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Mood and Delay Discounting for Food

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Mood and Delay Discounting for Food

A Senior Honors Thesis

Submitted in Partial Fulfillment of the Requirements
for Graduation in the Honors College

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MOOD AND DELAY DISCOUNTING

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MOOD AND DELAY DISCOUNTING

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Abstract

Self-control has been defined as choosing a larger, more delayed reinforcer over a smaller, less delayed reinforcer (Rachlin & Green, 1972). Impulsiveness is defined as the opposite. The delay discounting task (Mazur, 1987), is one of several ways used to measure impulsiveness. Much of the research with delay discounting uses monetary reinforcers, however some recent research has begun to investigate impulsivity with regard to food. Several studies have demonstrated that there is a relationship between food intake and impulsivity (Guerreri et al., 2007; Guerreri, Nederkoorn, & Jansen, 2007; Herman & Polivy, 1980). In the current experiment, it was hypothesized that positive and negative mood, or emotional arousal, would increase impulsive behavior when making hypothetical food choices. To test this prediction, female undergraduate psychology students at the College at Brockport were asked to participate in a mood manipulation procedure. Pieces of classical music whose effects are supported by previous research (Bouhuys et al., 1995; Clark et al., 2001; Clark & Teasdale, 1985; Heatherton et al., 1998; Stober, 1997; Willner et al., 1998; Wood et al., 1990) were used to temporarily influence mood. Once they were in the desired mood state, participants were asked to choose between varying amounts and delays of hypothetical food rewards in a computerized delay discounting task (Mitchell, 1999). In addition, impulsivity and mood were measured using questionnaire measures. It was predicted that positive and negative mood, as opposed to neutral mood, would increase impulsivity with respect to hypothetical food reinforcers. The results showed no significant relationships.

Mood and Delay Discounting for Food

Self-control is defined as taking a course of action that yields a more positive outcome in the long term than in the short term (Baumeister & Heatherton, 1996). Self-control has also been defined as choosing a larger, more delayed reinforcer over a smaller, less delayed reinforcer (Rachlin & Green, 1972). Impulsiveness has been described as an inability to wait, a tendency to act without forethought, insensitivity to consequences, and an inability to inhibit inappropriate behaviors (Reynolds et al., 2006). Impulsiveness is the opposite of self-control, defined as the tendency to choose small, relatively immediate rewards over larger, more delayed rewards (Rachlin, 1995).

Measures of Self-Control and Impulsivity

Based on these definitions of self-control and impulsivity a number of procedures have been developed in order to assess them, including the self-control paradigm (Ainslie, 1974; Logue, 1988) and the delay discounting task (Mazur, 1987). In the self-control paradigm, participants repeatedly make choices between reinforcers. There is a set amount and delay value for each reinforcer, and the participants receive real rewards. For example, in an experiment by Forzano & Logue (1992), participants choose between two choices, one that gives them access to juice for a shorter period of time after no delay, and one that gives them a longer period of access to juice after a longer delay. The participants are initially unaware of this difference, but figure it out over the course of the task. In a similar study (Forzano et al., 2014), access to a video cartoon is used as the reinforcer instead of juice. The delay discounting task is similar, but measures the construct of self-control in a different way. This task asks the participant to make a hypothetical choice between two rewards with varying amounts and delays. It has been found in both tasks that as the delay to the reinforcer increases, choice changes. This is called preference reversal.

Humans discount delayed events, therefore self-control decreases when the delay time is longer, and participants begin to value the smaller reward over the larger one due to the shorter delay (Logue, 1995). The point at which preference reverses is known as the switching point.

Finding and measuring this switching point is the purpose of the delay discounting task. It involves finding the point at which two rewards have approximately the same value (Odum, 2011), or when the individual switches their decision to value one reward over another (Logue, 1995). It is most frequently measured using k . The formula, $V=A/(1+kD)$, involves several variables where V is the indifference point, and is equal to the amount of the reward. D is the delay, and describes how much of the value is affected by D . If k is large, there is a big effect of the delay (Mazur, 1987). Additionally, as in Forzano et al. (2014), the proportion of self-control can be used as a measure with the delay discounting task. This measurement is derived from dividing the number of times the self-control choice is selected by the total number of choices presented. This is a useful and much simpler measurement.

Delay Discounting and Different Reinforcers

The majority of the research using the delay-discounting task with humans is based on Mazur's (1987) procedures for studying nonhuman animals. This early task used consumable reinforcers, in which subjects decided between two rewards, the smaller, sooner alternative (SS), and one that is a larger, later alternative (LL). This second option is delayed by some amount of time that varies. Choice pairs are presented multiple times, and participants are asked to choose the one they prefer each time. Each choice affects the final value of k , the point of preference reversal (Smith & Hantula, 2008).

A majority of research with humans, using both the self-control paradigm and the delay discounting task, has used money as a reinforcer almost exclusively. Previous research has shown that participants demonstrate self-control when the reward is points exchangeable for money (Logue et al., 1990, 1986). Other research has shown that the type and quality of reinforcer affects self-control in adult humans (Forzano & Logue 1994; 1995). For example, when consumable reinforcers, such as food or video are used, people are much more likely to show impulsivity (Forzano & Logue 1992; Logue & King 1991; Forzano et al., 2014). In addition, there is also much more individual variation when food is used as a reinforcer because of the many factors surrounding eating behaviors. For example, availability of food, presence of visual food cues, dieting status, hunger, and deprivation have all been shown to have an effect on self-control choices made during these tasks (Forzano et al., 2011; 2010; 2003; Forzano & Corry, 1998; Forzano & Logue, 1992; Kirk & Logue, 1997).

In contrast to the traditional delay discounting task with money, one study by Rasmussen, Lawyer & Reilly (2010), used bites of food as the reinforcer. In this task, participants were told that they would have the opportunity to choose between different amounts of food after delays of different lengths. They were asked to imagine a ½ inch cube of their favorite food, and answer questions about this chosen food. The delay discounting task presented a series of choices between a smaller number of bites immediately and 10 bites of food after delays of 1, 2, 5, 10 and 20 hours. This task asked questions like “would you rather eat 10 bites of your favorite food available in 1 hour, or 2 bites available in 5 hours?” It was made clear that these were hypothetical questions and that the participant would not actually receive any of the rewards chosen (Rasmussen, Lawyer & Reilly, 2010). They did not, however, keep track of the type of food the participant was visualizing for the task.

There are big differences between using food as opposed to money, just based on the nature of the reinforcer. Food is a more immediate, primary reinforcer. It is also consumable and therefore perishable. Money is secondary, and can be used to obtain something else at a later time. Humans tend to discount the value of delayed hypothetical food rewards more steeply than other reinforcers like hypothetical money. In other words, the switching point comes up sooner for food than other things, and people show more impulsivity (Odum et al., 2006). This could be because food is perishable and dependent on the individual's current level of hunger and other factors. Money holds its value over time and can be used when and however the individual wants to use it. (Forzano et al., 2014).

Impulsivity and Food Intake

Food choices are very complex and dependent on a variety of factors. What, when, and why we choose to eat depends on physiology, hunger, mood, and psychological and social factors. Certain traits, like impulsivity, have been thought to influence eating behavior, as well, and there have already been studies demonstrating this link. High impulsive women ate more during a fake taste test than low impulsive women, and also showed more eating disordered behaviors (Guerreri, Nederkoorn, & Jansen, 2007). Both self-reported, as measured by The Barratt Impulsiveness Scale, and behavioral trait impulsivity, as measured by The Stop Signal Reaction Time, were found to predict greater food intake (Guerreri et al., 2007).

Restraint

There are also numerous factors that affect food intake. Restraint status is defined as effort expended towards weight suppression, regardless of the actual success in doing so (Herman & Polivy, 1980). In general, restrained eaters will eat minimally under normal

circumstances, but when faced with a high calorie preload, most eat a large amount (Polivy, Heatherton, & Herman, 1988). Restraint status has been successful at predicting consistent group differences between dieters and nondieters, but it has been less successful at predicting individual behavior because of the large within-group variability (Polivy, Heatherton, & Herman, 1988). In general, dieters exhibit periods of restraint interrupted by overeating, and as a result do not lose any significant amount of weight (Heatherton et al., 1988).

Dieting

Dieting status is a similar concept to restraint. “Current dieting” refers to a current effort to reduce caloric intake to lose weight. Current dieters are considered restrained eaters but not all restrained eaters are currently dieting (Lowe, 1993). Current dieters are likely to think about their diets in all-or-none terms. Either they are dieting or they are not dieting. So when they “breach their diet boundary,” or break the rules they set for themselves, they are no longer dieting. This all-or-none attitude could explain research findings that have shown that after a “fattening” preload, or food eaten before the main task that is perceived as caloric, chronic dieters eat more than nondieters (Herman & Mack, 1975). Also, disinhibitors like anxiety, depression, and alcohol, which normally suppress nondieter’s eating, actually increased eating in dieters (Polivy & Herman, 1976a, 1976b; Herman & Polivy, 1975). In self-control research, dieters have been shown to have less self-control when food cues are present, as opposed to nondieters who are not affected by food cues (Forzano & Corry, 1998). Dieters’ deprivation, and perception of their deprivation and hunger level can explain why it has been demonstrated that they show less self-control for food reinforcers than nondieters (Forzano & Logue, 1992). Because dieting status seems to have such an effect on eating behavior (Forzano & Corry, 1998), self-control research

using food reinforcers tends to exclude dieters altogether (Forzano et al., 2010; Forzano et al., 2014).

Mood and Food Intake

In a majority of research examining mood and food intake, negative mood has been hypothesized to make people vulnerable to overeating (Greeno & Wing, 1994). Negatively valenced emotions, such as depression, anxiety, and anger have been shown to trigger overeating especially in restrained eaters. Frost et al. (1982) induced negative mood using negative adjectives, resulting in increased food intake among restrained eaters.

Positive mood has been relatively under investigated as a trigger for food intake (Evers et al., 2013). However, there are many reasons why positive mood would trigger food intake, including an associative learning mechanism where positive feelings have been associated with eating more (Patel & Schlundt, 2001). Culturally, food is celebratory, and therefore associated with positive experiences (Rozin, 1999). Also, socializing, a generally positive experience, and eating are closely connected, as food consumption tends to increase in the presence of others (Patel & Schlundt, 2001).

In a study by Evers et al. (2013) positive emotions induced through a 2.5-minute film resulted in a higher snack intake than the no emotion control during a 10-minute false taste test. A second study done to try and replicate these findings showed that positive emotions induced with a memory recall task caused more food intake than the no emotion control. However, positive and negative emotions had the same effect on food intake. A third study by the same group, this time done with a food diary recording organic emotional events and food intake, showed that consumption of snacks was more frequently preceded by positive emotions (Evers et

al., 2013). Macht (1999) found that motivation to eat was stronger during joy than sadness. However there is also evidence to suggest that these positive emotions only trigger food intake in individuals who scored low on restraint and disinhibition scales (Yeomans & Coughlin, 2009). Similar results have been shown for those diagnosed with bulimia and binge eating (Davis, Freeman & Garner, 1988). Highly restrained eaters respond more to negative emotions, while unrestrained eaters respond to positive emotions. This could be because positive moods, according to the "mood maintenance theory," encourage people to decide against eating more because they know that doing so would negatively affect their mood (Andrade, 2005).

Another possibility is that neither positive nor negative emotions, but rather intense emotional arousal in either direction, are responsible for increased food intake (Greeno & Wing, 1994). In a study where negative, positive, and neutral mood was induced through films, negative mood triggered higher food intake in participants higher in restraint. Participants in the positive mood condition also showed higher food intake, but to a lesser extent. This shows that mood has a disinhibiting effect on food intake in restrained eaters (Cools, Schotte, McNally, 1992).

Food and Neurotransmitters

Certain types of foods affect mood in different ways. There is some evidence that carbohydrates in particular have an effect on mood. The general hypothesis is that carbohydrate ingestion affects mood by increasing the synthesis and release of serotonin (Christensen, 1997). Essentially, more carbohydrates create more blood glucose. This in turn causes the release of a higher amount of insulin. Then there is more tryptophan created than the other amino acid, LNAA. Since tryptophan is the precursor to serotonin, more serotonin is synthesized (Christensen, 1997). The expectancy effect also contributes to carbohydrates effect on people.

According to this principle, people expect to feel good after eating carbohydrates, perhaps due to popular knowledge that good mood is associated with this food group, or past personal experiences, and so they do feel good (Christensen, 1997).

Interactions between serotonin and dopamine have been shown to contribute to the expression of impulsivity (Dalley & Roiser, 2012). Dopamine and serotonin work very closely, so it becomes difficult to know which effects are attributed to which neurotransmitter. Dopamine release is in part regulated by serotonin release (Meguid et al., 2000). Dopamine plays a large role in the treatment of ADHD, and stimulants that increase dopamine function in the brain have been shown to effectively treat ADHD (Dalley & Roiser, 2012). Looking at this mechanism from another angle, administration of D1 and D2 receptor antagonists increase impulsivity as demonstrated by a delay discounting task (Dalley & Roiser, 2012), however this is only when there is a cue to the larger reward. This is due to their strong preference for the large reward.

Animal studies have demonstrated that depleting serotonin in the brain of rats impaired behavioral restraint (Harrison, Everitt & Robbins, 1999; Masaki et al., 2006). This depletion, regardless of how it is achieved, reliably increases the likelihood of premature responding. This result has been shown with action restraint, however, and not in a delay discounting task (Eagle, Bari & Robbins, 2008).

Research has shown that suicide attempters score higher on both questionnaire and some behavioral measures of impulsivity (Klonsky & May, 2010). There are lower serotonin levels in those who attempt and complete suicide. In those who complete suicide, there is abnormal postmortem receptor binding of serotonin. However, this serotonin pattern is also seen in those with depression, bipolar disorder, and schizophrenia (Dalley & Roiser, 2012). Therefore, there are many other possible causal factors. The strongest evidence linking serotonin and impulsivity

is in tryptophan depletion studies. Many studies have demonstrated that when participants ingest an amino acid mixture without tryptophan, greatly reducing it in the body, impulsivity as measured by behavioral measures, such as delay discounting, is increased (Crean, Richards, de Wit, 2002; Schweighofer et al., 2008). Though a simple influence of serotonin on impulsivity is not supported, there is a link that needs more investigation in the future (Dalley & Roiser, 2012).

The Current Experiment

The major objective of the current research was to examine the way mood influences the relationship between our decisions about food and impulsive behaviors. More specifically, the purpose of this experiment was to investigate the effect of mood on delay discounting for hypothetical food rewards. The major hypothesis of this experiment predicted that mood would have an effect on impulsivity for food. Specifically, it was predicted that positive and negative mood would increase impulsivity with respect to hypothetical food reinforcers compared to neutral mood.

To test these predictions, the current study asked female undergraduate psychology students at the College at Brockport to participate in a mood manipulation procedure. Mood was manipulated using pieces of classical music whose effects are supported by previous research. Once they were in the desired mood state, a computerized delay discounting task was administered where the participants were asked to choose between varying amounts and delays of hypothetical food rewards. Additionally, the Three Factor Eating Questionnaire (TFEQ), the Perceived Stress Scale (PSS), the Pittsburgh Sleep Quality Index (PSQI), the Positive and Negative Affect Scale (PANAS), the Emotional Appetite Questionnaire (EMAQ), and a mood check were administered. Based on these measures, several additional relationships were hypothesized.

Hypothesis 2: Self-control would be positively correlated with the cognitive restraint and disinhibition of eating factors of the TFEQ, and negatively correlated with hunger, the third factor.

Hypothesis 3: Decreased sleep quality, as measured by the PSQI, would be negatively correlated with perceived stress. This relationship would be related to increased disinhibition of eating and decreased self-control.

Hypothesis 4: Participants in group 1, the positive mood group, would show higher scores on the positive scale of the PANAS than group 3. Participants in group 3, the negative mood group, were hypothesized to show higher scores on the negative scale of the PANAS than group 1.

Hypothesis 5: Sleep quality would be positively correlated with self-control.

Hypothesis 6: Perceived stress would be negatively correlated with self-control.

Method

Participants

194 female participants signed up to participate from a participant pool of undergraduate students enrolled in PSH 110, Principles of Psychology, at the College at Brockport during Spring and Fall 2015. Fifty-five percent of Brockport undergraduate students are female. Seventy-eight percent are white, ten percent are black or African American, five percent are Hispanic, and fewer than two percent are Asian (SUNY Brockport). There were 22 participants whose BMI was 30 or greater, qualifying them as obese, who were not chosen to participate due to findings that demonstrate those with higher body mass indices tend to show more impulsivity (Pignatti et al., 2006), and in particular obese women show more impulsivity in delay

discounting tasks (Weller et al., 2008). Fifty-three of the participants showed signs of depression as indicated by scores of 16 or higher on the Center for Epidemiological Studies Depression Scale (CES-D; Eaton et al., 2004) and were also not chosen to participate due to mood manipulations involved in the current study, as well as evidence showing depression increases eating in some individuals (Polivy, Heatherton, & Hermann, 1988).

Procedure

Students enrolled in PSH 110, Principles of Psychology at the College at Brockport, used the online SONA program (a participant pool management system) to sign up for this study, and received one research credit in that course for each part of the study. For the first part of the study, the prescreening, a notice on SONA said that females 18 or older were needed to complete an online survey that would take 15 minutes to complete and that they would receive one research credit. First participants saw a consent form for the questionnaire (See Appendix A: Consent Form-Questionnaire). The questionnaire was hosted on Qualtrics, an external survey site, and a link to it was provided on SONA. There were three parts to this questionnaire (See Appendix B- Questionnaire). In order to compare the current findings to previous research, those with obesity or at risk for depression were excluded. Therefore, the first part of the questionnaire asked for height in feet and inches, and weight in pounds, in order to calculate Body Mass Index (BMI) according to the National Institute of Health's standards. In order to make it less obvious that BMI was being calculated, this questionnaire also asked for age, gender, date of birth, and eye color. Next, to screen for depression, the Center for Epidemiological Studies Depression Scale (CES-D) was used (Eaton et al., 2004). If their scores passed the cut-off for depressive symptoms, which is a score of 16 or less, and their BMI was less than 30, they were notified of

an opportunity to participate in another study. Finally, in order to ensure that research credit in PSH 110 was given, students' were asked for their names and the number of their class section.

After meeting the prescreening criteria, 114 participants who passed the prescreening were contacted again through SONA asking if they would like to participate in another study (i.e., the second half of the study). The recruitment notice indicated that females 18 years or older were needed for a study that would take about 45 minutes to complete, and would involve listening to music and completing several questionnaire measures, in writing and on a computer. Some participants completed all questionnaire measures on a computer, and all received one research credit. Those that signed up on SONA were then assigned a participant number which was the only way they were identified throughout the study. The design for the second part of the study was a between-subjects experiment with three groups, one for the positive mood condition, one for the neutral mood condition, and one for the negative mood condition. Participants were randomly assigned to a group upon agreeing to participate in the second part of the study.

For the second part of the study, each participant individually came in to a Psychology lab in Holmes Hall (i.e., a room approximately 7x10, containing a table, chairs, a desktop computer, monitor, and mouse). All participants during the Spring 2015 semester completed the same measures in paper and pencil form, and the participants during the Fall of 2015 completed all measures and forms in an online format, in addition to two measures (Appendix E, F) that were added on after the start of the research. All participants were seated in front of a computer and were given a consent form, either electronic or paper and pencil, to read and sign (See Appendix C: Consent Form-Study) and upon consent, were asked to complete the Three Factor Eating Questionnaire (TFEQ; Stunkard & Messick, 1985. See Appendix D). This measure,

commonly used in eating research, is a 51-item self-report measure with three subscales: cognitive restraint, perceived hunger, and disinhibition of eating.

Next, the participants during Fall 2015 were asked to complete the Perceived Stress Scale (PSS; Cohen & Williamson, 1988. See Appendix E). This is a 10-item self-report questionnaire in which participants rate how often they felt or thought in a certain way over the past month using a 5-point Likert scale (0=never; 4=very often). Higher scores indicate greater perceived stress.

Next, the Pittsburgh Sleep Quality Index was presented to the participants during Fall 2015 (PSQI; Buysse et al., 1989. See Appendix F). This 24 item self-report measure asks about typical sleep habits over the past month. Subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medications, and daytime dysfunction are measured. The last 5 items, which direct the participant to ask a roommate or bed partner about their sleep patterns, were excluded because the participant completed this measure alone.

Then, the participant was prompted by either the researcher or the computer program to put on headphones and listen carefully to the music, and then the music started for the Musical Mood Induction Procedure (MMIP; Västfjäll, 2002). Music is commonly used to temporarily influence moods (Albersnagel, 1988; Bouhuys et al., 1995; Clark et al., 2001; Clark & Teasdale, 1985; Heatherton et al., 1998; Stober, 1997; Willner et al., 1998; Wood et al., 1990; Västfjäll, 2002). There were three possible music options, depending on the group that the participant was randomly assigned to. One group listened to a positive mood song selection (Delibes “Coppelia”), the second group listened to a neutral mood song selection (Faure “Ballad for Piano and Orchestra, Op. 19”), and the third group listened to a negative mood song selection

(Prokofiev “Russia under the Mongolian Yoke”). Each piece of music has been used in previous research (Bouhuys et al., 1995; Clark et al., 2001; Clark & Teasdale, 1985; Heatherton et al., 1998; Stober, 1997; Willner et al., 1998; Wood et al., 1990). Each songs run time was between 3-4 minutes.

After the song was over, the participant was prompted to complete the Positive and Negative Affect Scale (Watson, Clark & Tellegen, 1988. See Appendix G). This 20-item questionnaire has two scales, one measures positive affect, or the extent to which a person feels enthusiastic, active, alert, and pleurably engaged. The other measures negative affect, which is the subjective distress and unpleasurable engagement that includes a variety of negative mood states, including anger, disgust, guilt, fear, and nervousness. This scale has been shown to be valid and reliable (Watson et al., 1988).

When that measure was completed, the participant was presented with a computerized delay discounting task. This program, written in Visual Basic, was modified to ask questions about food reinforcers from the program used by Mitchell (1999). This program, and similar others, have been used in a number of studies (Johnson, & Bickel, 2002; Rasmussen, Lawyer & Reilly, 2009; Reynolds et al., 2004; Richards et al., 1999). The following instructions were presented on the screen:

“For this task imagine one standardized bite of your favorite snack food from the following list: chips, cookies, chocolate, pretzels, popcorn. This task has 138 questions. For each question, you can choose between 2 options by clicking on it using the computer mouse. You can change your selection as often as you like and

there is no right or wrong answer- we are interested in your personal preferences. Once you have decided which option you prefer you can register your preferences and go on to the next question by clicking on the 'next question' box. One option will always be some amount of food available now. The other option will always be a fixed amount of food available after a waiting period. The waiting period will vary between 0 minutes (now) and 20 hours. Imagine that the choices you are making are real- that if you choose 'food now' you would receive that amount of food at the end of the task and that if you choose 'food later' that you would actually have to wait before receiving the food. Please try the demonstration below. When you are ready to begin the task, click on the 'begin task' box."

This task consists of 138 questions that ask the participant which of two hypothetical food choices is preferred. Each question asks, "At this moment, what would you prefer?" and the participant has the option to click, for example, either "10 bites in 10 hours" or "3 bites now." In each question, participants are presented with a binary choice. There is a standard and an alternate choice presented in every question. The standard choice offers 10 bites at a delay varying between 0 minutes, 15 minutes, 30 minutes, 1 hour, 5 hours and 10 hours. The alternative choice offers between 0 and 10 bites now. The amount of food bites and the delay times are presented in random pairs to form the 138 binary choices the participant is asked to make. The amount of food bites and delay times were based on those used in a similar task by Rasmussen, Lawyer, and Reilly (2010). This task took approximately 10-15 minutes.

After completing the delay discounting task, the participants in the negative mood condition listened to the positive mood song selection. All participants completed a 5-item mood check modeled after one used by Rosenhan, Salovey & Hargis (1981; See Appendix H) which consists of five sets of binary mood adjectives on opposite ends of a 7-point Likert scale. Participants were only allowed to leave if their score, an average of the five chosen numbers, was 4 or less. If the participant scored higher than a 4, a different song selection, Mozart's *Eine Kleine Nachtmusik*, Allegro, demonstrated to induce a positive mood (Eich & Metcalfe, 1989; Gorn et al., 2001; Martin & Metha, 1997; Trambakolous, 1997) was played, and the measure was taken again.

Finally participants completed the Emotional Appetite Questionnaire (EMAQ; Geliebter & Aversa, 2003; See Appendix I). This measure consists of 22 questions about the tendency to eat in response to positive and negative situations and emotions. Each item is rated on a 9-point Likert scale in response to the question "As compared to usual, do you eat" with "much less" and "much more" on either side, and 5 being equal to "the same." There is also the option to indicate "not applicable" or "don't know." This measure shows high convergent validity with the Dutch Eating Behavior Questionnaire (DEBQ; van Strien et al., 1986), which has itself been highly validated. Discriminant validity was demonstrated by low correlations between the EMAQ's positive scores and the DEBQ-E score. Both of the negative emotion EMAQ scales were significantly positively correlated with BMI. Overall, it shows good construct validity as compared to the DEBQ, which is a more established questionnaire (Nolan, Halperin, & Geliebter, 2010).

Participant's names were only recorded at the prescreening questionnaire so that they could be assigned research credit and so that data for prescreening could be linked to their study data. After data were linked, names were removed. For the rest of the experiment, responses were recorded by participant number and no names appeared anywhere. All data were kept locked in Dr. Forzano's laboratory on the college campus on password protected computers. Data and consent forms will be destroyed by shredding and deleting when the research has been accepted and approved.

Results

Data Scoring

Data were collected from seven questionnaires and the delay discounting task. Scoring the screening questionnaire consisted of a BMI calculation, and scoring the CES-D (Eaton et al., 2004). BMI was calculated by dividing weight in kilograms by height in centimeters. To make this calculation easier, the BMI calculator on the National Institute of Health's website (U.S. Department of Health and Human Services) was used. With this online tool, the participant's height and weight was entered using standard measurements, and the classified into a category, underweight, normal weight, overweight, or obesity, according to a chart provided on the website. The CES-D is scored by assigning a value between zero and three to each of the five potential choices. "Not at all or less than 1 day last week" received a score of zero, "one or two days last week" received a score of one, "three or four days last week" received a score of two, and both "five to seven days last week" and "nearly every day for two weeks" received a score of three. When all individual scores per question were added up, a total score of 16 or more indicated that the participant was possibly at risk for clinical depression. This measure is a screening test, not a diagnostic tool.

The Three Factor Eating Questionnaire (TFEQ; Stunkard & Messick, 1985) is a 51-item questionnaire that measures three dimensions of eating behavior: cognitive restraint, disinhibition, and hunger. Each of these is a factor, for which there are 21, 16, and 14 items respectively. Part I consists of 36 true/false questions, and the second consisting of item 37-51 which are rated on a four-point scale, with the exception of question 50, which is rated on a 5-point scale. The maximum score possible for factors 1, 2, and 3 is 21, 16, and 14, and 0 is the minimum score for all three factors.

The Perceived Stress Scale (PSS; Cohen & Williamson, 1988) asks participants about the feelings and thoughts they have experienced over the last month on a 5-point Likert scale, with values from 0-4. It is scored by reversing items 4, 5, 7, and 8, and then adding up the 0-4 choice made by the participant. A higher score indicates higher perceived stress levels.

The Pittsburgh Sleep Quality Inventory (PSQI; Buysse et al., 1989) is scored by combining the individual scores for duration of sleep, sleep disturbance, sleep latency, day dysfunction due to sleepiness, sleep efficiency, medication to sleep, and overall sleep quality. Duration of sleep is calculated by coding reported number of hours slept into a value 0-3. Sleep disturbance is calculated by adding the ratings of how often participants are disturbed by eight different common nighttime disturbances, and then assigning that sum a value 0-3. Sleep latency is calculated by recoding reported number of minutes participant takes to fall asleep into a value 0-3, and adding that value to a 0-3 score based on reported difficulty falling asleep within 30 minutes. That combined score is also a value 0-3. The remaining factors are scored similarly, and all of the seven 0-3 values calculated are summed to find a global sleep quality score. A score of 5 or greater is associated with poor sleep quality.

The Positive and Negative Affect Scale (PANAS; Watson, Clark & Tellegen, 1988) consists of 20 words that describe different feelings and emotions. Participants are asked to indicate to what extent they feel this way at the present moment by giving each word a numerical rating from 1-5. To obtain the positive affect score, items 1, 3, 5, 9, 10, 12, 14, 16, 17, and 19 are added. Higher scores represent higher levels of positive affect. The remaining items are totaled to find the negative affect score. Higher scores on these items represent higher negative affect.

The delay discounting task (Mitchell, 1999) was scored by calculating how many times the larger, later option was chosen out of the total 138 times the choice was posed. This larger, later option is the self-control choice, based on the definition of self-control as the choice of a larger, later reward over a smaller, sooner one. The proportion of self-control choices made is represented by a number between 0 and 1, with numbers closer to 1 indicating more self-control.

The Mood Check is a five-item questionnaire based on a questionnaire by the same name developed by Rosenhan, Salovey and Hargis (1981) to assess whether the participant has sustained any lasting effects of mood after participation. Each of the five items consists of a pair of binary emotion words: elated/depressed, happy/sad, good/bad, exhilarated/dejected, satisfied/dissatisfied. Between the word pairs are numbers 1-7, and the participant is asked to choose a number based on how they feel, 1 meaning they feel the emotion next to it on the left, and 7 meaning they feel the emotion next to it on the right. If the average of their five chosen numbers is below 4, the participant is asked to listen to another musical selection proven to induce a positive mood, and complete this questionnaire a second time.

The Emotional Appetite Questionnaire (EMAQ; Geliebter & Aversa, 2003) is scored by adding up the number on the 9-point Likert scale that the participant has chosen. All of the items are separated into either positive or negative emotions and situations, and the mean for both the

positive and negative group is found for each person. The researcher can tell from this information if the participant experiences a change in eating habits under positive, negative, or both emotional valences.

Data Collected

Table 1. Data collected.

Participant#	Semester_run	Date_run	Time_run	Age	BMI	CESD_score	Group
1	1	4/20/2015	12pm	19	28.9	4	1
3	1	4/21/2015	3:30pm	18	19	15	3
4	1	4/21/2015	6:30pm	20	24.3	7	1
5	1	4/21/2015	7:30pm	18	23.6	2	3
6	1	4/21/2015	8:30pm	18	23.4	11	2
7	1	4/22/2015	6pm	18	21.9	14	1
8	1	4/22/2015	7pm	18	20.8	2	3
9	1	4/22/2015	6pm	19	27.5	7	2
10	1	4/24/2015	9:05am	18	23.2	12	1
12	1	4/27/2015	10:10am	19	19.4	9	2
13	1	4/27/2015	10:10am	18	29	15	1
14	1	4/27/2015	11:15am	20	25.6	15	3
15	1	4/29/2015	6:30pm	19	26.5	15	2
16	1	4/29/2015	6:30pm	18	23.8	5	1
17	1	4/30/2015	3:30pm	18	20.4	12	3
18	1	5/1/2015	2:30pm	18	24.4	8	2
19	1	5/4/2015	11:15am	19	22	12	1
20	1	5/5/2015	3:30pm	18	23.9	7	3
21	1	5/4/2015	2:30pm	18	20.7	13	2

22	1	5/7/2015	5:30pm	22	26.6	5	1
23	2	10/2/2015	8am	18	20.5	8	3
24	2	10/2/2015	9:05am	21	24	9	2
25	2	10/2/2015	2:30pm	18	25	5	1
26	2	10/2/2015	2:30pm	18	22	8	3
27	2	10/2/2015	3:35pm	18	20.6	7	2
28	2	10/5/2015	2:30pm	18	19.9	5	2
29	2	10/5/2015	3:35pm	18	19.5	8	2
30	2	10/5/2015	4:45pm	33	21.7	12	3
31	2	10/6/2015	12:30pm	19	25	7	1
32	2	10/6/2015	12:30pm	18	24.2	15	3
33	2	10/6/2015	12:30pm	18	22.6	9	2
34	2	10/6/2015	5pm	19	24.1	6	1
35	2	10/6/2015	5pm	18	21.6	11	3
36	2	10/8/2015	5pm	18	27.3	4	2
37	2	10/8/2015	5:45pm	18	26.5	9	1
38	2	10/12/2015	2:30pm	19	26.6	0	3
39	2	10/12/2015	3:35pm	18	21.6	4	2
40	2	10/13/2015	12:30pm	18	24.2	14	1
41	2	10/22/2015	12:30pm	19	19.5	6	3
42	2	10/22/2015	5pm	18	27.3	9	2
43	2	10/22/2015	5pm	18	27.3	11	1
44	2	10/22/2015	5pm	18	19.8	0	3
45	2	10/22/2015	6:30pm	21	21.6	7	2
46	2	10/26/2015	9:05am	19	26.5	13	1
47	2	10/29/2015	5pm	18	21.6	1	3
48	2	10/26/2015	2:30pm	18	19.5	13	2

49	2	10/27/2015	12:30pm	18	25.1	13	1
50	2	10/27/2015	6:30pm	19	20.8	8	3
52	2	10/29/2015	5pm	18	21.9	7	1

Table 1 cont.

Participant#	TFEQ_FAC 1	TFEQ_FAC 2	TFEQ_FAC 3	PSS	PSQI	PANAS_pos	PANAS_neg	propSC
1	18	7	9			22	16	0.38
3	2	4	11			10	12	0.62
4	14	5	6			29	11	0.54
5	9	5	3			20	10	0.43
6	8	5	8			20	10	0.71
7	10	6	4			12	15	0.34
8	8	4	3			22	10	0.49
9	14	10	3			26	11	0.72
10	12	10	7			19	13	0.2
12	6	6	11			32	11	0.53
13	12.5	10	4			38	14	0.49
14	16	8	5			25	11	0.64
15	5	5	7			14	13	0.45
16	6.5	7	8			27	17	0.41
17	11	6	9			15	22	0.47
18	5	5	4			18	13	0.28
19	4	4	5			23	12	0.31
20	11	5	5			20	10	0.79
21	15	10	7			29	12	0.29

22	5	5	9			12	22	0.53
23	4	6.5	3	23	10	11	10	0.44
24	6	6	6	18	5	13	11	0.47
25	11	7	7	11	7	26	11	0.87
26	8	10	6	15	4	22	11	0.68
27	6	4	5	18	7	18	10	0.79
28	5	2	2	14	7	36	12	0.57
29	2	6	5	32	10	27	22	0.2
30	15	4	3	14	5	32	10	0.22
31	6	8	7	55	8	19	12	0.57
32	14	9	5	23	8	34	20	0.54
33	12	4	10	21	9	33	20	0.22
34	9	8	8	11	3	25	11	0.83
35	9	4	5	16	12	17	16	0.78
36	9	8	6	17	5	18	12	0.33
37	5	10	9	22	7	40	16	0.62
38	8	5	7	9	2	23	10	0.16
39	9	3	4	12	9	18	10	0.59
40	14	3	3	11	6	29	10	0.6
41	6	4	8	11	5	33	11	0.52
42	2	13	12	27	12	12	17	0.3
43	8	6	6	19	?	28	13	0.77
44	0	3	6.5	13	4	29	13	0.25
45	11	7	5	9	2	29	16	0.07
46	17	6	9	22	2	23	19	0.33
47	14	6	6	11	5	22	13	0.72
48	1	2	6	25	7	17	15	0.51

49	10	3	2	17	8	37	16	0.22
50	3	4	5	22	8	21	18	0.19
52	3	9	9	14	6	28	17	0.5

Table 1 cont.

Participant#	mood_check	mood_check2	(+)emotion_mean	(+)situation_mean	Total(+)mean	(-)emotion_mean	(-)situation_mean	Total(-)mean
1	4.6		6	6.67	6.33	4	3.25	3.63
3	2		6.2	7	6.6	3.56	3.6	3.58
4	2.6		4.33	5	4.67	4.56	3.2	3.88
5	2.4		3.2	3	3.1	6.43	5.6	6.01
6	2.4		5.8	4	4.9	5.11	5.2	5.16
7	4.4		4.4	4	4.2	4.25	4.8	4.53
8	2.2		5	5	5	4.11	3.6	3.86
9	3.2		3.4	2	2.7	6.44	6.4	6.42
10	3		5	5	5	5.22	5.4	5.31
12	2		5.6	5.67	5.63	5.56	5.2	5.38
13	1.4		5	6	5.5	5.56	5.25	5.4
14	2.8		5	4.6	4.8	4.3	4.6	4.45
15	5.6	3.6	5.4	6	5.7	3.7	5.2	4.45
16	2.8		5	5	5	5.1	4	4.55
17	3.4		4.6	4.67	4.63	4.78	3.8	4.29
18	4.2	1.8	3.6	4.67	4.13	4.33	4.6	4.47
19	3.2		3.8	3	3.4	4.22	3.8	4.01
20	3.6		5	4.67	4.88	4.88	4	4.4

21	3.4		5	4	4.5	7	6.2	6.6
22	2.2		5	5.3	5.15	5.1	4.8	4.95
23	4	2.8	4.8	5.67	5.23	6.11	5.6	5.86
24	1.4		5	5	5	6.78	5.8	6.29
25	3		4.2	5.33	4.77	4.33	2.6	3.47
26	2.8		3.6	4.67	4.13	6	5.4	5.7
27	3		5	5	5	5	5	5
28	4.2	4	5	5	5	3	2.2	2.6
29	1.4		5	5	5	4.78	4.4	4.59
30	4.2	3.4	2.6	3	2.8	1.67	1	1.33
31	3.6		5	5	5	5.67	5.2	5.43
32	4	5	5	5.33	5.17	5	3.2	4.1
33	2.4		4.8	5.67	5.23	4.89	4.6	4.74
34	3		5.4	5	5.2	5.11	4.75	4.93
35	5.8	1	5	5	5	3.22	3	3.11
36	3.8		4.6	4	4.3	6.13	3	4.56
37	2.2		4.4	3	3.7	4.25	5.67	4.96
38	3.2		5	5.33	5.17	5.67	5.2	5.43
39	2		5	4.67	4.83	4	3	3.5
40	2.6		5	5.33	5.17	4.44	3.2	3.82
41	3.8		5.2	5.33	5.27	4.11	3.2	3.66
42	2.6		2.2	3.67	2.93	4.11	1.4	2.67
43	1.4		5.8	7.67	6.73	1.67	1	1.33
44	1.8		5	5.33	5.17	3.33	1.8	2.57
45	2.4		4.4	5.33	4.87	5.56	3.6	4.58
46	3		4.6	4.33	4.47	5.22	3.2	4.21
47	2.8		4.8	4.33	4.57	4.56	2.6	3.58

48	3.4		7	6	6.5	5	4.8	4.9
49	4.6	3.8	5	5	5	4.11	3.2	3.66
50	3.4		6.4	6	6.2	3.44	2.4	2.92
52	2.2		4.6	5	4.8	6.22	4.4	5.31

Analyses

The proportion of self-control choices made was compared to positive and negative affect, restraint, disinhibition, hunger, sleep quality, and stress level within each mood group using one-way ANOVAs. It is expected that the results will show increased impulsivity for both positive and negative mood conditions. The neutral mood condition is expected to show no increase in impulsive behavior. It is plausible that either positive or negative mood will increase impulsivity. It is also possible that none of the mood conditions increase impulsivity.

If both positive and negative mood conditions are shown to increase impulsive behavior as measured by response to hypothetical food choices, the hypothesis will be supported. If just one of the mood conditions, or the neutral mood condition increases impulsivity, the hypothesis will not be supported. If none of the experimental conditions increase impulsivity, the hypothesis will also be unsupported. If the current hypothesis were supported, it would be consistent with the research of Cools, Schotte, and McNally (1992) and Greeno and Wing's 1994 study.

Hypothesis 1: To test the major hypothesis of this experiment that positive and negative mood would increase impulsivity compared to neutral mood, an ANOVA was conducted with the mood group as the independent variable, and the proportion of self-control choices as the dependent variable. No significant difference was found ($F(48) = 0.452$; $p = 0.639$; $M_{pos} = 0.501$, $M_{neg} = 0.496$, $M_{neut} = 0.439$).

Hypothesis 2: To test the hypothesis that self-control would be positively correlated with the cognitive restraint and disinhibition of eating factors of the TFEQ, and negatively correlated with the hunger factor, a correlation was conducted. Self-control was not found to be significantly positively correlated with the restraint factor ($r(47) = 0.076, p = 0.603$), nor with the disinhibition factor ($r(47) = 0.032, p = 0.829$). Self-control was also not found to be correlated with the hunger factor ($r(47) = 0.017, p = 0.908$).

Hypothesis 3: To test the hypothesis that decreased sleep quality would be negatively correlated with perceived stress, and both would be related to increased disinhibition and decreased self-control, a multiple regression was run. Sleep quality, perceived stress, and disinhibition did not significantly predict proportion of self-control scores ($F(4, 23) = 0.451, p = 0.771, R^2 = 0.073$).

Hypothesis 4: To test the hypothesis that group 1 positive scores on the PANAS would be higher than those of group 3, and group 3 would score higher on the negative scale of the PANAS than group 1, a MANOVA was conducted. No significant difference was found between the positive PANAS score of group 1 and the positive PANAS score of group 3 ($F(2) = 1.064, p = 0.353$), nor between the negative PANAS score of group 1 and the negative PANAS score of group 3 ($F(2) = 0.716, p = 0.494$).

Hypothesis 5: To test the hypothesis that sleep quality would be positively correlated with proportion of self-control, a correlation was run. There was no significant relationship found ($r(47) = 0.119, p = 0.547$).

Hypothesis 6: A correlation was run to test the hypothesis that perceived stress would be negatively correlated with self-control. No significant relationship was found ($r(47) = -0.80, p = 0.681$).

Discussion

The purpose of this experiment was to investigate the relationship between mood and impulsive behavior regarding food. The major hypothesis predicted that both positive and negative mood, as opposed to neutral mood, would increase impulsivity for hypothetical food reinforcers, however, no significant relationships were found.

One potential reason there were no significant results found is that mood was not sufficiently manipulated. According to a manipulation check that was done by conducting a MANOVA, there was no significant relationship found between the positive PANAS score for group 1, and the positive PANAS score for group 3. There was also no significant relationship found between the negative PANAS score of group 1 and group 3.

Methodological changes may have had unintended effects that impacted the results. Students during the first half of the experiment completed all surveys, with the exception of the delay discounting task, as paper and pencil measures, where the experimenter came in and out to deliver each new survey. The second half of the study, the participants took all questionnaires in an online survey format. This was only potentially problematic for the Musical Mood Induction Procedure, where in the first half of the study, the experimenter came in to start the music, and then came back when the music was over to deliver the survey, ensuring that the participant at the very least listened to the music. In the online format, participants were prompted to listen to music, but they could have skipped through this part without having listened to the audio.

Sample size is another consideration. With only 50 participants, and even fewer who experienced a change in mood, there may not have been enough data to show a relationship.

Due to the hypothetical nature of the reinforcers, the potential external validity of the research is lessened. In previous studies where the musical mood induction procedure has predicted a food-related outcome, intake of real food was used (Cools, Schotte & McNally, 1992). Similarly, where other mood induction procedures were used, real food intake was measured (Evers et al., 2013; Yeomans & Coughlan, 2009; Patel & Schlundt, 2001). Also, many of these studies divided participants into groups based on restraint status (Evers et al., 2013; Yeomans & Coughlan, 2009) or used a particular group of women, for example, Patel and Schlundt's (2001) study exclusively used obese participants. A difference in procedure and type of participants could be part of the explanation for why no significant results were found in the present study.

It can be hard to reliably manipulate mood in the desired way, and then reliably measure mood. Therefore making secondary measurements based on a mood manipulation has the potential to be inaccurate. Though the MMIP has been validated by previous research, perhaps a different method should have been used in this setting and with this sample.

Additionally, there are other potential influences on outcome due to the method of using a participant pool to recruit participants. Students in an introductory psychology course are required to participate in studies of their choosing. While these participants are often not curious about what the study is investigating, they are also sometimes unconcerned with following directions or answering accurately.

The findings of this research will contribute to the growing literature concerning food choices and their influences. The findings will also add to the literature on impulsivity. The lack of expected results from the mood manipulation also contribute to existing literature describing how to effectively manipulate mood.

Future research might explore the possibility of using real food reinforcers or a more externally valid way of making food choices. Additionally, perhaps a stronger mood induction procedure is needed to sufficiently see the effects of such mood states.

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Appendix A: Consent Form- Questionnaire

Consent Form

The purpose of this research project is to examine individual choices when faced with varying amounts of food, offered at varying times. This research project is being conducted in order to meet an Honor's Program requirement in the Department of Psychology at the College at Brockport, SUNY.

In order to participate in this prescreening study, your informed consent is required. If you would like to participate in this prescreening, and agree with the statements below, please click "Continue" at the bottom of this page. You may change your mind at any time, even after the survey has begun.

I understand that:

1. My participation is voluntary, and I have the right to refuse to answer any questions.
2. Due to the online administration of this survey and the nature of the internet, complete confidentiality cannot be guaranteed. The researcher will be able to connect my name with my survey responses temporarily if I am chosen to participate in a future study. If any publication results from this research, I will not be identified by name.
3. I will receive one research credit for my PSH 110 class. There will be minimal risks of time to participate in this project. In addition, if I have any concern regarding my responses to questions on the survey, I can contact the Counseling Center at 395-2207.
4. My participation involves taking a 26 question survey on the computer. It is estimated that it will take 10 minutes to complete the survey.
5. Approximately 300 people will take part in this prescreening. My responses will determine whether I am contacted for another study. The results will be used for the completion of an Honors thesis by the primary researcher.
6. Data will be kept in the faculty advisor's locked laboratory on a password protected computer. Data and consent forms will be destroyed by shredding when the research has been accepted and approved.

I am 18 years of age or older. I have read and understand the above statements. All my questions about my participation in this study have been answered to my satisfaction. I agree to participate in the study realizing I may withdraw without penalty at any time during the survey process. Clicking "Continue" on this page indicates my consent to participate in this prescreening.

If you have any questions you may contact:

Primary researcher:

Madeleine Albano, malba1@u.brockport.edu, (631)766-2512

Faculty Advisor:

Dr. L. B. Forzano, Psychology Department, lforzano@brockport.edu, (585) 395-2759

Continue

Next screen is a link to Qualtrics

Appendix B: Screening Questionnaire

Gender:

Age:

Height:

Weight:

Date of birth:

Eye color:

For each statement, please indicate how often you have felt this way recently by selecting the option you most agree with.

1. My appetite was poor.

- Not at all or less than 1 day last week.
- One or two days last week.
- Three to four days last week.
- Five to seven days last week.
- Nearly every day for two weeks.

2. I could not shake off the blues.

- Not at all or less than 1 day last week.
- One or two days last week.
- Three to four days last week.
- Five to seven days last week.
- Nearly every day for two weeks.

3. I had trouble keeping my mind on what I was doing.

- Not at all or less than 1 day last week.
- One or two days last week.
- Three to four days last week.
- Five to seven days last week.
- Nearly every day for two weeks.

4. I felt depressed.

- Not at all or less than 1 day last week.
- One or two days last week.
- Three to four days last week.
- Five to seven days last week.
- Nearly every day for two weeks.

5. My sleep was restless.

- Not at all or less than 1 day last week.
- One or two days last week.
- Three to four days last week.
- Five to seven days last week.
- Nearly every day for two weeks.

6. I felt sad.

- Not at all or less than 1 day last week.
- One or two days last week.
- Three to four days last week.
- Five to seven days last week.
- Nearly every day for two weeks.

7. I could not get going.

- Not at all or less than 1 day last week.
- One or two days last week.
- Three to four days last week.
- Five to seven days last week.
- Nearly every day for two weeks.

8. Nothing made me happy.

- Not at all or less than 1 day last week.
- One or two days last week.
- Three to four days last week.
- Five to seven days last week.
- Nearly every day for two weeks.

9. I felt like a bad person.

- Not at all or less than 1 day last week.
- One or two days last week.
- Three to four days last week.
- Five to seven days last week.
- Nearly every day for two weeks.

10. I lost interest in my usual activities.

- Not at all or less than 1 day last week.
- One or two days last week.
- Three to four days last week.
- Five to seven days last week.
- Nearly every day for two weeks.

11. I slept much more than usual.

- Not at all or less than 1 day last week.
- One or two days last week.
- Three to four days last week.
- Five to seven days last week.

-Nearly every day for two weeks.

12. I felt like I was moving too slowly.

-Not at all or less than 1 day last week.

-One or two days last week.

-Three to four days last week.

-Five to seven days last week.

-Nearly every day for two weeks.

13. I felt fidgety.

-Not at all or less than 1 day last week.

-One or two days last week.

-Three to four days last week.

-Five to seven days last week.

-Nearly every day for two weeks.

14. I wished I were dead.

-Not at all or less than 1 day last week.

-One or two days last week.

-Three to four days last week.

-Five to seven days last week.

-Nearly every day for two weeks.

15. I wanted to hurt myself.

-Not at all or less than 1 day last week.

-One or two days last week.

-Three to four days last week.

-Five to seven days last week.

-Nearly every day for two weeks.

16. I was tired all the time.

-Not at all or less than 1 day last week.

-One or two days last week.

-Three to four days last week.

-Five to seven days last week.

-Nearly every day for two weeks.

17. I did not like myself.

-Not at all or less than 1 day last week.

-One or two days last week.

-Three to four days last week.

-Five to seven days last week.

-Nearly every day for two weeks.

18. I lost a lot of weight without trying to.

-Not at all or less than 1 day last week.

- One or two days last week.
- Three to four days last week.
- Five to seven days last week.
- Nearly every day for two weeks.

19. I had a lot of trouble getting to sleep.

- Not at all or less than 1 day last week.
- One or two days last week.
- Three to four days last week.
- Five to seven days last week.
- Nearly every day for two weeks.

20. I could not focus on the important things.

- Not at all or less than 1 day last week.
- One or two days last week.
- Three to four days last week.
- Five to seven days last week.
- Nearly every day for two weeks.

If you have any concern regarding your responses to questions on the survey, you can contact the campus Counseling Center at 395-2207.

So that we can ensure that you receive research credits in PSH 110, please type in your name

Last, first

And select your section

- Dr. Brown, MWF 8:00-8:50, Section 01
- Dr. Lipko-Speed, TR 11-12:15, Section 02
- Dr. Hobson, TR 5:00-6:15, Section 03
- Dr. Hobson, TR 6:30-7:45, Section 04
- Dr. Brown, MWF 11:15-12:05, Section 05

Appendix C: Consent Form- Study

Consent Form

The purpose of this research project is to examine individual choices when faced with varying amounts of food, offered at varying times. This research project is being conducted in order to meet an Honor's Program requirement at the College at Brockport, SUNY.

In order to participate in this study, your informed consent is required. If you would like to participate, and agree with the statements below, please sign your name in the space provided. You may change your mind at any time, even after the study has begun.

I understand that:

1. My participation is voluntary, and I have the right to refuse to answer any questions.
2. Due to the online administration of this survey and the nature of the internet, complete confidentiality cannot be guaranteed. The researcher will be able to connect my name with my survey responses temporarily if I am chosen to participate in a future study. If any publication results from this research, I will not be identified by name.
3. I will receive one research credit for my PSH 110 class. There will be minimal risks of time to participate in this project. In addition, this study may involve a temporary change in my emotions. If I have any concern I can contact the Counseling Center at 395-2207.
4. My participation involves listening to a musical selection and completing a computer survey of 138 of questions, and completing seven additional questionnaires. It is estimated that it will take a total of 45 minutes.
5. Approximately 80 people will take part in this study. The results will be used for the completion of an Honors thesis by the primary researcher.
6. Data will be kept in the faculty advisor's locked laboratory on a password protected computer. Data and consent forms will be destroyed by shredding and deleting when the research has been accepted and approved.

I am 18 years of age or older. I have read and understand the above statements. All my questions about my participation in this study have been answered to my satisfaction. I agree to participate in the study realizing I may withdraw without penalty at any time during the survey process. Clicking "Continue" on this page indicates my consent to participate in this prescreening.

If you have any questions you may contact:

Primary researcher:

Madeleine Albano, malba1@u.brockport.edu, (631)766-2512

Faculty Advisor:

Dr. L. B. Forzano, Psychology Department, lforzano@brockport.edu, (585) 395-2759

Continue

Next screen is a link to Qualtrics

Appendix D: TFEQ

TFE Questionnaire

Participant Number:

Part I

1. When I smell a sizzling steak or see a juicy piece of meat, I find it very difficult to keep from eating, even if I just finished a meal.

True False

2. I usually eat too much at social occasions, like parties and picnics.

True False

3. I am usually so hungry that I eat more than three times a day.

True False

4. When I have eaten my quota of calories, I am usually good about not eating any more.

True False

5. Dieting is so hard for me because I just get too hungry.

True False

6. I deliberately take small helpings as a means of controlling my weight.

True False

7. Sometimes things just taste so good that I keep on eating even when I am no longer hungry.

True False

8. Since I am often hungry, I sometimes wish that while I am eating, an expert would tell me that I have had enough or that I can have something more to eat.

True False

9. When I feel anxious, I find myself eating.

True False

10. Life is too short to worry about eating.

True False

11. Since my weight goes up and down, I have gone on reducing diets more than once.

True False

12. I often feel so hungry that I just have to eat something.

True False

13. When I am with someone who is overeating, I usually overeat too.

True False

14. I have a pretty good idea of the number of calories in common food.

True False

15. Sometimes when I start eating, I just can't seem to stop.

True False

16. It is not difficult for me to leave something on my plate.

True False

17. At certain times of the day, I get hungry because I have gotten used to eating then.

True False

18. While on a diet, if I eat food that is not allowed, I consciously eat less for a period of time to make up for it.

True False

19. Being with someone who is eating often makes me hungry enough to eat also.

True False

20. When I feel blue, I often overeat.

True False

21. I enjoy eating too much to spoil it by counting calories or watching my weight.

True False

22. When I see a real delicacy, I often get so hungry that I have to eat right away.

True False

23. I often stop eating when I am not really full as a conscious means of limiting the amount that I eat.

True False

24. I get so hungry that my stomach often seems like a bottomless pit.

True False

25. My weight has hardly changed at all in the last ten years.

True False

26. I am always hungry so it is hard for me to stop eating before I finish the food on my plate.

True False

27. When I feel lonely, I console myself by eating.

True False

28. I consciously hold back at meals in order not to gain weight.

True False

29. I sometimes get very hungry late in the evening or at night.

True False

30. I eat anything I want, any time I want.

True False

31. Without even thinking about it, I take a long time to eat.

True False

32. I count calories as a conscious means of controlling my weight.

True False

33. I do not eat some foods because they make me fat.

True False

34. I am always hungry enough to eat at any time.

True False

35. I pay a great deal of attention to changes in my figure.

True False

36. While on a diet, if I eat a food that is not allowed, I often then splurge and eat other high caloric foods.

True False

Directions: Please answer the following questions by circling the number above the response that is appropriate to you.

37. How often are you dieting in a conscious effort to control your weight?

1	2	3	4
rarely	sometimes	usually	always

38. Would a weight fluctuation of 5 lbs. affect the way you live your life?

1	2	3	4
not at all	slightly	moderately	very much

39. How often do you feel hungry?

1	2	3	4
only at mealtimes	sometimes between meals	often between meals	almost always

40. Do your feelings of guilt about overeating help you to control your food intake?

1	2	3	4
never	rarely	often	always

41. How difficult would it be for you to stop eating halfway through dinner and not eat for the next four hours?

1	2	3	4
easy	slightly difficult	moderately difficult	very difficult

42. How conscious are you of what you are eating?

1	2	3	4
not at all	slightly	moderately	extremely

43. How frequently do you avoid 'stocking up' on tempting foods?

1	2	3	4
almost never always	seldom	usually	almost

44. How likely are you to shop for low calorie foods?

1	2	3	4
---	---	---	---

- | | | | | |
|--|----------|----------|------------|-------------|
| | unlikely | slightly | moderately | very likely |
| | | unlikely | likely | |
45. Do you eat sensibly in front of others and splurge alone?
- | | | | |
|-------|--------|-------|--------|
| 1 | 2 | 3 | 4 |
| never | rarely | often | always |
46. How likely are you to consciously eat slowly in order to cut down on how much you eat?
- | | | | |
|----------|----------|------------|-------------|
| 1 | 2 | 3 | 4 |
| unlikely | slightly | moderately | very likely |
| | unlikely | likely | |
47. How frequently do you skip dessert because you are no longer hungry?
- | | | | |
|--------|--------|-------------|-----------|
| 1 | 2 | 3 | 4 |
| almost | seldom | at least | almost |
| never | | once a week | every day |
48. How likely are you to consciously eat less than you want?
- | | | | |
|----------|----------|------------|-------------|
| 1 | 2 | 3 | 4 |
| unlikely | slightly | moderately | very likely |
| | likely | likely | |
49. Do you go on eating binges though you are not hungry?
- | | | | |
|-------|--------|-----------|----------------------|
| 1 | 2 | 3 | 4 |
| never | rarely | sometimes | at least once a week |
50. On a scale of 0 to 5, where 0 means no restraint in eating(eating whatever you want, whenever you want it) and 5 means total restraint(constantly limiting food intake and never 'giving in'), what number would you give yourself?
- 0
- eat whatever you want, whenever you want it
- 1
- usually eat whatever you want, whenever you want it
- 2
- often eat whatever you want, whenever you want it

3

often limit food intake, but often 'give in'

4

usually limit food intake, rarely 'give in'

5

constantly limiting food intake, never 'giving in'

51. To what extent does this statement describe your eating behavior?
 "I start dieting in the morning, but because of the many number of things that happen during the day, by evening I have given up and eat what I want, promising to start dieting again tomorrow."

1

2

3

4

not like me

little like me

pretty good

describes me

description

perfectly

of me

Appendix E: Perceived Stress Scale

The questions in this scale ask you about your feelings and thoughts during the last month. In each case, you will be asked to indicate by circling how often you felt or thought a certain way.

0 = Never 1 = Almost Never 2 = Sometimes 3 = Fairly Often 4 = Very Often

1. In the last month, how often have you been upset because of something that happened unexpectedly?
2. In the last month, how often have you felt that you were unable to control the important things in your life?
3. In the last month, how often have you felt nervous and "stressed"?
4. In the last month, how often have you felt confident about your ability to handle your personal problems?
5. In the last month, how often have you felt that things were going your way?.....
6. In the last month, how often have you found that you could not cope with all the things that you had to do?
7. In the last month, how often have you been able to control irritations in your life?
8. In the last month, how often have you felt that you were on top of things?..
9. In the last month, how often have you been angered because of things that were outside of your control?.....
10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

Appendix F: Pittsburgh Sleep Quality Index

INSTRUCTIONS: The following questions relate to your usual sleep habits during the past month only. Your answers should indicate the most accurate reply for the majority of days and nights in the past month. Please answer all questions.

1. During the past month, what time have you usually gone to bed at night?
BED TIME _____
2. During the past month, how long (in minutes) has it usually taken you to fall asleep each night?
NUMBER OF MINUTES _____
3. During the past month, what time have you usually gotten up in the morning? GETTING UP TIME

4. During the past month, how many hours of actual sleep did you get at night? (This may be different than the number of hours you spent in bed.)
HOURS OF SLEEP PER NIGHT _____

For each of the remaining questions, choose the one best response. Please answer all questions.

5. During the past month, how often have you had trouble sleeping because you . . . a) Cannot get to sleep within 30 minutes

Not during the past month _____ Less than once a week _____ Once or twice a week _____ Three or more times a week _____

- b) Wake up in the middle of the night or early morning

Not during the past month _____ Less than once a week _____ Once or twice a week _____ Three or more times a week _____

- c) Have to get up to use the bathroom

Not during the past month _____ Less than once a week _____ Once or twice a week _____ Three or more times a week _____

- d) Cannot breathe comfortably

Not during the past month _____ Less than once a week _____ Once or twice a week _____ Three or more times a week _____

- e) Cough or snore loudly

Not during the past month _____ Less than once a week _____ Once or twice a week _____ Three or more times a week _____

- f) Feel too cold

Not during the past month _____ Less than once a week _____ Once or twice a week _____ Three or more times a week _____

- g) Feel too hot

Not during the past month _____ Less than once a week _____ Once or twice a week _____ Three or more times a week _____

h) Had bad dreams

Not during the past month _____ Less than once a week _____ Once or twice a week _____ Three or more times a week _____

i) Have pain

Not during the past month _____ Less than once a week _____ Once or twice a week _____ Three or more times a week _____

j) Other reason(s), please describe _____

How often during the past month have you had trouble sleeping because of this?

Not during the past month _____ Less than once a week _____ Once or twice a week _____ Three or more times a week _____

6. During the past month, how would you rate your sleep quality overall?

Very good _____ Fairly good _____ Fairly bad _____ Very bad _____

7. During the past month, how often have you taken medicine to help you sleep (prescribed or "over the counter")?

Not during the past month _____ Less than once a week _____ Once or twice a week _____ Three or more times a week _____

8. During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?

Not during the past month _____ Less than once a week _____ Once or twice a week _____ Three or more times a week _____

9. During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done?

No problem at all _____ Only a very slight problem _____

Somewhat of a problem _____ A very big problem _____

10. Do you have a bed partner or roommate?

No bed partner or room mate _____ Partner/roommate in other room _____

Partner in same room, but not same bed _____ Partner in same bed _____

Appendix G: The PANAS

This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent you feel this way right now, that is, at the present moment. Use the following scale to record your answers.

1	2	3	4	5
very slightly or not at all	a little	moderately	quite a bit	extremely

_____ interested	_____ irritable
_____ distressed	_____ alert
_____ excited	_____ ashamed
_____ upset	_____ inspired
_____ strong	_____ nervous
_____ guilty	_____ determined
_____ scared	_____ attentive
_____ hostile	_____ jittery
_____ enthusiastic	_____ active
_____ proud	_____ afraid

Appendix H: 5-Item Mood Check

This scale consists of a number of words that describe different feelings and emotions. Read each item and then circle a number to indicate to what extent you feel this way right now, that is, at the present moment. Use the following scale to record your answers, 1 meaning you feel the emotion next to it on the left, 7 meaning you feel the emotion on the right, and 4 being neutral.

1. elated	1	2	3	4	5	6	7	depressed
2. happy	1	2	3	4	5	6	7	sad
3. good	1	2	3	4	5	6	7	bad
4. exhilarated	1	2	3	4	5	6	7	dejected
5. satisfied	1	2	3	4	5	6	7	dissatisfied

Appendix I: The EMAQ

Please tell us first how your eating behavior is affected by certain emotional states and situations by circling a number on the scale below. The scale ranges from 1-9, where 1 represents much less food intake than usual, 9 much more than usual, and 5 the same as usual. If the specific question does not apply please circle NA. If you don't know the answer, please circle DK. The following refer to EMOTIONS:

As compared to usual, do you eat: Much less The same Much more

When you are:	Sad	1	2	3	4	5	6	7	8	9	NA	DK
	Bored	1	2	3	4	5	6	7	8	9	NA	DK
	Confident	1	2	3	4	5	6	7	8	9	NA	DK
	Angry	1	2	3	4	5	6	7	8	9	NA	DK
	Anxious	1	2	3	4	5	6	7	8	9	NA	DK
	Happy	1	2	3	4	5	6	7	8	9	NA	DK
	Frustrated	1	2	3	4	5	6	7	8	9	NA	DK
	Tired	1	2	3	4	5	6	7	8	9	NA	DK
	Depressed	1	2	3	4	5	6	7	8	9	NA	DK
	Frightened	1	2	3	4	5	6	7	8	9	NA	DK
	Relaxed	1	2	3	4	5	6	7	8	9	NA	DK
	Playful	1	2	3	4	5	6	7	8	9	NA	DK
	Lonely	1	2	3	4	5	6	7	8	9	NA	DK
	Enthusiastic	1	2	3	4	5	6	7	8	9	NA	DK
	When under pressure	1	2	3	4	5	6	7	8	9	NA	DK
	After a heated argument	1	2	3	4	5	6	7	8	9	NA	DK
	After a tragedy of someone close to you	1	2	3	4	5	6	7	8	9	NA	DK
	When falling in love	1	2	3	4	5	6	7	8	9	NA	DK
	After ending a relationship	1	2	3	4	5	6	7	8	9	NA	DK
	When engaged in an enjoyable hobby	1	2	3	4	5	6	7	8	9	NA	DK
	After losing money or property	1	2	3	4	5	6	7	8	9	NA	DK
	After receiving good news	1	2	3	4	5	6	7	8	9	NA	DK