraction from their day and it is likely that TV watching and other activities not only provided distraction from this but may have also distracted them from their calorie intake.

As the intake of this population in the current study aligns with the scientific community's understanding of preferred foods for snacking<sup>14,21,23,32</sup> and eating under stress,<sup>17-19</sup> attention must be turned to the characteristics that differentiate the indulgent escape occasions in normal weight women from those in overweight and obese women. Analysis of attitudinal and weight-gain prevention self-efficacy differences between weight status groupings has yielded more conclusive data.

In the current study, normal weight women were more likely to express healthier attitudes toward food, compared to overweight and obese women who were more likely to display less healthy attitudes toward food. A large part of the description of these attitudinal clusters revolved around the issue of being able to resist (or in the case of the less healthy attitudes, not resist) environmental and social cues that make food a constant temptation. (See Figure 1.1 on page 32 for descriptions of attitude clusters.)

These descriptions highlight restrained eating tendencies. Indeed, research as reviewed by Lowe et al., has shown that restrained eating habits likely arise out of an individual's increased sensitivity to the obesogenic environment.<sup>33</sup> Obese and overweight women in the current study had tried significantly more weight loss strategies overall than normal weight women. In addition, obese women scored significantly lower than normal and overweight women on the Weight Efficacy Life-style (WEL) Questionnaire. Together, these results indicate that individuals who are more prone to dieting may be less able to resist the prominence of the obesogenic environment around them. The normal weight women in the current study, because they are more resistant to the cues in this environment, may be able to maintain their weight with less dieting.

### ***Limitations***

There are several limitations to this study. First, the definition of snacking used in this analysis was based on participants' definitions of snacking, which may vary from person to person. However, the previous cluster analysis<sup>1</sup> may have reduced some of the potential individual variation in definitions given that it identified the motivations of this group of women. Additionally, use of a single one-day food record may have affected estimates of actual intake at the individual level as snacking occasions for individuals may vary from one day to the next and may not represent a "typical" day. Finally, this was a cross-sectional study and therefore the results cannot show a causal relationship between weight status and snacking.

### ***Implications for Practice***

This research has implications across all disciplines of healthcare. Snacking is unlikely a homeostatic response to a calorie deficit and stress eating is similar in that it is driven by psychological and external motivators. Individuals are hardwired to consume high-fat and high-sugar foods under stress. Additionally, research has shown that individuals may resort to old habits during times of stress, particularly those who are sensitive to the obesogenic environment. Fruit and vegetable intakes for all women during the indulgent snack occasions in the current study were lower than grain and dairy intakes. Health promotion efforts could focus on changing the make-up of indulgent escape occasions to focus more on fruits and vegetables, because they are low in energy density and can be portable and convenient, and less on grains and dairy foods.

However, shifting the focus to coaching individuals to modify their food environment, be mindful of portion size and motivations for eating, and seek alternative methods to relieve stress may be a more successful approach when advising midlife women on weight status issues.

For instance, health care practitioners could counsel women to be mindful of their motivations for snacks and also their portion sizes for these occasions. In a controlled intervention, young adults were better able to control calorie intake from a chocolate cookie snack, when hungry, after a mindfulness exercise compared to control participants.<sup>34</sup> Mindfulness implies that individuals focus on the food versus other distractions while eating. Because only 7.8% of all women in the current study were only eating during these occasions, an emphasis on avoiding distractions while eating is warranted.

Much of the research<sup>35-37</sup> shows that simply changing the environment can help individuals to eat less. Therefore, keeping indulgent snacking foods out of sight while putting fruits and vegetables within arm's reach at home may help to promote healthier snack intake. Healthcare practitioners need to be able to recognize stress and possible stress-related eating and advise women to identify alternative methods to relieve stress that do not adversely affect diet quality or weight status.

### ***Implications for Future Research***

Future research should be designed as a prospective study with a minimum of two days of data collection at each time point. In addition to the analysis of food group, and macro- and micronutrient intakes, identification of the actual foods and beverages consumed by these women during their snacking occasions would be helpful. Collecting complete physical activity data from participants would be helpful in determining if this factor affects snacking habits. The use of a validated restraint questionnaire would also be ideal for identifying associations between restraint and indulgent snacking habits.

Another issue that should be considered is how adherence to social norms affects women's consumption of indulgent snacks. As Wansink et al. found in multiple studies,<sup>22,38</sup> consumption of comfort food among women is often accompanied by feelings of guilt. In the current study, the majority of women consumed their indulgent snacks alone and at home. Understanding the reason behind women's decision to

partake in these occasions alone and at home would provide a better understanding of the occasions as a whole.

Finally, a larger study population would help to account for a potentially high proportion of under-reporters given the study population. By providing large sample sizes in each weight status group, data from under-reporters in all groups could be analyzed separately from that of participants who did not under-report. These two analyses could then be compared to determine if underreporting makes a difference in intake and other factors measured in the current study.

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Table 2.1 Demographic characteristics of all participants and classified by weight status

Demographic variables	All Mean ( $\pm$ SD) n = 414	Normal Weight Mean ( $\pm$ SD) n = 147	Overweight Mean ( $\pm$ SD) n = 103	Obese Mean ( $\pm$ SD) n = 164	Overall p-value <sup>†</sup>
Age	49.1 (5.6)	48.0 (5.3) <sup>a</sup>	49.5 (5.7) <sup>b</sup>	49.8 (5.6) <sup>b</sup>	0.015
	n (%)	n (%)	n (%)	n (%)	Overall p-value*
Marital Status					0.611
Now Married	311 (75.1)	117 (37.6)	75 (24.2)	119 (28.7)	
Never Married	44 (10.6)	13 (27.3)	13 (29.6)	19 (43.2)	
Divorced, Widowed, Separated	59 (14.3)	18 (30.5)	15 (25.4)	26 (44.1)	
Race					0.016
White	345 (83.3)	126 (36.5)	83 (24.1)	136 (39.4)	
Black/African-American	40 (9.7)	8 (20.0)	12 (30.0)	20 (50.0)	
Asian or Pacific Islander	19 (4.6)	12 (63.2)	5 (26.3)	2 (10.5)	
American Indian, Aleut Eskimo	3 (0.7)	0 (0.0)	2 (66.7)	1 (33.3)	
Other	7 (1.7)	1 (14.3)	1 (14.3)	5 (71.4)	
Spanish Origin					0.147
Yes	48 (11.6)	11 (22.9)	15 (32.0)	22 (45.8)	
No	366 (88.4)	136 (32.9)	88 (21.3)	142 (34.3)	

Table 2.1 Demographics of all participants and classified by weight status (continued)

Demographic variables	All n (%) n = 414	Normal Weight n (%) n = 147	Overweight n (%) n = 103	Obese n (%) n = 164	Overall p-value*
Highest Education Level Attained					0.033
Some or Graduated High School	77 (18.7)	25 (32.5)	20 (26.0)	32 (41.6)	
Some College	97 (23.6)	25 (25.8)	23 (23.7)	49 (50.5)	
Associate's Degree	58 (14.1)	17 (29.3)	13 (22.4)	28 (28.3)	
Bachelor's Degree	116 (28.2)	51(44.0)	31 (26.7)	34 (29.3)	
Post Graduate Degree	63 (15.3)	29 (46.0)	15 (23.8)	19 (30.2)	
Income					0.019
< \$30,000	66 (15.9)	16 (24.2)	15 (22.7)	35 (53.0)	
\$30,000-\$49,999	55 (13.3)	16 (29.1)	13 (23.6)	26 (47.3)	
\$50,000-\$74,999	87 (20.5)	25 (29.4)	23 (27.1)	37 (43.5)	
≥\$75,000	208 (50.2)	90 (43.3)	52 (25.0)	66 (31.7)	
SD = Standard Deviation    Normal Weight BMI = 18.5-24.9 kg/m <sup>2</sup> Overweight BMI = 25.0-29.9 kg/m <sup>2</sup> Obese BMI = ≥ 30 kg/m <sup>2</sup> Where n does not equal the total n for individual weight status, data are missing. † Where superscript letters are different in the same row, means are significantly different according to ANOVA and Duncan's Multiple Range Test. (p < 0.05) * P-value according to Chi Square test (p < 0.05)					

Table 2.2 Physical characteristics by weight status

Physical variables	All Mean ( $\pm$ SD) n = 414	Normal Weight Mean ( $\pm$ SD) n = 147	Overweight Mean ( $\pm$ SD) n = 103	Obese Mean ( $\pm$ SD) n = 164	Overall p-value <sup>†</sup>
Weight (lb) <sup>‡</sup>	174 (48)	132 (15) <sup>a</sup>	163 (18) <sup>b</sup>	219 (43) <sup>c</sup>	<0.0001
Weight change from 2 yrs ago (lb) <sup>‡</sup>	0.78 (22.4)	-3.13 (15.1) <sup>a</sup>	0.75 (21.7) <sup>b</sup>	4.31 (27.4) <sup>b</sup>	0.001
Weight change from 5 yrs ago (lb)	5.6 (27.0)	0.83 (15.4) <sup>a</sup>	3.57 (25.3) <sup>a</sup>	11.2 (34.5) <sup>b</sup>	0.003
BMI (kg/m <sup>2</sup> ) <sup>‡</sup>	29.4 (7.9)	22.2 (1.7) <sup>a</sup>	27.3 (1.4) <sup>b</sup>	37.1 (6.7) <sup>c</sup>	<0.0001
	<b>n (%)</b>	<b>n (%)</b>	<b>n (%)</b>	<b>n (%)</b>	<b>Overall p-value*</b>
Menopause Status					0.020
Pre-menopausal	221 (53.4)	92 (41.6)	49 (22.2)	80 (36.2)	
Post-menopausal	193 (46.6)	55 (28.5)	54 (28.0)	84 (43.5)	
Physical Activity Level					0.289
Low	43 (16.0)	11 (25.6)	11 (25.6)	21 (48.8)	
Normal	109 (40.7)	45 (41.3)	27 (24.8)	37 (33.9)	
High	116 (43.3)	36 (31.0)	30 (25.9)	50 (43.1)	
SD = Standard Deviation    Normal Weight BMI = 18.5-24.9 kg/m <sup>2</sup> Overweight BMI = 25.0-29.9 kg/m <sup>2</sup> Obese BMI = $\geq$ 30 kg/m <sup>2</sup> Where n does not equal the total n for individual weight status, data are missing. <sup>†</sup> Where superscript letters are different in the same row, means are significantly different according to ANOVA and Duncan's Multiple Range Test. (p < 0.05) <sup>‡</sup> Univariate analysis indicated skewed data, thus Wilcoxon Rank Sum Test with Kruskal-Wallis procedure was used to determine statistical significance (p < 0.05), where superscript letters are different in the same row, ranks are different according to post-hoc analysis with Bonferroni correction. * P-value according to Chi Square test (p < 0.05)					

**Table 2.3** Macronutrient composition of indulgent escape snacks by weight status

	<b>All Mean (± SD) n = 414</b>	<b>Normal Weight Mean (± SD) n = 147</b>	<b>Overweight Mean (± SD) n = 103</b>	<b>Obese Mean (± SD) n = 164</b>	<b>Overall p-value</b>
Energy (kcal) ‡	288 (210)	309 (235) <sup>a</sup>	230 (178) <sup>b</sup>	305 (199) <sup>a</sup>	0.001
Energy density (kcal/g) ‡	1.88 (1.77)	1.91 (1.87)	1.74 (1.79)	1.94 (1.68)	0.259
Total fat (g) ‡	12.7 (11.8)	14.0 (13.3) <sup>a</sup>	9.0 (9.8) <sup>b</sup>	14.0 (11.0) <sup>a</sup>	<0.0001
Cholesterol (mg) ‡	26.9 (34.3)	27.0 (33.7) <sup>ab</sup>	20.9 (40.6) <sup>a</sup>	30.0 (30.6) <sup>b</sup>	0.012
Saturated fat (g) ‡	5.2 (5.5)	5.7 (6.7) <sup>ab</sup>	3.78 (4.27) <sup>a</sup>	5.7 (4.91) <sup>b</sup>	0.004
Trans fat (g) ‡	0.92 (1.83)	0.82 (1.51)	1.02 (2.59)	0.94 (1.52)	0.126
Total carbohydrate (g) ‡	39.5 (32.6)	42.0 (34.3) <sup>a</sup>	32.4 (24.6) <sup>b</sup>	41.7 (34.8) <sup>a</sup>	0.018
Sugar (g) ‡	25.9 (27.3)	28.3 (29.2) <sup>a</sup>	20.1 (19.0) <sup>b</sup>	27.4 (29.4) <sup>a</sup>	0.039
Dietary fiber (g) ‡	2.16 (2.71)	2.48 (3.36)	1.97 (2.83)	1.99 (1.80)	0.128
Added sugar (g) ‡	27.8 (28.5)	28.4 (27.5) <sup>ab</sup>	21.4 (16.6) <sup>a</sup>	31.1 (34.1) <sup>b</sup>	0.032
Total protein (g) ‡	5.3 (5.8)	5.6 (5.5) <sup>a</sup>	4.27 (4.79) <sup>b</sup>	5.5 (6.4) <sup>ab</sup>	0.009
Total alcohol (g) ‡	8.2 (17.0)	6.5 (15.5)	21.6 (26.9)	3.77 (6.91)	0.486

SD = Standard Deviation Normal Weight BMI = 18.5-24.9 kg/m<sup>2</sup> Overweight BMI = 25.0-29.9 kg/m<sup>2</sup> Obese BMI = ≥ 30 kg/m<sup>2</sup>

‡Univariate analysis indicated skewed data, thus Wilcoxon Rank Sum Test with Kruskal-Wallis procedure was used in place of ANOVA to determine statistical significance (p < 0.05), where superscript letters are different in the same row, ranks are different according to post-hoc analysis with Bonferroni correction.

**Table 2.4 Micronutrient composition of indulgent escape snacks by weight status**

	<b>All Mean (± SD) n = 414</b>	<b>Normal Weight Mean (± SD) n = 147</b>	<b>Overweight Mean (± SD) n = 103</b>	<b>Obese Mean (± SD) n = 164</b>	<b>Overall p-value</b>
Sodium (mg) ‡	207 (248)	184 (173) <sup>ab</sup>	175 (254) <sup>a</sup>	248 (294) <sup>b</sup>	0.014
Potassium (mg) ‡	246 (257)	290 (317)	223 (249)	220 (191)	0.060
Calcium (mg) ‡	104 (141)	114 (127) <sup>a</sup>	87.0 (144) <sup>b</sup>	105 (151) <sup>ab</sup>	0.037
Vitamin D [Calciferol] (mcg) ‡	0.78 (1.08)	0.92 (1.08)	0.71 (1.14)	0.69 (1.04)	0.212
SD = Standard Deviation    Normal Weight BMI = 18.5-24.9 kg/m <sup>2</sup> Overweight BMI = 25.0-29.9 kg/m <sup>2</sup> Obese BMI = ≥ 30 kg/m <sup>2</sup> ‡Univariate analysis indicated skewed data, thus Wilcoxon Rank Sum Test with Kruskal-Wallis procedure was used in place of ANOVA to determine statistical significance (p < 0.05), where superscript letters are different in the same row, ranks are different according to post-hoc analysis with Bonferroni correction.					

Table 2.5 Macronutrient and micronutrient composition of indulgent escape snacks as a portion of total daily intake by weight status

	<b>All Mean (± SD) n = 414</b>	<b>Normal Weight Mean (± SD) n = 147</b>	<b>Overweight Mean (± SD) n = 103</b>	<b>Obese Mean (± SD) n = 164</b>	<b>Overall p- value<sup>†</sup></b>
Energy (kcal) ‡	0.15 (0.10)	0.16 (0.11) <sup>a</sup>	0.12 (0.18) <sup>b</sup>	0.15 (0.10) <sup>a</sup>	0.011
Total fat (g) ‡	0.15 (0.13)	0.17 (0.14) <sup>a</sup>	0.12 (0.10) <sup>b</sup>	0.16 (0.13) <sup>a</sup>	0.008
Cholesterol (mg) ‡	0.12 (0.15)	0.13 (0.14)	0.09 (0.15)	0.13 (0.15)	0.084
Saturated fat (g) ‡	0.18 (0.16)	0.19 (0.17) <sup>ab</sup>	0.14 (0.14) <sup>a</sup>	0.19 (0.15) <sup>b</sup>	0.034
Total carbohydrate (g) ‡	0.17 (0.13)	0.18 (0.13)	0.14 (0.09)	0.17 (0.13)	0.086
Sugar (g) ‡	0.24 (0.20)	0.26 (0.20)	0.22 (0.20)	0.23 (0.20)	0.222
Added sugar (g)	0.35 (0.23)	0.37 (0.23)	0.33 (0.23)	0.35 (0.24)	0.610
Total protein (g) ‡	0.07 (0.07)	0.08 (0.07) <sup>a</sup>	0.06 (0.06) <sup>b</sup>	0.08 (0.08) <sup>ab</sup>	0.012
Sodium (mg) ‡	0.07 (0.08)	0.07 (0.06) <sup>a</sup>	0.06 (0.10) <sup>b</sup>	0.08 (0.09) <sup>c</sup>	0.012
Calcium (mg) ‡	0.12 (0.14)	0.13 (0.14)	0.11 (0.15)	0.12 (0.15)	0.142

**Table 2.5** Macronutrient and micronutrient composition of indulgent escape snacks as a portion of total daily intake by weight status (continued)

	<b>All Mean (± SD) n = 414</b>	<b>Normal Weight Mean (± SD) n = 147</b>	<b>Overweight Mean (± SD) n = 103</b>	<b>Obese Mean (± SD) n = 164</b>	<b>Overall p- value<sup>†</sup></b>
Daily Energy Intake (kcal)	2021 (663)	2004 (595)	1930 (634)	2095 (730)	0.130
Estimated Energy Requirements (kcal) <sup>‡,1</sup>	1408 (236)	1224 (111) <sup>a</sup>	1359 (127) <sup>b</sup>	1604 (222) <sup>c</sup>	<0.0001
Estimated Energy Needs: Intake Ratio <sup>2</sup>	1.47 (0.52)	1.65 (0.52) <sup>a</sup>	1.43 (0.48) <sup>b</sup>	1.32 (0.49) <sup>b</sup>	<0.0001
<p>SD = Standard Deviation    Normal Weight BMI = 18.5-24.9 kg/m<sup>2</sup>    Overweight BMI = 25.0-29.9 kg/m<sup>2</sup>    Obese BMI = ≥ 30 kg/m<sup>2</sup>  <sup>†</sup> Where superscript letters are different in the same row, means are significantly different according to ANOVA and Duncan's Multiple Range Test. (p &lt; 0.05)  <sup>‡</sup> Univariate analysis indicated skewed data, thus Wilcoxon Rank Sum Test with Kruskal-Wallis procedure was used in place of ANOVA to determine statistical significance (p &lt; 0.05), where superscript letters are different in the same row, ranks are different according to post-hoc analysis with Bonferroni correction.  <sup>1</sup> Estimated Energy Requirements were calculated using the Mifflin-St. Jeor equation: 10 x weight (kg) + 6.25 x height (cm) - 5 x age (yr) - 161. (Mifflin et al., 1990)  <sup>2</sup> Mifflin-St. Jeor: Intake Ratio is calculated by dividing the estimated energy needs by total intake.</p>					

Table 2.6 Food group composition of indulgent escape snacks by weight status

<b>Food Group<sup>s</sup></b>	<b>All Mean (± SD) n = 414</b>	<b>Normal Weight Mean (± SD) n = 147</b>	<b>Overweight Mean (± SD) n = 103</b>	<b>Obese Mean (± SD) n = 164</b>	<b>Overall p-value<sup>†</sup></b>
Fruits	0.13 (0.56)	0.18 (0.74)	0.12 (0.48)	0.09 (0.41)	0.629
Vegetables	0.08 (0.35)	0.08 (0.31)	0.05 (0.26)	0.11 (0.43)	0.677
Grains	0.65 (1.02)	0.57 (0.85)	0.58 (1.12)	0.76 (1.08)	0.205
Whole Grains	0.25 (0.83)	0.19 (0.65)	0.27 (0.97)	0.31 (0.89)	0.619
Refined Grains	0.36 (0.70)	0.34 (0.66)	0.29 (0.58)	0.43 (0.80)	0.457
Meats	0.03 (0.30)	0.02 (0.16)	0.00 (0.00)	0.07 (0.46)	0.157
Regular Meats	0.02 (0.27)	0.00 (0.04)	0.00 (0.00)	0.05 (0.43)	0.298
Lean Meats	0.01 (0.13)	0.01 (0.15)	0.00 (0.00)	0.01 (0.16)	0.519
Dairy	0.45 (0.82)	0.46 (0.78)	0.33 (0.78)	0.51 (0.88)	0.246
Regular Dairy	0.35 (0.78)	0.33 (0.75)	0.25 (0.73)	0.43 (0.83)	0.229
Lean Dairy	0.10 (0.35)	0.12 (0.35)	0.07 (0.34)	0.09 (0.35)	0.138
Sweets	0.29 (0.75)	0.40 (0.99)	0.22 (0.45)	0.24 (0.64)	0.482



Table 2.6 Food group composition of indulgent escape snack by weight status (continued)

<b>Food Group<sup>§</sup></b>	<b>All Mean (± SD) n = 414</b>	<b>Normal Weight Mean (± SD) n = 147</b>	<b>Overweight Mean (± SD) n = 103</b>	<b>Obese Mean (± SD) n = 164</b>	<b>Overall p-value<sup>‡</sup></b>
Fats & Oils	0.08 (0.47)	0.07 (0.41)	0.09 (0.40)	0.09 (0.56)	0.846
Regular Fats	0.06 (0.35)	0.05 (0.40)	0.07 (0.35)	0.05 (0.30)	0.682
Lean Fats	0.02 (0.31)	0.01 (0.09)	0.02 (0.20)	0.04 (0.47)	0.507

SD = Standard Deviation    Normal Weight BMI = 18.5-24.9 kg/m<sup>2</sup>    Overweight BMI = 25.0-29.9 kg/m<sup>2</sup>    Obese BMI = ≥ 30 kg/m<sup>2</sup>  
<sup>§</sup>Serving sizes are based on 2005 Dietary Guideline recommendations. Where these recommendations do not exist, standard serving sizes set by the Food and Drug Administration are used. The 2010 Dietary Guidelines serving size recommendations remain unchanged from 2005.  
<sup>‡</sup> Univariate analysis indicated skewed data, thus Wilcoxon Rank Sum Test with Kruskal-Wallis procedure was used in place of ANOVA to determine statistical significance. (p< 0.05)

Table 2.7 Beverage consumption during indulgent escape snacks by weight status

Beverage <sup>§</sup>	All Mean (± SD) n = 414	Normal Weight Mean (± SD) n = 147	Overweight Mean (± SD) n = 103	Obese Mean (± SD) n = 164	Overall p-value <sup>‡</sup>
All Non-Alcoholic Beverages	0.78 (1.18)	0.80 (1.39)	0.81 (1.04)	0.76 (1.06)	0.822
Regular Beverages	0.13 (0.50)	0.10 (0.40)	0.16 (0.53)	0.14 (0.56)	0.581
Unsweetened Beverages	0.50 (1.08)	0.59 (1.36)	0.58 (0.99)	0.38 (0.81)	0.066
Diet Beverages	0.15 (0.49)	0.11 (0.39)	0.07 (0.27)	0.23 (0.65)	0.085
Alcoholic Beverages	0.07 (0.44)	0.07 (0.46)	0.13 (0.65)	0.03 (0.17)	0.556

SD = Standard Deviation Normal Weight BMI = 18.5-24.9 kg/m<sup>2</sup> Overweight BMI = 25.0-29.9 kg/m<sup>2</sup> Obese BMI = ≥ 30 kg/m<sup>2</sup>  
<sup>§</sup> Serving sizes are based on 2005 Dietary Guideline recommendations. Where these recommendations do not exist, standard serving sizes set by the Food and Drug Administration are used. The 2010 Dietary Guidelines serving size recommendations remain unchanged from 2005.  
<sup>‡</sup> Univariate analysis indicated skewed data, thus Wilcoxon Rank Sum Test with Kruskal-Wallis procedure was used in place of ANOVA to determine statistical significance. (p< 0.05)

Table 2.8 Attitude clusters by weight status

Attitude Cluster	All n (%) n = 414	Normal Weight n (%) n = 147	Overweight n (%) n = 103	Obese n (%) n = 164	Overall p-value*
Attitude					<0.0001
Boredom Binger	76 (18.4)	13 (17.1)	12 (15.8)	51 (67.1)	
Family Before Self	73 (17.6)	23 (31.5)	19 (26.0)	31 (42.5)	
Live to Eat	68 (16.4)	10 (14.7)	22 (32.4)	36 (52.9)	
Creative Cook	60 (14.5)	38 (63.3)	12 (20.0)	10 (16.7)	
Hate to Cook	52 (12.6)	24 (46.2)	16 (30.8)	12 (23.1)	
Limited Time Cook	43 (10.4)	13 (30.2)	13 (30.2)	17 (39.5)	
Health Conscious	42 (10.1)	26 (61.9)	9 (21.4)	7(16.7)	

SD = Standard Deviation    Normal Weight BMI = 18.5-24.9 kg/m<sup>2</sup>    Overweight BMI = 25.0-29.9 kg/m<sup>2</sup>    Obese BMI = ≥ 30 kg/m<sup>2</sup>  
 Where n does not equal the total n for individual weight status, data are missing.  
 \* P-value according to Chi Square test (p < 0.05)

Table 2.9 Snack occasion characteristics by weight status

<b>Time</b>	<b>All n (%) n = 414</b>	<b>Normal Weight n (%) n = 147</b>	<b>Overweight n (%) n = 103</b>	<b>Obese n (%) n = 164</b>	<b>Overall p-value*</b>
<b>Preparation Time</b>					0.726
No time	258 (62.3)	88 (34.1)	66 (25.6)	104 (40.3)	
Under 5 minutes	111 (26.8)	46 (41.4)	26 (23.4)	39 (35.4)	
> 5 minutes	39 (9.4)	12 (30.8)	9 (23.1)	18 (46.2)	
Don't know	6 (1.5)	1 (16.7)	2 (33.3)	3 (50.0)	
<b>Consumption time</b>					0.145
Under 5 minutes	135 (32.9)	54 (40.0)	39 (28.9)	42 (31.1)	
5-10 minutes	125 (30.4)	35 (28.0)	34 (27.2)	56 (44.8)	
11-15 minutes	71 (17.3)	28 (39.4)	15 (21.1)	28 (39.4)	
16-20 minutes	46 (11.2)	18 (39.1)	10 (21.7)	18 (39.1)	
> 20 minutes	36 (8.3)	12 (35.3)	4 (11.8)	18 (52.9)	
<b>Clean up time</b>					0.807
Under 5 minutes	385 (93.7)	137 (25.6)	96 (24.9)	152 (39.5)	
> 5 minutes	26 (6.3)	13 (44.8)	5 (17.2)	11 (37.9)	

Table 2.9 Snack occasion characteristics by weight status (continued)

<b>Time</b>	<b>All n (%) n = 414</b>	<b>Normal Weight n (%) n = 147</b>	<b>Overweight n (%) n = 103</b>	<b>Obese n (%) n = 164</b>	<b>Overall p-value*</b>
Other individuals present during snack					0.645
No	192 (54.6)	57 (39.4)	32 (21.9)	57 (39.0)	
Yes	160 (45.5)	41 (35.3)	31 (26.7)	44 (37.9)	
SD = Standard Deviation    Normal Weight BMI = 18.5-24.9 kg/m <sup>2</sup> Overweight BMI = 25.0-29.9 kg/m <sup>2</sup> Obese BMI = ≥ 30 kg/m <sup>2</sup> Where n does not equal the total n for individual weight status, data are missing. * P-value according to Chi Square test (p < 0.05)					

Table 2.10 Activities performed while snacking by weight status

	<b>All n (%) n = 414</b>	<b>Normal Weight n (%) n = 147</b>	<b>Overweight n (%) n = 103</b>	<b>Obese n (%) n = 164</b>	<b>Overall p-value*</b>
Nothing else	32 (7.8)	16 (50.0)	5 (15.6)	11 (34.4)	0.180
Watching television	197 (47.7)	59 (30.0)	53 (26.9)	85 (43.2)	0.073
Conversation with others	104 (25.2)	37 (25.6)	19 (18.3)	48 (26.2)	0.151
Caring for others	12 (2.9)	4 (33.3)	3 (25.0)	5 (41.7)	0.985
Reading	39 (9.4)	18 (46.2)	10 (25.6)	11 (28.3)	0.247
Using computer (non-work-related)	48 (11.6)	18 (37.5)	12 (25.0)	18 (37.5)	0.940
Working (including on the computer)	44 (10.7)	12 (27.3)	13 (29.6)	19 (43.2)	0.455
Traveling (driving)	19 (4.6)	6 (31.6)	5 (26.3)	8 (42.1)	0.932
Other	49 (11.9)	22 (44.9)	8 (16.3)	19 (38.8)	0.230
SD = Standard Deviation    Normal Weight BMI = 18.5-24.9 kg/m <sup>2</sup> Overweight BMI = 25.0-29.9 kg/m <sup>2</sup> Obese BMI = ≥ 30 kg/m <sup>2</sup> Where n does not equal the total n for individual weight status, data are missing. * P-value according to Chi Square test (p < 0.05)					

Table 2.11 Weight gain prevention practices by weight status

	All n (%) n = 414	Normal Weight n (%) n = 147	Overweight n (%) n = 103	Obese n (%) n = 164	Overall p-value*
Commercial weight loss programs	110 (27.0)	19 (17.3) <sup>a</sup>	23 (20.9) <sup>a</sup>	68 (61.8) <sup>b</sup>	<0.0001
Meal replacements or slimming products	94 (23.1)	17 (18.1) <sup>a</sup>	24 (25.5) <sup>b</sup>	53 (56.4) <sup>b</sup>	<0.0001
Exercise	364 (89.4)	122 (33.5)	91 (25.0)	151 (41.5)	0.081
Cutting down on meal size or between-meal snacks	370 (90.6)	121 (32.7) <sup>a</sup>	94 (25.4) <sup>ab</sup>	155 (41.9) <sup>b</sup>	0.006
Cutting down on fats and/or sugars	346 (84.8)	114 (33.0)	90 (26.0)	142 (41.0)	0.110
Laxatives or diuretics	41 (10.1)	9 (22.0)	11 (26.8)	21 (51.2)	0.116
Supplements to burn fat or boost metabolism	90 (22.3)	17 (11.6) <sup>a</sup>	28 (31.1) <sup>b</sup>	45 (50.0) <sup>b</sup>	0.001
Supplements to feel full	51 (12.5)	11 (21.6)	15 (29.4)	25 (49.0)	0.072
Fasting	83 (20.4)	22 (26.5)	26 (31.3)	35 (42.2)	0.114
Vegetarian diet	54 (13.4)	20 (37.4)	13 (24.1)	21 (38.9)	0.967
Smoking	37 (8.9)	14 (38.9)	8 (22.2)	14 (38.9)	0.878
Skipping meals	161 (39.7)	39 (24.2) <sup>a</sup>	39 (24.2) <sup>ab</sup>	83 (51.6) <sup>b</sup>	<0.0001
Eating more protein	181 (44.9)	50 (27.6) <sup>a</sup>	43 (23.8) <sup>ab</sup>	88 (48.6) <sup>b</sup>	0.001

SD = Standard Deviation    Normal Weight BMI = 18.5-24.9 kg/m<sup>2</sup>    Overweight BMI = 25.0-29.9 kg/m<sup>2</sup>    Obese BMI = ≥ 30 kg/m<sup>2</sup>  
Where n does not equal the total n for each weight status, data are missing.  
\* P-value according to Chi Square test (p < 0.05), where superscript letters are different in the same row, frequencies are significantly different according to post-hoc two-way chi-square tests with Bonferroni correction.

Table 2.12 Attempts at weight gain prevention practices by weight status

	<b>All Mean (± SD) n = 414</b>	<b>Normal Weight Mean (± SD) n = 147</b>	<b>Overweight Mean (± SD) n = 103</b>	<b>Obese Mean (± SD) n = 164</b>	<b>Overall p-value<sup>†</sup></b>
Lifetime utilization of practices	4.88 (2.45)	4.12 (2.37) <sup>a</sup>	4.94 (2.42) <sup>b</sup>	5.52 (2.37) <sup>b</sup>	<0.0001
Practices utilized in the last 12 months	3.23 (1.88)	3.08 (1.86)	3.31 (1.84)	3.32 (1.92)	0.511
Practices utilized greater than 12 months ago	1.64 (1.88)	1.04 (1.53) <sup>a</sup>	1.63 (1.69) <sup>b</sup>	2.19 (2.11) <sup>b</sup>	<0.001
SD = Standard Deviation    Normal Weight BMI = 18.5-24.9 kg/m <sup>2</sup> Overweight BMI = 25.0-29.9 kg/m <sup>2</sup> Obese BMI = ≥ 30 kg/m <sup>2</sup> <sup>†</sup> Where superscript letters are different in the same row, means are significantly different according to ANOVA and Duncan's Multiple Range Test. (p < 0.05)					



Table 2.13 Total and subcategory scores for the Weight Efficacy Life-style (WEL) questionnaire by weight status

	<b>All Mean (± SD) n = 414</b>	<b>Normal Weight Mean (± SD) n = 147</b>	<b>Overweight Mean (± SD) n = 103</b>	<b>Obese Mean (± SD) n = 164</b>	<b>Overall p-value<sup>†</sup></b>
Total WEL	5.96 (1.61)	6.41 (1.40) <sup>a</sup>	5.96 (1.74) <sup>a</sup>	5.46 (1.60) <sup>b</sup>	<0.0001
Negative Emotions	5.68 (2.08)	6.25 (1.86) <sup>a</sup>	5.87 (2.14) <sup>a</sup>	4.94 (2.04) <sup>b</sup>	<0.0001
Availability	4.98 (1.93)	5.58 (1.85) <sup>a</sup>	4.98 (1.84) <sup>b</sup>	4.42 (1.89) <sup>c</sup>	<0.0001
Social Pressure	5.82 (1.94)	6.38 (1.78) <sup>a</sup>	5.79 (1.96) <sup>b</sup>	5.34 (1.94) <sup>b</sup>	<0.0001
Physical Discomfort	6.58 (1.68)	6.85 (1.56)	6.41 (1.83)	6.44 (1.67)	0.060
Positive Activities	6.30 (1.72)	6.59 (1.61) <sup>a</sup>	6.35 (1.83) <sup>ab</sup>	6.01 (1.71) <sup>b</sup>	0.019
SD = Standard Deviation    Normal Weight BMI = 18.5-24.9 kg/m <sup>2</sup> Overweight BMI = 25.0-29.9 kg/m <sup>2</sup> Obese BMI = ≥ 30 kg/m <sup>2</sup> <sup>†</sup> Where superscript letters are different in the same row, means are significantly different according to ANOVA and Duncan's Multiple Range Test. (p < 0.05)					

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## **Appendices**

## Appendix A: General Instructions



P.O. Box 474 Toledo, OH 43654  
Toll-Free Number: 1-800-537-4097  
Mon – Fri, 8:00 AM to 11:00 PM EST  
Sat & Sun, 10:00 AM to 6:00 PM EST  
Contact Us: <http://mysurvey.com/contactus.cfm>  
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### Shaping the Future with Your Opinions

178592


## General Instructions

Dear MySurvey Member,

Thank you for agreeing to participate in this study.

**To the 40 to 60 year old women helping with this study:**

This packet contains the following documents you need to complete for this study:

- One (1) Food Record Booklet (white booklet) and One (1) Food Record Booklet Instructional DVD 
- Four (4) Meal/Snack Questionnaires (Breakfast - yellow booklet, Lunch – pink booklet, Dinner – blue booklet, Snack – tan booklet)
- One (1) General Questionnaire (green booklet)
- One (1) Return envelope

For this study, we would like you to record everything you eat and drink in the Food Record Booklet for an assigned 24-hour period of time, fill out four questionnaires about meals and a snack, and fill out one general questionnaire.

**Your assigned 24-hour time period:  
Begins at 4 AM on a weekday  
(This could be a Monday, Tuesday, Wednesday, or a Thursday)**

### For your assigned 24-hour period:

Record everything you eat and drink on the Food Record Form in the Food Record Booklet (white booklet). Carefully describe all foods and beverages and amounts consumed. To do this accurately, please follow the directions in the Food Record Booklet and watch the instructional video on the enclosed DVD or access the video on the website <http://courses.cfans.umn.edu/CFANSVideo/FoodRecordManual/>. The video lasts about 12 minutes. The success of this study depends on accurate food records, so please eat as you normally do and record all that you eat and drink immediately after eating or drinking.

Fill out the following four questionnaires throughout your assigned 24-hour period:

- 1) Fill out the yellow **Breakfast Questionnaire** after eating your morning meal.
- 2) Fill out the pink **Lunch Questionnaire** after eating your noon meal.
- 3) Fill out the blue **Dinner Questionnaire** after eating your evening meal.
- 4) Fill out the tan **Snack Questionnaire** after eating a snack. If you usually have more than one snack, fill out the form after eating a larger snack, for example chips and juice versus juice only.

You should keep the white Food Record Booklet and yellow, pink, blue and tan questionnaires with you throughout the day.

### At the end of your assigned 24 hour period:


Fill out the green **General Questionnaire**.

Once you have completed the following items, please return them in the envelope provided.

- Food Record Booklet (white booklet)
- Breakfast Questionnaire (yellow booklet)
- Lunch Questionnaire (pink booklet)
- Dinner Questionnaire (blue booklet)
- Snack Questionnaire (tan booklet)
- General Questionnaire (green booklet)

It would be greatly appreciated if you could do this as soon as possible after you complete them. You do not need to mail back this letter.

Thank you for your help on this study.

Sincerely,  
  
Carol Adams

## Appendix B: General Questionnaire



P.O. Box 474 Toledo, OH 43654  
 Toll-Free Number: 1-800-537-4097  
 Mon – Fri, 8:00 AM to 11:00 PM EST  
 Sat, 10:00 AM to 6:00 PM EST  
 Contact Us: <http://mysurvey.com/contactus.cfm>  
 Privacy: <http://mysurvey.com/privacy.cfm>

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### General Questionnaire

Please complete the following questionnaire after you have completed the Breakfast, Lunch, Dinner and Snack Questionnaires and the Food Record Form over your assigned 24 hour period.

Please X one box for questions 1 through 7. (X ONE BOX FOR EACH)

	Usually / Always	Sometimes	Rarely / Never
1. When you eat bread or rolls, how often do you add butter or margarine?.....	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
2. When you cook vegetables, how often do you add oil, margarine or butter?.....	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
3. When you eat vegetables, how often do you add oil, butter or margarine at the table?.....	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
4. When you eat potatoes, how often do you use butter, margarine, or sour cream?.....	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
5. How often do you use milk or cream in coffee or tea?.....	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
6. When you eat chicken or turkey, how often do you eat the skin?.....	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
	<b>Yes</b>	<b>No</b>	
7. Do you eat in restaurants and/or purchase take-out food more than three times per week?.....	1 <input type="checkbox"/>	2 <input type="checkbox"/>	

#### What type of milk, spreads and cooking oils do you usually use?

Please specify only the type you use most often.

8. **Milk: (X ONE Box)**  
 1  Whole cow's milk    2  2 % cow's milk    3  1 % cow's milk    4  Skim cow's milk    5  Do not use  
 6  Another type of milk (Write In) \_\_\_\_\_
9. **Margarine: (X ONE Box)**  
 1  Regular    2  Diet/low-fat    3  Fat-free    4  Spray    5  Do not use  
 6  Brand name (Write In) \_\_\_\_\_
10. **Real Butter: (X ONE Box)**  
 1  Regular    2  Whipped    3  Light    4  Do not use
11. **Salad Dressing (X ONE Box)**  
 1  Regular    2  Diet/low-fat    3  Fat-free    4  Do not use  
 5  Brand name (Write In) \_\_\_\_\_
12. **Oil: (X ONE Box)**  
 1  Canola oil    2  Corn oil    3  Olive oil    4  Safflower oil    5  Soybean oil  
 6  Other oil    7  Do not use
13. **Mayonnaise: (X ONE Box)**  
 1  Regular    2  Diet/low-fat    3  Fat-free    4  Do not use  
 5  Brand name (Write In) \_\_\_\_\_

14. Have you used the following practices to prevent weight gain? (X ONE Box For EACH)

	Yes, in the last 12 months	Yes, more than 12 months ago	No, never
Commercial weight loss programs (e.g. Weight Watchers, Jenny Craig) .....	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
Meal replacements or slimming products (e.g. Herbalife) .....	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
Exercise .....	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
Cutting down on size of meals or between meal snacks .....	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
Cutting down on fats and/or sugars .....	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
Laxatives or diuretics .....	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
Supplements to burn fat or boost metabolism .....	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
Supplements to feel full .....	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
Fasting .....	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
Vegetarian diet .....	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
Smoking .....	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
Skipping meals .....	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
Eating more protein .....	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>

15. How tall are you? (Write In #) \_\_\_\_\_ feet \_\_\_\_\_ inches

16. How much do you weigh now? (Write In #) \_\_\_\_\_ lbs

17. What did you weigh 2 years ago? (Write in #) \_\_\_\_\_ lbs

18. What did you weigh 5 years ago? (Write in #) \_\_\_\_\_ lbs

19. Have you had a menstrual period during the previous 12 months? (X ONE Box)

1  Yes      2  No

20. Are you currently taking hormone replacement therapy? (X ONE Box)

1  Yes      2  No

21. Did you take a vitamin and mineral supplement, such as Centrum® or One-A-Day®, today? (X ONE Box)

1  Yes      2  No

22. Please select a number from 0 to 9 where 0 is not confident and 9 is very confident. (X ONE Box For EACH)

	←-----→									
	Not Confident									
	0	1	2	3	4	5	6	7	8	9
I can resist eating when I am anxious (nervous).....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	8 <input type="checkbox"/>	9 <input type="checkbox"/>
I can control my eating on the weekends.....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	8 <input type="checkbox"/>	9 <input type="checkbox"/>
I can resist eating even when I have to say "no" to others.....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	8 <input type="checkbox"/>	9 <input type="checkbox"/>
I can resist eating when I feel physically run down...	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	8 <input type="checkbox"/>	9 <input type="checkbox"/>
I can resist eating when I am watching TV .....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	8 <input type="checkbox"/>	9 <input type="checkbox"/>
I can resist eating when I am depressed (or down) ..	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	8 <input type="checkbox"/>	9 <input type="checkbox"/>
I can resist eating when there are many different kinds of food available.....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	8 <input type="checkbox"/>	9 <input type="checkbox"/>
I can resist eating even when I feel it's impolite to refuse a second helping .....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	8 <input type="checkbox"/>	9 <input type="checkbox"/>
I can resist eating even when I have a headache....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	8 <input type="checkbox"/>	9 <input type="checkbox"/>
I can resist eating when I am reading .....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	8 <input type="checkbox"/>	9 <input type="checkbox"/>
I can resist eating when I am angry (or irritable).....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	8 <input type="checkbox"/>	9 <input type="checkbox"/>
I can resist eating even when I am at a party .....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	8 <input type="checkbox"/>	9 <input type="checkbox"/>
I can resist eating even when others are pressuring me to eat.....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	8 <input type="checkbox"/>	9 <input type="checkbox"/>
I can resist eating when I am in pain.....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	8 <input type="checkbox"/>	9 <input type="checkbox"/>
I can resist eating just before going to bed .....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	8 <input type="checkbox"/>	9 <input type="checkbox"/>
I can resist eating when I have experienced failure ..	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	8 <input type="checkbox"/>	9 <input type="checkbox"/>
I can resist eating even when high-calorie foods are available .....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	8 <input type="checkbox"/>	9 <input type="checkbox"/>
I can resist eating when I think others will be upset if I don't eat .....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	8 <input type="checkbox"/>	9 <input type="checkbox"/>
I can resist eating when I feel uncomfortable.....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	8 <input type="checkbox"/>	9 <input type="checkbox"/>
I can resist eating when I am happy .....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	8 <input type="checkbox"/>	9 <input type="checkbox"/>

23. Which type(s) of foods do you think are good sources of **protein**? (X ALL That APPLY)

- 1  Beef, chicken, fish, pork, lamb
- 2  Milk, yogurt, cheese, eggs
- 3  Margarine, olive oil, canola oil, corn oil, butter
- 4  Wheat bread, corn meal, oatmeal, pasta, rice
- 5  Baked beans, lentils, peanuts, walnuts, chickpeas
- 6  Lettuce, cabbage, broccoli, carrots, greens
- 7  Apples, oranges, bananas, grapes, prunes
- 8  Soy powder, whey powder, Ensure, Boost

24. How often do you choose each type(s) of food as a **protein** source? (X ONE Box For EACH)

	Usually / Always	Sometimes	Rarely / Never
Beef, chicken, fish, pork, lamb .....	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
Milk, yogurt, cheese, eggs .....	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
Margarine, olive oil, canola oil, corn oil, butter .....	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
Wheat bread, corn meal, oatmeal, pasta, rice .....	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
Baked beans, lentils, peanuts, walnuts, chickpeas .....	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
Lettuce, cabbage, broccoli, carrots, greens .....	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
Apples, oranges, bananas, grapes, prunes .....	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
Soy powder, whey powder, Ensure, Boost .....	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>

25. How much of the calories you eat each day should come from **protein**? (X ONE Box)

- 1  5% – 10%
- 2  12% – 15%
- 3  20% - 25%
- 4  30% - 40%
- 5  I don't know

26. **Protein** is helpful for weight loss because ..... (X ALL That APPLY)

- 1  protein builds muscle, not fat.
- 2  extra protein is not stored in the body.
- 3  protein provides more energy than carbs or fat.
- 4  protein helps you feel full.
- 5  I don't know

27. Which of the following protein supplement products have you seen in stores or in advertisements? (X ALL That APPLY)

- 1  Protein water (such as Special K<sub>2</sub>O, Stacker 2)
- 2  Whey protein beverage (such as Naked Juices)
- 3  Soy protein beverage (such as Odwalla, Bolthouse Farms, Silk)
- 4  Protein bars (such as Genisoy, Detour)
- 5  Soy protein powder mix (such as Genisoy, Soytein)
- 6  Whey protein powder mix (such as Designer Whey)
- 7  Amino acid tablets (such as Lysine, Carnitine, Arginine)

28. How often do you buy the following **protein** supplement products? (X ONE Box For EACH)

	Never	Once A Year	Once A Month	Once A Week	Every Day
Protein water (such as Special K <sub>2</sub> O, Stacker 2) .....	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Whey protein beverage (such as Naked Juices) .....	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Soy protein beverage (such as Odwalla, Bolthouse Farms, Silk) .....	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Protein bars (such as Genisoy, Detour) .....	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Soy protein powder mix (such as Genisoy, Soytein) .....	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Whey protein powder mix (such as Designer Whey) .....	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Amino acid tablets (such as Lysine, Carnitine, Arginine) .....	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>

29. Have you ever eaten more protein than you usually eat to help you lose weight? (X ONE Box)

- 1  Yes
- 2  No



We are interested in finding out about the kinds of physical activities that people do as part of their everyday lives. The following questions will ask you about the time you spent being physically active in the **last 7 days**. Please answer each question even if you do not consider yourself to be an active person. Please think about the activities you do at work, as part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise or sport.

Think about all the **vigorous** and **moderate** activities that you did in the **last 7 days**. **Vigorous** physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. **Moderate** activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal.

#### **JOB-RELATED PHYSICAL ACTIVITY**

The first section is about your work. This includes paid jobs, farming, volunteer work, course work, and any other unpaid work that you did outside your home. Do not include unpaid work you might do around your home, like housework, yard work, general maintenance, and caring for your family. These are asked in Part 3.

30. Do you currently have a job or do any unpaid work outside your home? (X ONE Box)

1  Yes → (Continue)

2  No (Skip To TRANSPORTATION PHYSICAL ACTIVITY)

The next questions are about all the physical activity you did in the **last 7 days** as part of your paid or unpaid work. This does not include traveling to and from work.

31. During the **last 7 days**, on how many days did you do **vigorous** physical activities like heavy lifting, digging, heavy construction, or climbing up stairs **as part of your work**? Think about only those physical activities that you did for at least 10 minutes at a time.

(Write In #) \_\_\_\_\_ days per week → (Continue)

1  No vigorous job-related physical activity → (Skip To Qu. 33)

32. How much time did you usually spend on one of those days doing **vigorous** physical activities as part of your work? (Write in # of hours and/or minutes)

\_\_\_\_\_ hours per day      \_\_\_\_\_ minutes per day

33. Again, think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** physical activities like carrying light loads **as part of your work**? Please do not include walking.

(Write In #) \_\_\_\_\_ days per week → (Continue)

1  No moderate job-related physical activity → (Skip To Qu. 35)

34. How much time did you usually spend on one of those days doing **moderate** physical activities as part of your work? (Write in # of hours and/or minutes)

\_\_\_\_\_ hours per day      \_\_\_\_\_ minutes per day

35. During the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time **as part of your work**? Please do not count any walking you did to travel to or from work.

(Write In #) \_\_\_\_\_ days per week → (Continue)

1  No job-related walking → (Skip To TRANSPORTATION PHYSICAL ACTIVITY)

36. How much time did you usually spend on one of those days **walking** as part of your work? (Write in # of hours and/or minutes)

\_\_\_\_\_ hours per day      \_\_\_\_\_ minutes per day

#### **TRANSPORTATION PHYSICAL ACTIVITY**

These questions are about how you traveled from place to place, including to places like work, stores, movies, and so on.

37. During the **last 7 days**, on how many days did you **travel in a motor vehicle** like a train, bus, car, or tram?

(Write In #) \_\_\_\_\_ days per week → (Continue)

1  No traveling in a motor vehicle → (Skip To Qu. 39)



38. How much time did you usually spend on one of those days **traveling** in a train, bus, car, tram, or other kind of motor vehicle? **(Write in # of hours and/or minutes)**

\_\_\_\_\_ hours per day \_\_\_\_\_ minutes per day

Now think only about the **bicycling** and **walking** you might have done to travel to and from work, to do errands, or to go from place to place.

39. During the **last 7 days**, on how many days did you **bicycle** for at least 10 minutes at a time to go **from place to place**?

**(Write In #)** \_\_\_\_\_ days per week → **(Continue)**

†  No bicycling from place to place → **(Skip To Qu. 41)**

40. How much time did you usually spend on one of those days to **bicycle** from place to place? **(Write in # of hours and/or minutes)**

\_\_\_\_\_ hours per day \_\_\_\_\_ minutes per day

41. During the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time to go **from place to place**?

**(Write In #)** \_\_\_\_\_ days per week → **(Continue)**

†  No walking from place to place → **(Skip To HOUSEWORK, HOUSE MAINTENANCE, AND CARING FOR FAMILY)**

42. How much time did you usually spend on one of those days **walking** from place to place? **(Write in # of hours and/or minutes)**

\_\_\_\_\_ hours per day \_\_\_\_\_ minutes per day

#### **HOUSEWORK, HOUSE MAINTENANCE, AND CARING FOR FAMILY**

This section is about some of the physical activities you might have done in the **last 7 days** in and around your home, like housework, gardening, yard work, general maintenance work, and caring for your family.

43. Think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **vigorous** physical activities like heavy lifting, chopping wood, shoveling snow, or digging **in the garden or yard**?

**(Write In #)** \_\_\_\_\_ days per week → **(Continue)**

†  No vigorous activity in garden or yard → **(Skip To Qu. 45)**

44. How much time did you usually spend on one of those days doing **vigorous** physical activities in the garden or yard? **(Write in # of hours and/or minutes)**

\_\_\_\_\_ hours per day \_\_\_\_\_ minutes per day

45. Again, think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** activities like carrying light loads, sweeping, washing windows, and raking **in the garden or yard**?

**(Write In #)** \_\_\_\_\_ days per week → **(Continue)**

†  No moderate activity in garden or yard → **(Skip To Qu. 47)**

46. How much time did you usually spend on one of those days doing **moderate** physical activities in the garden or yard? **(Write in # of hours and/or minutes)**

\_\_\_\_\_ hours per day \_\_\_\_\_ minutes per day

47. Once again, think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** activities like carrying light loads, washing windows, scrubbing floors and sweeping **inside your home**?

**(Write In #)** \_\_\_\_\_ days per week → **(Continue)**

†  No moderate activity inside home → **(Skip To RECREATION, SPORT AND LEISURE-TIME PHYSICAL ACTIVITY)**

48. How much time did you usually spend on one of those days doing **moderate** physical activities inside your home?  
(Write in # of hours and/or minutes)

\_\_\_\_\_ hours per day \_\_\_\_\_ minutes per day

**RECREATION, SPORT, AND LEISURE-TIME PHYSICAL ACTIVITY**

This section is about all the physical activities that you did in the **last 7 days** solely for recreation, sport, exercise or leisure. Please do not include any activities you have already mentioned.

49. Not counting any walking you have already mentioned, during the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time **in your leisure time**?

(Write In #) \_\_\_\_\_ days per week → (Continue)

No walking in leisure time → (Skip To Qu. 51)

50. How much time did you usually spend on one of those days **walking** in your leisure time?  
(Write in # of hours and/or minutes)

\_\_\_\_\_ hours per day \_\_\_\_\_ minutes per day

51. Think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **vigorous** physical activities like aerobics, running, fast bicycling, or fast swimming **in your leisure time**?

(Write In #) \_\_\_\_\_ days per week → (Continue)

No vigorous activity in leisure time → (Skip To Qu. 53)

52. How much time did you usually spend on one of those days doing **vigorous** physical activities in your leisure time? (Write in # of hours and/or minutes)

\_\_\_\_\_ hours per day \_\_\_\_\_ minutes per day

53. Again, think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** physical activities like bicycling at a regular pace, swimming at a regular pace, and doubles tennis **in your leisure time**?

(Write In #) \_\_\_\_\_ days per week → (Continue)

No moderate activity in leisure time → (Skip To TIME SPENT SITTING)

54. How much time did you usually spend on one of those days doing **moderate** physical activities in your leisure time? (Write in # of hours and/or minutes)

\_\_\_\_\_ hours per day \_\_\_\_\_ minutes per day

**TIME SPENT SITTING**

These questions are about the time you spend sitting while at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading or sitting or lying down to watch television. Do not include any time spent sitting in a motor vehicle that you have already told me about.

55. During the **last 7 days**, how much time did you usually spend **sitting** on a **weekday**?  
(Write in # of hours and/or minutes)

\_\_\_\_\_ hours per day \_\_\_\_\_ minutes per day

56. During the **last 7 days**, how much time did you usually spend **sitting** on a **weekend day**?  
(Write in # of hours and/or minutes)

\_\_\_\_\_ hours per day \_\_\_\_\_ minutes per day

57. Below are a number of statements about food. Using a 6 point scale, where "1" means "Strongly Disagree" and "6" means "Strongly Agree," please indicate how much you agree or disagree with each statement. If the statement does not apply to you, please select Strongly Disagree.  
(X ONE Box For EACH Statement)

Statements	Strongly Disagree ← → Strongly Agree					
	1	2	3	4	5	6
Deciding what to serve for dinner is stressful .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I can usually eat what I want, and I never seem to gain weight.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am always looking for ways to make meals more interesting and varied.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Meals are family time in my household.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I put a lot of effort in looking for coupons and/or finding products on sale.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Having to plan meals is a hassle .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I really feel guilty when I overeat.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Meals in my household can be very stressful times.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eating something indulgent helps me relax .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am a real food lover .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I will pay more for higher quality products.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
On most days food takes a back seat to other activities/responsibilities.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I avoid cooking as much as possible .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
When I am feeling bored I usually have something to eat.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The more authentic an ethnic restaurant the better.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I can't watch television without having a snack.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I try to eat well, but it doesn't usually work out.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I'm tired of hearing what is and isn't healthy .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Others show their appreciation for the foods I serve .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Having something to eat helps me deal with stress.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Even when we eat together, people in my household frequently eat different foods .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I make a point to eat foods that are natural/organic.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I get a lot of satisfaction in seeing others enjoy foods I have made.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I only buy foods I know people in my household will eat .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If it is just me eating, I never bother to cook .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I always compare prices on the foods I buy.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Frequently I eat just to have something to do.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am finding it harder and harder to maintain my weight.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I consider myself to be an adventurous eater.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taking care of others usually comes before my meal needs.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I will always buy one brand over another if it is on sale .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Question 57 Continued On Next Page →

**Question 57 Continued**

	<b>Strongly Disagree</b>	←—————→				<b>Strongly Agree</b>
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
I would eat differently if it weren't for the influence of others I eat with.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
I frequently eat certain foods because they remind me of the past.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
I tend to take comfort in eating the same foods regularly..1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Seeing advertisements for food makes me hungry.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
I carefully read nutrition/ingredient labels on the foods I buy.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
On most days I am so busy that I need to force myself to eat.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
I will pay more for foods that are more healthful.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
I like to cook, but never get around to it.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
I am careful to balance the foods/calories I eat throughout the day.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
I usually don't have time to plan meals.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
It always seems that I am being tempted to eat.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Cooking is a real chore.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
I take the time to prepare good meals most nights of the week.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
I watch my fat intake carefully.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
I have to admit I live to eat.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
I know more about nutrition than most people.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
It is hard not to eat when I smell food.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
I prepare special dishes that I am known for.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
If I have a disappointing meal, I will make up for it the next time I eat.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
It is important to use food up before it goes bad.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Certain foods I eat connect me with my cultural heritage.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
I cook certain dishes because they remind me of my mother/grandmother.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
I can't go to bed without having something to eat.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
When it comes to food, I tend to buy the best.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
I really only have time to cook on weekends.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
I always reward myself with a treat when I have had a stressful day.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
I love to try new recipes and new food products.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
It seems I am always trying to lose or maintain weight....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
When it comes to eating, I never just let myself go.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
I am a very creative cook.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
I derive a great deal of pleasure from the food I eat.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Each meal I serve is well balanced across all food groups.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
I eat certain foods when I am angry or sad.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
I really wish I had more time to cook for my household....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
It seems that I am always feeling guilty about what I ate...1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>

**Thank you for your help with this study. Please return your completed questionnaires in the enclosed postage-paid envelope as soon as possible.**

## Appendix C: Snacking Occasion Questionnaire



P.O. Box 474 Toledo, OH 43654  
Toll-Free Number: **1-800-537-4097**  
Mon – Fri, 8:00 AM to 11:00 PM EST  
Sat, 10:00 AM to 6:00 PM EST  
Contact Us: <http://mysurvey.com/contactus.cfm>  
Privacy: <http://mysurvey.com/privacy.cfm>

174075-1

[Please read the General Instructions before completing this form.]

### Snack Questionnaire

(tan booklet)

**Instructions:** Record everything you ate and drank for this snack on your Food Record Form in the Food Record Booklet, then fill out this Snack Questionnaire.

If you don't eat a Snack, do not fill out this Snack Questionnaire.

Please answer the following questions as they apply to you personally, and not for other members of your household. Thank you for taking the time to answer these important questions.

1. Which day of the week was this snack?(X ONE Box)

- 1  Monday
- 2  Tuesday
- 3  Wednesday
- 4  Thursday

2. What time of day did this meal occur? (Write the hour and minute and circle AM or PM)

For example if you ate at 9:30 PM, write:  
Hour 9 Minute 30

AM

PM

Hour \_\_\_\_\_ Minute \_\_\_\_\_

AM

PM

4. Which of the following statements describe your **needs** surrounding **this meal**? What did you want to accomplish by eating at this particular meal? Check how much you disagree or agree with each statement. If the statement does not apply to you, please select Strongly Disagree. (X ONE Box For EACH Statement)

I wanted to ...	← Strongly Disagree → Strongly Agree					
	1	2	3	4	5	6
Avoid/reduce stress.....1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Control/limit my calorie intake.....1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Do other things while eating.....1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reward myself.....1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Create/maintain a family tradition.....1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Have a fun/festive time.....1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Compensate for other things I have eaten or will eat.....1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Treat myself.....1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Serve others what is expected.....1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Really enjoy the moment.....1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Have a balanced meal.....1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Minimize clean up effort.....1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not have to think/put forth effort.....1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Teach others.....1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Care for myself.....1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Be thrifty/frugal.....1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Save money.....1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Have some personal time alone.....1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Make children happy.....1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eat light.....1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Recall pleasant memories.....1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not feel guilty afterward.....1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Feel like a good mom.....1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Feel appreciated by others/family.....1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Maintain a habit/tradition.....1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Satisfy a craving.....1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Do my own thing.....1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Refresh myself.....1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Have a brief escape from the day.....1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Have something to do to pass the time.....1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Question 4 Continued On Next Page →**



**Question 4 Continued.**

	<b>Strongly Disagree</b>	←—————→				<b>Strongly Agree</b>
I wanted to ...	1	2	3	4	5	6
Eat responsibly.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Eat quickly.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Use willpower to keep from overeating.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Take food along with me to other places.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Eat immediately.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Really enjoy eating.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Re-energize myself.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Stick to a diet.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Take a break during/after a busy day.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Have a pleasant meal with others.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Reconnect myself with the past.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Minimize planning.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Set a tone for the day.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Show my love for others.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Feel better – less sad/stressed/angry.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Maintain my cultural heritage.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Feel good about what I eat.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Spread my calories across the day.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Minimize preparation effort.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Stay on a budget.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Connect with others/family.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Satisfy my hunger.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>

5. Which of the following statements describe the **benefits** you were seeking in the food and/or beverage you ate and/or drank at **this meal**? What did you want the food to do for you at this particular meal? Check how much you disagree or agree with each statement. If the statement does not apply to you, please select Strongly Disagree. (X ONE Box For EACH Statement)

For this meal I wanted something that ...	<b>Strongly Disagree</b>	←—————→				<b>Strongly Agree</b>
	1	2	3	4	5	6
Has fiber.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Tastes fresh.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Is really indulgent.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Is low in fat/cholesterol.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Is really flavorful.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>

**Question 5 Continued On Next Page →**

**Question 5 Continued.**

	<b>Strongly Disagree</b>	←—————→				<b>Strongly Agree</b>
<b>For this meal I wanted something that ...</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
Is not boring.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Is healthy to eat.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Really tastes great.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Is ready to eat, needs no preparation.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
I know will be good.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Looks appetizing.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Is rich tasting.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Is easy to prepare.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Children will also eat.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Provides specific vitamins/minerals/nutrients.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Is low in salt.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Isn't messy.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Everyone will eat without complaints.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Can be eaten in a car.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Satisfies a craving.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Is low in carbohydrates.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Was on sale, a good deal.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Reminds me of the past.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Is low in calories.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Is easy to clean up afterward.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Creates family ties.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Is inexpensive.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Has calcium.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Is easy to eat.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Is fun to eat.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Is a favorite of someone in the family.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Is not time consuming to prepare and/or eat/drink.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Is portable.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Won't make me feel sluggish.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Is natural/organic.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Can be eaten with hands.....1	<input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>



6. Approximately how long did it take you or someone else to prepare the food and/or beverage for this snack? (X ONE Box)

- 01  No time
- 02  Under 5 minutes
- 03  5-10 minutes
- 04  11-15 minutes
- 05  16-20 minutes
- 06  21-30 minutes
- 07  31-45 minutes
- 08  46 minutes – 1 hour
- 09  1-2 hours
- 10  More than 2 hours
- 11  Don't know

7. Approximately how long did it take to consume the food and/or beverage for this snack? (X ONE Box)

- 1  Under 5 minutes
- 2  5-10 minutes
- 3  11-15 minutes
- 4  16-20 minutes
- 5  21-30 minutes
- 6  31-45 minutes
- 7  46 minutes – 1 hour
- 8  1-2 hours
- 9  More than 2 hours

8. Approximately how long did it take to clean up after consuming the food and/or beverage for this snack? (X ONE Box)

- 1  Under 5 minutes
- 2  5-10 minutes
- 3  11-15 minutes
- 4  16-20 minutes
- 5  21-30 minutes
- 6  31-45 minutes
- 7  46 minutes – 1 hour
- 8  1-2 hours
- 9  More than 2 hours

9. What activities were you engaged in during this snack? (X ALL That Apply)

- 01  Nothing else
- 02  Watching television
- 03  Conversation with others
- 04  Caring for others
- 05  Reading
- 06  Listening to the radio
- 07  Cooking
- 08  Using computer (non work-related)
- 09  Working (including on the computer)
- 10  Talking on phone
- 11  Traveling (driving)
- 12  Getting ready to leave
- 13  Other, please specify: \_\_\_\_\_

10. When did you decide what to eat and/or drink for this snack? (X ONE Box)

- 1  Someone else decided
- 2  Immediately before
- 3  A few hours before
- 4  Earlier in day
- 5  Yesterday
- 6  Before yesterday

11A. First, rate how satisfied you were with the food and/or beverage you consumed for this snack for each of the dimensions listed below using a 6 point scale where "1" means "Very Dissatisfied" and "6" means "Very Satisfied". (X ONE Box For EACH Under Column "A")

11B. Then in the last 3 columns, rate the importance for this snack. (X ONE Box For EACH Under Column "B")

	"A"						"B"			
	Very Dissatisfied					Very Satisfied	Not Important	Important	Very Important	
	NA	1	2	3	4	5	6	1	2	3
Tasted good.....+	<input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
Was convenient to obtain, prepare or eat and/or drink.....+	<input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
Was healthful.....+	<input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
Helped me maintain a tradition.....+	<input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
Comforted me.....+	<input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
Appealed to others present.....+	<input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
Was a good value.....+	<input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
Satisfied my hunger.....+	<input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
Helped me care for others present.....+	<input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
Made me feel rewarded or indulged.....+	<input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
Helped control my weight.....+	<input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>

12. Where did this snack take place? **(X ONE Box)**
- 1  At Home → **(Skip To Qu. 15)**
  - 2  Away From Home → **(Continue)**
13. If this snack occurred away from home, what was the source of the food and/or drink you consumed? **(X ONE Box)**
- 1  Purchased and consumed in a restaurant/cafeteria → **(Continue)**
  - 2  Purchased in a restaurant/cafeteria and consumed elsewhere → **(Continue)**
  - 3  Brought/carried from home → **(Skip To Qu. 15)**
  - 4  Purchased in a store → **(Skip To Qu. 16)**
  - 5  Purchased from a vending machine → **(Skip To Qu. 16)**
  - 6  Other, please specify \_\_\_\_\_ → **(Skip To Qu. 16)**
14. If the food and/or beverage at this snack was purchased in a restaurant, what type of restaurant was it? **(X ONE Box)**
- 1  Fast Food
  - 2  Family
  - 3  Fine Dining
  - 4  Cafeteria
  - 5  Coffee Shop
  - 6  Deli
  - 7  Other, please specify \_\_\_\_\_
- **(Skip To Qu. 16)**
15. If this snack took place at home, or was carried from home, who prepared the food and/or beverage? **(X ALL That Apply)**
- 1  I did all the preparation
  - 2  I did some of the preparation
  - 3  Other adult(s) did the preparation
  - 4  A child did the preparation
16. Not including yourself, who was present at this snack? **(Write In # or 0. If you ate out, please count only people sitting at the same table with you.)**
- For example, if you ate a snack in your home with your 10 year old child and your spouse:*
- # 1 Adults living in household (not including yourself)
- # 1 Children (Under the age of 18) living in household
- # 0 Adults not living in household
- # 0 Children (Under the age of 18) not living in household
- # \_\_\_\_\_ Adults living in household (not including yourself)
- # \_\_\_\_\_ Children (Under the age of 18) living in household
- # \_\_\_\_\_ Adults not living in household
- # \_\_\_\_\_ Children (Under the age of 18) not living in household

**Thank you for completing this questionnaire.**

# Appendix D: Food Record Booklet



P.O. Box 474 Toledo, OH 43654  
Toll-Free Number: 1-800-537-4097  
Mon – Fri, 8:00 AM to 11:00 PM EST  
Sat, 10:00 AM to 6:00 PM EST  
Contact Us: <http://mysurvey.com/contactus.cfm>  
Privacy: <http://mysurvey.com/privacy.cfm>

*Shaping the Future with Your Opinions*

174075

## FOOD RECORD BOOKLET FOR ONE DAY

Please keep this booklet with you to record everything you eat and drink for your assigned 24-hour period.

We prepared a 12 minute video to help you describe the foods and beverages and the amounts you consume. Before completing the food record form, please watch the instructional video on the enclosed DVD or access the video on the website <http://courses.cfans.umn.edu/CFANSVideo/FoodRecordManual/>.

Note: The success of this study depends on the accuracy of your food record. We realize that it will be time consuming to keep detailed records and appreciate your help.

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	Page
<b>I. Instructions for recording everything you eat and drink</b>	<b>2-6</b>
General and detailed instructions	2-3
Example food record form for 24 hours	4-5
Example recipe	6
<b>II. Food pictures and guides to estimate amount consumed</b>	<b>7-12</b>
<b>III. Food Record Form</b>	<b>13-15</b>
Recipe Forms	16-17

## GENERAL INSTRUCTIONS

- Record everything you eat and drink for your assigned 24-hour period on the Food Record Form (Find the form beginning on page 13 toward the end of this booklet).
- Print clearly with only one food or beverage item on each line.
- Record each meal/snack immediately after it is eaten.
- Leave one blank line between each meal/snack.

### DETAILED INSTRUCTIONS BY COLUMN (See examples on pages 4-5)

#### Column 1 – Type of Occasion

1. Write what type of meal/snack this was (breakfast, lunch, dinner, or snack).

#### Column 2 – Time Eaten

2. Write the time of day that you ate or drank in the "Time Eaten" column.

#### Column 3 – Foods and Beverages

3. Fully describe all foods and beverages including water. Include details such as how a food was prepared and whether condiments or spreads were added. For example, if you ate a chicken thigh, write if you ate the skin. If you drank coffee, was it caffeinated or decaffeinated? Was your salad dressing low fat or regular?

INCLUDE	FOR EXAMPLE
How prepared	Fried, broiled, breaded, etc.
Added fats	Fried in butter
Brand name	Stouffer's Frozen Lasagna

4. Include things that you added to the food or beverage at the table. Example: 1 Tbsp butter to a baked potato; 1 tsp sugar to coffee. Write what you added on separate lines.

#### Column 4 – Amount Eaten

5. Record exact amounts in the "Amount Eaten" column.
  - The number of pieces or slices
  - Weight: ounces or grams
  - Volume: cup, tsp (teaspoon), Tbsp (tablespoon), fluid ounce (fl oz), liters
  - Dimensions: inches or centimeters
  - Use pictures and guides on pages 7-12 to estimate amounts

**Example**

(3) FOODS AND BEVERAGES (preparation method, added fat, brand name, source of food)	(4) AMOUNT EATEN
<i>Chicken Caesar Salad</i>	
<i>Romaine lettuce</i>	<i>3 cups</i>
<i>chicken breast, (no skin) grilled</i>	<i>1 medium</i>
<i>Caesar dressing</i>	<i>¼ cup</i>
<i>parmesan cheese</i>	<i>2 Tbsp.</i>
<i>Croutons</i>	<i>6 large</i>
<i>Spaghetti &amp; Meat Balls</i>	
<i>cooked spaghetti</i>	<i>1½ cups</i>
<i>Meatballs</i>	<i>4 (1" diameter)</i>
<i>Ragu meatless spaghetti sauce</i>	<i>½ cup</i>
<i>parmesan cheese</i>	<i>1 Tbsp</i>
<i>Soft Shell Chicken Tacos</i>	
<i>flour tortilla</i>	<i>1 (8" diameter)</i>
<i>Roasted, cubed chicken dark meat (no skin)</i>	<i>½ cup</i>
<i>Chopped lettuce</i>	<i>½ cup</i>
<i>Tomato salsa (chopped tomato, onion, jalapenos)</i>	<i>2 Tbsp.</i>

5. Describe each ingredient in a mixed dish or write recipes on pages 16-17. An example of a completed recipe is on page 6.
6. When you have finished recording what you ate and drank for each meal or snack, go back and review your list to see if you forgot any foods or beverages or anything you added at the table.

**Example of Food Record Form for 24-hours**  
**(Remember: Leave one blank line between each meal/snack.)**

(1) TYPE OF OCCASION (breakfast, lunch, dinner, snack)	(2) TIME EATEN (Hour: Minute AM/PM)	(3) FOODS AND BEVERAGES (preparation method, added fat, brand name, source of food)	(4) AMOUNT EATEN
Snack	7:30 AM	Werther's original hard candy	1 piece (5 g)
		Amount or size	How many?
Breakfast	8:00 AM	Denny's buttermilk pancakes	2 pieces 5 in. diameter
		Butter, whipped	2 tsp
		Maple syrup	¼ cup
		Bacon	2 strips 6" long
		Coffee, decaffeinated	2 cups
		Half & half	2 Tbsp
Snack	9:30 AM	Brownie (made at home from a mix with vegetable oil and real eggs)	2 pieces (2 in. wide x 2 in. long Thickness 5)
		How big?	
Snack	11:00 AM	Tall latte made with 2% milk	12 oz.
Snack	11:30 AM	Chips Ahoy chocolate chip Cookies	2 cookies 3 in. diameter

**Example of Food Record Form for 24-hours (continued)**  
**(Remember: Leave one blank line between each meal/snack.)**

(1) TYPE OF OCCASION (breakfast, lunch, dinner, snack)	(2) TIME EATEN (Hour: Minute AM/PM)	(3) FOODS AND BEVERAGES (preparation method, added fat, brand name, source of food)	(4) AMOUNT EATEN
Lunch	12:00 Noon	Ham sandwich	
		Rye bread	2 slices
		Ham (from Albertson's deli)	3 slices
		Kraft American cheese slice How thick? See guide on p.12	1 slice Thickness 1
		Best Foods low fat mayonnaise	2 tsp
		Doritos regular tortilla chips	12 chips
		Senor Felix Salsa	1/4 cup
		Minute Maid lemonade	10 oz.
Dinner	6:00 PM	Beef Stew	1 cup (1 serving)
		Salad: See recipe on p. 6	
		Romaine lettuce	1 cup
		Tomato	1/4 medium
		Kraft Italian fat free salad dressing	1 Tbsp
		French bread	2 slices (1 slice = 3 in. length x 2 in. width x 1/2 in. thick)
		Butter, regular stick	2 tsp
		Water	12 oz.
Snack	8:30 PM	Dreyers Grand Chocolate ice cream	1 cup

**Recipe 1: (Write In) Beef Stew**

Number of servings made: (Write In #) 6      Number of servings you ate: (Write In #) 1

Serving Size 1 cup

INGREDIENTS	AMOUNT
Stew beef, boneless chuck roast, trimmed	2 lbs (pkg weight)
Browned in oil	¼ cup
White flour	1 ½ Tbsp
Onion	1 large
Beef broth, canned	2 cups
Tomato sauce, canned	1 cup
Potatoes, medium sized, white, peeled	6
Carrots, fresh (each about 6 inches long)	6
Celery	1 stalk
Fresh parsley	¼ cup

PREPARATION
Beef browned in oil, not drained
All ingredients added raw to same pan
Simmered 2-3 hours



## Beef, Pork, Chicken and Fish



1-1/2 ounces



3 ounces



6 ounces



9 ounces

## Cereal and Soup



1/2 cup



1 cup



1-1/2 cups

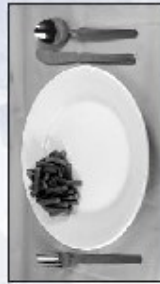


2 cups

**Vegetables such as Green Beans,  
Corn and Potatoes**



1/4 cup



1/2 cup



1 cup



1-1/2 cups

4

**Spaghetti and Casseroles**



1/2 cup



1 cup



2 cups



3 cups

5

## Salad Dressing



1 Tablespoon (Tbsp)



2 Tablespoons



3 Tablespoons



4 Tablespoons  
= 1/4 cup

7

## Spreads such as Butter, Margarine, Mayonnaise, or Peanut Butter



1 teaspoon (tsp)



2 teaspoons



3 teaspoons  
= 1 Tablespoon



2 Tablespoons

6

**Salads**



1/2 cup



1 cup



1 1/2 cups



2 cups

8

**Ice Cream, Mashed Potatoes,  
or Cottage Cheese**



1/2 cup



1 cup



1 1/2 cups







2 cups



9



## Five Ways to Size Up Your Servings



- 1** **3 ounces** of meat is about the size and thickness of 3 decks of playing cards or 21 radio tape cassettes.



- 2** **1 ounce** of cheese is about the size of 4 marked dice.



- 3** **1/2 cup** of ice cream is about the size of a tennis ball or tennis ball.



- 4** **1 cup** of mashed potatoes or cereal is about the size of your fist.



- 5** **1 teaspoon** of butter or peanut butter is about the size of the tip of your thumb.

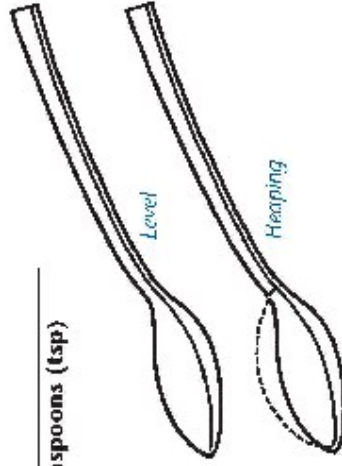



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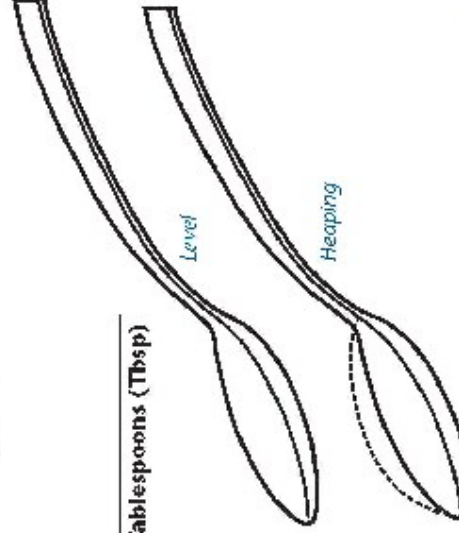
www.fda.gov/oc/foods

## Eating and Serving Spoons

### Teaspoons (tsp)

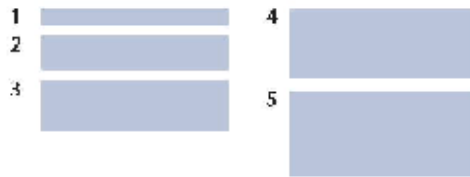


### Tablespoons (Tbsp)



1

## Thickness



## 12 fluid ounces

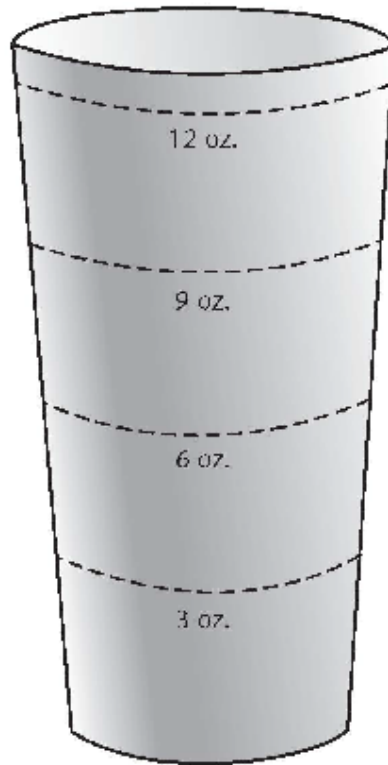


Illustration of a 12-ounce graduated cylinder. The cylinder is shaded to show its three-dimensional form.

