Positive Emotions, Expressive Suppression, and Food Intake among College Students

THESIS

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Abstract

Historically, negative emotions have been linked to increased eating. However, recent evidence suggests that the effort to regulate emotions, rather than the emotions themselves, may help explain overeating. Although prior research suggested that suppressing negative emotions leads to higher food intake, the relationship between suppression of positive emotions and consumption has not been explored. The present study contrasted negative and positive emotions conditions to assess expressive suppression's effect on eating among female undergraduates ($N = 86; M_{age} = 19.01$). Participants were assigned to one of four conditions: expressive suppression and a positive emotions induction, expressive suppression and a negative emotions induction, normal expression and a positive emotions induction, or normal expression and a negative emotions induction. Participants were offered M&Ms after the induction, ostensibly as part of a taste test. Positive and negative emotions were measured using the PANAS. Happiness and sadness were assessed using visual analogue scales. Contrary to hypotheses, women consumed more in the positive emotions conditions than in the negative emotions conditions. Positive emotions and happiness did not predict intake in the positive emotions conditions. Negative emotions did not predict consumption in the negative conditions, but sadness marginally predicted eating. There were no differences in candy intake between women who suppressed their emotions and women who expressed their emotions. Several factors such as the strength of the induced emotions
and differences in familiarity with the induction stimuli may account for these unexpected findings. The results of this study add to the growing literature suggesting that positive emotions contribute to unhealthy food consumption.
Dedication

To my parents, friends, and Jaclyn:

I appreciate the love and encouragement that made this possible.
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Publications


Fields of Study

Major Field: Psychology
Table of Contents

Abstract.............................................................................................................................. ii

Dedication.......................................................................................................................... iv

Acknowledgments ............................................................................................................. v

Vita ...................................................................................................................................... vi

List of Tables .................................................................................................................... viii

Chapter 1: Background and Significance ........................................................................ 1

Chapter 2: Research Design and Methods ..................................................................... 9

Chapter 3: Results .......................................................................................................... 18

Chapter 4: Discussion..................................................................................................... 25

Appendix A: Tables ......................................................................................................... 35

Appendix B: Self-Report Measures ............................................................................... 40
List of Tables

Table 1. Demographic Information for Total Sample (n=86)........................36
Table 2. ANOVA Statistics for Randomization Checks..................................37
Table 3. Emotions Before and After the Inductions.............................................38
Table 4. ANCOVA Statistics for Primary Analyses.............................................39
Chapter 1: Background and Significance

Obesity is a significant public health problem in the United States, as more than one-third of adults are obese (Ogden, Carroll, Kit, & Flegal, 2012). Negative emotions have been linked to increased eating in many different groups, including people with eating disorders, restrained eaters, and both obese and non-obese people (Evers, Adriaanse, de Ridder, & de Witt Huberts, 2013; Jansen et al., 2008; Polivy, Peter, & McFarlane, 1994; Spoor, Bekker, Van Strien, & van Heck, 2007). Given these findings, many researchers have concluded that experiencing negative emotions directly leads to overeating. However, recent evidence suggests that the effort to regulate emotions, rather than the emotions themselves, may help explain overeating (Evers, Stok, & de Ridder, 2010). For example, people who were told to suppress their negative emotions ate more food than people who were not given specific emotion regulation instructions (Evers et al., 2010). If expressive suppression, rather than negative emotions, promotes increased eating, then people who suppress positive emotions should also consume more food. This study contrasted negative and positive emotions conditions to assess expressive suppression’s effect on food intake.

Negative Emotions and Food Intake

Negative emotions may promote increased food consumption. Among a community sample of women, negative emotions were associated with overeating (Spoor et al., 2007). Further, men and women experienced more hunger and impulsive eating
behavior when angry (Macht, 1999). Laboratory studies have also examined the relationship between negative emotions and food intake. For example, college students who were asked to remember a sad event ate more than students who remembered an emotionally neutral event, such as taking a walk (Evers et al., 2013). Women who watched a clip from a horror movie ate more food than their counterparts who saw a calm travelogue (Cools, Schotte, & McNally, 1992).

Much of the literature on negative emotions and eating has focused on people with eating disorders and weight concerns. However, because these populations have different eating patterns than people without eating disorders and without weight concerns, studies examining these groups will not be included in this review (Berg et al., 2009; Geliebter, Hassid, & Hashim, 2001).

Several different theories have addressed how negative emotions promote overeating. The emotional eating theory states that negative emotions cause people to eat more (Bruch, 1973; Macht & Simons, 2011). This theory has two underlying assumptions: negative emotions increase the desire to eat and ultimately lead to increased eating; increased eating subsequently lowers the intensity of the negative emotions.

Another theory states that people indulge in eating following negative emotions because of self-licensing (de Witt Huberts, Evers, & De Ridder, 2012; Kivetz & Simonson, 2002). In this framework, people are more likely to overeat if they can use their context to justify their behavior. For example, negative emotions can provide a justifying context. People may feel justified in overeating due to the common belief that
eating will make them feel better. This theory is similar to the emotional eating theory, however it assumes a more cognitively active role on the part of the consumer.

A third model posits that overeating occurs because people are trying to distract themselves from ego-threatening information (Heatherton & Baumeister, 1991). In this conceptualization, people eat in an attempt to focus on their present environment and behavior, rather than negative emotions or distressing thoughts. These three theories share a common theme: people eat more when experiencing negative emotions in order to change how they feel. However, people experiencing negative emotions do not always consume more food.

In a review of 35 studies, Macht (2008) found mixed support for the notion that negative emotions lead to increased eating among non-disordered individuals. Negative emotions led to increased eating in 43% of the studies, decreased eating in 39%, and the remaining studies found no change in eating. Some studies found that normal weight women, who reported eating in response to negative emotions, did not actually eat more after experiencing negative emotions (Adriaanse, de Ridder, & Evers, 2011; Evers, D, & Adriaanse, 2009). The theories discussed above cannot completely account for these inconsistent results.

Another theory proposes that self control is like a muscle (Baumeister, Vohs, & Tice, 2007). As muscles become fatigued their effectiveness decreases and thus functioning is temporarily impaired. Studies have found that the ability to utilize self control can also be exhausted (Baumeister, Bratslavsky, Muraven, & Tice, 1998). For example, after completing an activity that requires self control individuals may struggle
to exert self control on a subsequent task. Given this framework, it is possible that depletion of the mental resources necessary for self control contributes to overeating.

**Positive Emotions and Food Intake**

Positive emotions have also been linked to increased food consumption. Women who were shown a comedy film clip subsequently ate more food than women who watched an emotionally neutral clip (Cools et al., 1992). Another study found that eating style, restrained versus unrestrained, moderated the relationship between positive mood and eating (Turner, Luszczynska, Warner, & Schwarzer, 2010). Women with a more restrained eating style consumed fewer cookies when they experienced positive emotions, while women with a less restrained eating style consumed more. Other studies found that eating style had no effect on the amount of food people ate after experiencing positive emotions. Regardless of their eating style, college students who were asked to remember a pleasant memory ate more food than students who were asked to remember a neutral memory, such as their daily routine (Evers et al., 2013). Another study found that eating style did not predict whether people would eat more or less following a positive or negative emotion induction, both of which led to increased intake compared to a control condition (Evers et al., 2009).

In contrast to the studies showing that positive emotions increase food consumption, several studies found that positive emotions led to decreased consumption. For example, positive emotions were associated with lower food intake, regardless of typical eating style (Turner et al., 2010). Another study found that positive emotions were unrelated to food consumption, as female college students who were shown amusing film clips did not eat more than students who were shown neutral film clips.
Thus, the relationships among positive and negative emotions and food intake are inconsistent. Recent evidence suggests that emotion regulation may account for some of these varying findings.

**Emotion Regulation**

Emotion regulation is any process people use to influence when, how intensely, and how long they experience an emotion (Gross & Thompson, 2007). Emotion regulation strategies can be placed into two categories: antecedent-focused and response-focused (Gross, 1998). Antecedent-focused strategies are techniques people use before an emotion is felt. These strategies allow people to subsequently change their behavior and physiological responding. Alternatively, response-focused strategies are used after people have felt an emotion and their behavior and physiological responding have already changed. Two primary examples of emotion regulation strategies are cognitive reappraisal and expressive suppression.

Cognitive reappraisal occurs when a person changes the way he/she thinks about an emotionally provoking situation in order to alter its emotional impact. For example, to avoid feeling scared while watching a horror film an individual may think about how the movie is not real and that the people they are seeing are all actors. Expressive suppression is an attempt to stop emotionally-revealing behavior, such as trying to keep oneself from crying following a tragic event. Studies have shown that expression suppression often does not reduce the experience of the emotion it is meant to suppress (Gross, 2002). Furthermore, people who often use expressive suppression tend to experience fewer positive emotions and more negative emotions compared to people who favor antecedent-focused strategies (Gross & John, 2003). Frequent use of expressive
suppression is also associated with more depressive symptoms, lower social support, lower self-esteem, and lower levels of life satisfaction (John & Gross, 2004).

Expressive suppression is effortful and depletes cognitive resources (Gross, 1998). For example, people who used expressive suppression while learning names and facts had poorer recall than people who used cognitive reappraisal (Richards & Gross, 2000). Expressive suppression may not only interfere with cognitive processes, such as memory, but also with future attempts at self-regulation. Studies have found that when people exercised their self-regulation in one domain, their subsequent abilities to regulate themselves were impaired (Baumeister, Bratslavsky, Muraven, & Tice, 1998; Vohs & Faber, 2007). Therefore, people who use expressive suppression excessively may subsequently consume more food because they are less capable of regulating their food intake.

**Emotion Regulation and Food Intake**

A study by Evers and colleagues explored how expressive suppression and cognitive reappraisal affected eating (Evers et al., 2010). They assigned non-obese, female university students into three different conditions: an expressive suppression condition, a cognitive reappraisal condition, and a control condition. In the expressive suppression condition, participants were told not to show any emotion while they were watching a film clip, so that an observer would have difficulty telling the type of film they were watching. In the cognitive reappraisal condition, participants were told to take an objective and distant perspective while watching the film clip, and to remember that what they were seeing was not real. The control group was given no instructions and thus was allowed to regulate their emotions naturally. All women reported similar levels
of negative emotions following the video. All participants consumed the same amount of non-comfort food, but participants in the expressive suppression condition consumed more comfort food than participants in either of the other two conditions (Evers et al., 2010).

Although the study by Evers and colleagues demonstrated that negative emotion and the intensity of that emotion do not necessarily contribute to overeating, the influence of emotional valence on subsequent eating was unclear (Evers et al., 2010). If expressive suppression, and not negative emotion, is indeed promoting increased eating, then expressive suppression of positive emotions should also result in overeating. However, expressive suppression of positive emotions is known to reduce people’s experience of those emotions (Gross & Levenson, 1997). If people who suppress their positive emotions report feeling less positive emotions but subsequently eat more food, it would suggest that maladaptive emotion regulation may lead to overeating, regardless of the intensity of the regulated emotion.

Since positive emotions are less aversive than negative emotions, it is necessary to consider whether people use expressive suppression to regulate positive emotions. Indeed, there is evidence that certain groups suppress their positive emotions. Psychiatric patients suffering from major depressive disorder reported using expressive suppression strategies in response to feelings of positive emotions (Beblo et al., 2012). Similarly, people with severe social anxiety frequently suppressed their expression of positive emotions (Kashdan & Steger, 2006; Kashdan & Breen, 2008). Although prior research suggests that people sometimes suppress their positive emotions, the consequences of positive emotion suppression on food intake are unclear.
Current Study

The goal of the current study was to determine if women would eat more food following expressive suppression, regardless of the valence of the suppressed emotion. This study tested the hypothesis that independent of the emotion they experienced, women who suppressed their emotions would eat more food than those who do not suppress their emotions. Specifically, women in the positive emotions condition who suppressed their emotions would eat more food than their counterparts who were not told to regulate their emotions. Similarly, women in the negative emotions condition who suppressed their emotions would eat more food than their counterparts who were not told to regulate their emotions.
Chapter 2: Research Design and Methods

Research Protocol

Participants. Participants were female college students recruited from the Research Experience Program (REP) for undergraduate psychology students enrolled in Introductory Psychology at The Ohio State University. Students received course credit in exchange for their participation in the study. Participants were all female in order to create homogenous groups. In addition, eating in response to emotions is more consistently observed in females, thus effects were expected to be stronger among women compared to men (Bailly, Maitre, Amanda, Herve, & Alaphilippe, 2012; Grunberg & Straub, 1992). Participants provided their height and weight at the study visit; those who had a body mass index (BMI: kg/m$^2$) of 30 or greater were excluded from the analyses.

Study Protocol. The study appeared on the REP website with the following description: “This study is investigating if the way people watch different types of films affects their taste perceptions. Participants will be asked not to eat or drink anything but water for at least two hours before their appointment. Participants will be given specific viewing instructions, watch a film, and then answer some questions about the film. Afterwards, participants will try some snack food and report how it tastes. Participants will also fill out additional questionnaires throughout the study. Because part of the study involves tasting chocolate, women who are allergic to chocolate or who do not like
chocolate should not enroll in this study.” Participants were instructed not to eat or drink anything but water for two hours before the study to standardize the students’ levels of hunger as much as possible (Evers et al., 2010). These instructions were implemented to minimize the variability in hunger and subsequent hunger-related differences in food intake.

Participants were randomly assigned to one of the four conditions after they signed up online. After arriving at the lab, participants were seated in front of a computer and the experimenter read from the following script: “The purpose of this study is to see if the way people watch different types of films affects how different foods taste. First, you will answer questionnaires about your background, your habits, and how you are feeling right now. Next I will tell you how we would like you to watch a film clip, and then you will watch the clip for a few minutes. Afterwards, you will answer a few more questionnaires and then you will be presented with a bowl of chocolate candies. I will ask you to try some of the candies and then provide us feedback on how they taste.”

The women received an informed consent form. After giving their consent, participants provided demographic information, answered sleep and hunger questionnaires, and reported their positive and negative emotions, as well as their current feelings of happiness and sadness. Based on Richards and Gross’ (2000) prior experimental manipulations of emotion regulation, students in the expressive suppression condition were told the following:

I will show you the film clip in just a moment. Please watch and listen to it carefully. In addition, it is extremely important for the sake of this study that if you have any feelings as you watch the film clip, please try your best not to let
those feelings show. In other words, as you watch the film clip, please try to
behave in such a way that a person watching you would not know you are feeling
anything at all. So, watch the film clip carefully, but please try to behave so that
someone watching you would not know you are feeling anything at all. (p. 413)

Studies that have used these instructions and unobtrusively visually recorded and
coded participant behaviors found that participants decreased their emotional expression
(Gross & Levenson, 1997; Gross, 1998). In the control condition, participants were told
"I will show you the film clip in just a moment. Please watch and listen to it carefully."
No specific viewing instructions were given.

Participants were asked to write a brief summary of the scene they just saw, in
order to ensure they were paying attention. A manipulation check was performed to
assess whether the film clips successfully evoked the intended emotions. Further,
participants answered questions about whether they suppressed or spontaneously
expressed their emotions during the film. Women then reported their feelings of hunger
and appetite again. Next, participants were given a bowl of M&Ms chocolate candies
and a taste questionnaire. M&Ms have been frequently used in studies examining the
relationship between emotions and food intake (Evers et al., 2013; Zellner et al., 2006).
The bowl was weighed by the experimenter before the participant arrived and again after
they departed. Following the procedures of Evers and colleagues, participants were told,
“We are interested in how the film affected your taste perceptions. You will have ten
minutes to complete the taste questionnaire. During this time you can eat as many
M&Ms as you want in order to complete the questionnaire” (Evers et al., 2010). The
experimenter then left the room for the duration of the tasting.
After eating, participants completed a measure of dietary restraint. A funneled debriefing procedure was used to assess if participants were aware of the true nature of the study (Chartrand & Bargh, 1996). The debrief questions began asking for the participant’s thoughts about the purpose of the study and then narrowed in scope until the final question asked if they were aware of the intended manipulation.

**Self-report measures**

**Demographic information.** Participants were asked to provide their height and weight in order to calculate BMI. They were also asked about their age, year in college, and race, and national origin.

**Dietary restraint.** To control for individual differences in eating styles, participants were given the Dutch Eating Behavior Questionnaire (DEBQ) (van Strien, Frijters, Bergers, & Defares, 1986). The 33-item measure consists of three subscales: restrained eating, emotional eating, and external eating. Restrained eating items ask about dieting behavior, emotional eating items ask if participants eat in response to negative emotions, and external eating items ask if people tend to eat in response to external cues of food, such as seeing others eat or smelling food. The DEBQ is a valid measure of eating behavior as it was able to distinguish between the eating behaviors of dieters, people with eating disorders, and controls (Wardle, 1987). The DEBQ also has high test-retest reliability ($r = .92$) (Allison, Kalinsky, & Gorman, 1992).

**Distraction taste test.** Fake taste tests are often used in studies examining the relationship between emotions and food intake (Dingemans, Martijn, van Furth, & Jansen, 2009; Evers et al., 2009; Yeomans & Coughlan, 2009). The participants were given a questionnaire asking them to rate various qualities about the chocolate candy.
Participants were asked the following questions: “how salty was the candy,” “how sweet was the candy,” “how savory was the candy,” “how pleasant was the texture of the candy,” and “how much did you enjoy the candy?” Responses ranged on a scale from 1 (not at all) to 7 (extremely).

Emotion inductions. Many studies have successfully used film clips to induce positive and negative emotions (Evers et al., 2013, 2010; Richards & Gross, 2000; Turner et al., 2010). In the positive emotions condition participants watched a 138-second clip from the sitcom Friends (Warner Brothers, 1999). In a prior study, women’s feelings of positive emotions increased after watching this scene (Yeomans and Coughland, 2009). In the negative emotions condition participants watched a 155 second film clip from the film The Champ (Lovell & Zeffirelli, 1979). The scene depicts a child grieving for his father, who has recently died as a result of injuries he received in a boxing match. In a prior study, college students reported feeling sad after watching this scene (Gross & Levenson, 1995).

Hunger. To ensure that baseline differences in hunger were unrelated to food consumption, participants were asked to report if they felt full, satisfied, hungry, and the desire to eat (Flint, Raben, Blundell, & Astrup, 2000; Harthoorn & Dransfield, 2008). Responses were recorded on Likert scales ranging from 1-7. These scales are valid measures of hunger and appetite; a correlation analysis found that premeal values on these scales predicted subsequent food intake (Flint et al., 2000). The Cronbach’s alpha of these four items was .78 in the present study.

Manipulation checks: expressive suppression and control. Participants were asked the following two questions to assess if they suppressed their emotions during the
film: “While watching the clip, do you think your facial expressions revealed your feelings” and “while watching the clip, were you able to suppress your emotions” (Evers et al., 2010; Richards & Gross, 2000). Participants were also asked the following question to assess if they expressed their emotions during the film: “To what extent did you express your emotions spontaneously while watching the clip” (Evers et al., 2010; Richards & Gross, 2000). Responses on all three items ranged from 1 (not at all) to 7 (a great deal). The second item was reverse scored. In the current study the Cronbach’s alpha for all three items was .82.

**Manipulation check: positive and negative emotions.** Positive and negative emotions were measured before and after the film with the 20-item Positive and Negative Affectivity Schedule (PANAS) (Watson, Clark, & Tellegen, 1988). The PANAS consists of two 10-item scales that measure positive affect and negative affect, respectively. The negative affect scale contains adjectives, such as “upset” and “nervous,” and the positive affect scale contains adjectives like “interested” and “excited.” Participants were instructed to rate the adjectives based on the extent to which they feel each adjective describes them “right now” on a scale of 1 (very little) to 5 (extremely). The PANAS has good convergent validity. The negative affect subscale correlated positively ($r = .56$) with Beck Depression Inventory and the positive affect subscale correlated negatively ($r = -.35$) (Beck, Erbaugh, Ward, Mock, & Mendelsohn, 1961; Watson et al., 1988). The PA scale and the NA scale of the PANAS also have high inter-item reliability (Crawford & Henry, 2004; Watson et al., 1988).
Manipulation check: sadness and happiness. Participants were asked to rate how sad and happy they feel before and after the film. These emotions were assessed using visual analogue scales.

Sleep. Sleep loss decreases leptin, a chemical released by adipose tissue that serves as a satiety signal (Spiegel et al., 2004). Therefore sleep quality the night before the study was assessed because lower leptin levels may result in overeating. Sleep quality was assessed with the sleep efficiency subscale of the Pittsburgh Sleep Quality Index (Buysse, Reynolds III, Monk, Berman, & Kupfer, 1989). The validity of the PSQI was assessed with polysomnography, which found that the PSQI accurately detected differences between people with sleeping disorders and controls (Buysse et al., 1989). The sleep efficiency subscale was also found to be a valid measure when compared to polysomnographic results. Additionally, participants reported the number of hours they slept the night before the study.

Statistical Analyses

Preliminary analyses: emotion manipulation checks. Collapsing across emotion regulation conditions, a paired sample $t$-test was used to assess whether women’s positive emotions increased following the positive emotions film clip. Similarly collapsing across emotion regulation conditions, a paired sample $t$-test was used to assess whether women’s negative emotions increased following the negative emotions film clip.

Collapsing across emotion regulation conditions, a paired sample $t$-test was used to assess whether women’s feelings of happiness increased following the positive emotions film clip. Similarly, a paired sample $t$-test was used to assess whether women’s
feelings of sadness increased following the negative emotions film clip.

**Emotion regulation checks.** Collapsing across emotional valence conditions, a t-test was used to determine whether women in the expressive suppression conditions reported suppressing their emotions more often than women in the control conditions.

**Analysis of study aims.** To test my primary hypothesis, I conducted a 2 (emotion regulation: suppression versus control) x 2 (emotional valence: positive versus negative) ANCOVA predicting amount of food consumed using BMI, hunger, restrained eating, emotional eating, external eating, and sleep efficiency as covariates.

Four regressions were performed to explore the effects of self-reported emotions on food intake. In the negative emotions conditions, negative emotions after the video was the predictor and intake was the outcome, with BMI, hunger, restrained eating, emotional eating, external eating, and sleep efficiency as covariates. The second regression in the negative emotions conditions featured sadness after the video as the predictor and food intake as the outcome, with BMI, hunger, restrained eating, emotional eating, external eating, and sleep efficiency as covariates. For the positive emotions conditions, positive emotions after the video was the predictor and food intake was the outcome, with BMI, hunger, restrained eating, emotional eating, external eating, and sleep efficiency as covariates. The second regression in the positive emotions conditions had happiness after the film as the predictor and food intake as the outcome, with BMI, hunger, restrained eating, emotional eating, external eating, and sleep efficiency as covariates.

**Power Analysis.** A post-hoc power analysis was performed to determine the power achieved in the present study. The sample size of 86 provided 89% power to
detect significant differences in food consumption.
Chapter 3: Results

A total of 96 female undergraduates participated in this study. Data from 10 women were excluded from the analyses for the following reasons: 3 had a BMI of over 30; 5 did not follow study instructions and came to the experiment having recently eaten, began a new diet, given up candy for Lent, or reported not liking candy; 2 non-native English speakers expressed difficulty understanding the instructions and vocabulary used in the self-report questionnaires.

Demographics

Women's ages ranged from 18 to 24 with a mean of 19.01 (SD=1.23). The participants were primarily white (77.9%) and in their first academic year (76.8%) at The Ohio State University. Table 1 provides additional demographic information.

Randomization checks

The four groups did not differ on age, race, BMI, and year in school (all ps > .18; Table 2). Women also reported their positive emotions, negative emotions, sadness, happiness, hunger, hours of sleep the previous night, and sleep efficiency before the study manipulation. At baseline, the four groups did not differ on these variables (all ps > .29; Table 2). Additionally, restrained eating, emotional eating, external eating were measured after the manipulation in each condition. The groups did not differ on any of the DEBQ’s subscales (all ps > .17; Table 2).
**Emotion manipulation checks**

I predicted that women in the positive emotions conditions would report increased positive emotions and happiness following the film clip. Contrary to my prediction, women's positive emotions did not increase after the film clip, $t(42) = 0.34, p = .74$. However, women reported greater happiness after the film than before, $t(42) = 6.82, p < .001$. I also predicted that the positive emotions film clip would lower levels of negative emotions and reported sadness. Consistent with my hypotheses, women's levels of negative emotions decreased after the film clip, $t(42) = -3.39, p = .002$. Similarly, women's ratings of sadness were lower after watching the positive clip, $t(42) = -2.90, p = .006$. Table 3 provides the means and standard deviations for all emotion measures.

In the negative emotions conditions, I predicted that women would report higher levels of negative emotions and sadness. Indeed, women's negative emotions increased after the film, $t(42) = 4.32, p < .001$. Women also reported more sadness after watching the film clip, $t(42) = 7.07, p < .001$. Further, I hypothesized that the negative emotions film clip would lower levels of positive emotions and reported happiness. Consistent with my hypotheses, women's reported positive emotions decreased after the negative film, $t(42) = -6.92, p < .001$. Additionally, women's ratings of happiness after the negative film were lower than their previous reports, $t(42) = -8.10, p < .001$.

**Emotion regulation check**

As women in the suppression conditions were instructed to suppress their emotions, I expected them to express their emotions less frequently than the women in the control conditions. Indeed, women asked to suppress their emotions ($M = 2.95, SD = $
reported that they were less expressive than women in the control conditions ($M = 4.04, SD = 1.24$), $t(84) = 3.78, p < .001$.

**Distraction taste test**

Participants rated the saltiness, sweetness, and savoriness of the candy, in addition to its texture and how much they enjoyed eating it. Although I made no hypotheses about the taste test items as they were intended to serve as distractions, I performed exploratory one-way between subjects ANOVAs to assess whether there were differences by group on any of the taste questions.

The groups’ candy saltiness ratings differed, $F(3,82) = 4.46, p = .006$. Post-hoc comparisons using the Tukey HSD test revealed that the mean saltiness rating in the expressive suppression and negative emotions condition ($M = 2.66, SD = 1.74$) was significantly higher than the expressive suppression and positive emotions condition ($M = 1.36, SD = 0.66$). The normal expression and negative emotions condition ($M = 2.10, SD = 1.18$) and the normal expression and positive emotions conditions ($M = 2.05, SD = 0.84$) did not differ from any of the other conditions.

The groups’ enjoyment ratings of the candy also differed, $F(3,82) = 4.43, p = .006$. Post-hoc comparisons using the Tukey HSD test indicated that the mean enjoyment rating in the expressive suppression and negative emotions condition ($M = 4.67, SD = 1.62$) was significantly lower than the expressive suppression and positive emotions condition ($M = 5.95, SD = 1.00$) and the normal expression and positive emotions condition ($M = 5.81, SD = 1.12$). The normal expression and negative emotions condition ($M = 5.36, SD = 1.26$) did not differ from the other conditions. There were no differences among the groups on any of the other taste test items (all $ps > .18$).
Analysis of study aims

I hypothesized that women who were asked to suppress their emotions would eat more candy in both the negative and positive emotions conditions compared to their counterparts who freely expressed their emotions. To test this hypothesis, I conducted a 2 (emotion regulation: suppression versus control) x 2 (emotional valence: positive versus negative) ANCOVA predicting amount of candy consumed using BMI, hunger, restrained eating, emotional eating, external eating, and sleep efficiency as covariates. Table 4 contains detailed ANCOVA results.

Contrary to my hypothesis, the ANCOVA revealed a significant main effect of emotional valence, $F(1,76) = 10.36$, $p = .002$. Women in the positive emotions conditions consumed more candy ($M = 31.61$ grams, $SD = 19.78$) compared to their counterparts in the negative emotions conditions ($M = 21.93$ grams, $SD = 14.48$). The predicted main effect of expressive suppression was not significant, $F(1,76) = .35$, $p = .55$. There were no differences in candy intake between women who were told to suppress their emotions and women given no viewing instructions prior to watching the film clip. Additionally, the interaction of emotional valence and expressive suppression was not significant, $F(9,76) = .007$, $p = .99$.

To control for individual differences in eating style, participants completed the DEBQ. The measure consists of restrained eating, emotional eating, and external eating subscales. Women with higher scores on the emotional eating subscale consumed more candy than women with lower scores, $F(1,76) = 4.73$, $p = .03$. High scores on the emotional eating subscale indicate that a person often copes with negative emotions by
eating. There were no significant effects of the restrained eating, $F(1,76) = 1.06, p = .31$, or the external eating subscales, $F(1,76) = 1.81, p = .18$.

To control for differences in body mass, BMI was included as a covariate in the ANCOVA. BMI did not affect candy intake, $F(1,76) = 0.30, p = .59$. To minimize hunger-related differences in candy intake, baseline hunger was included as a covariate in the primary analysis. There was no effect of baseline hunger on intake, $F(1,76) = 0.52, p = .47$. Sleep efficiency was also included as a covariate because lack of sleep may promote eating. Sleep efficiency did not affect consumption in the present study, $F(1,76) = 1.59, p = .21$. To more thoroughly assess sleep the night before the study, participants reported the number of hours they slept. The number of hours women slept was substituted into the ANCOVA for sleep efficiency. The overall pattern of results did not change, and sleep the night before did not affect eating, $F(1,76) = 0.09, p = .77$.

In addition to the ANCOVA, I conducted four regressions to determine whether emotions predicted candy intake in the positive and negative conditions. In the first regression, positive emotions after the positive film clip was the predictor, intake was the outcome, and BMI, sleep efficiency, hunger, restrained eating, emotional eating, and external eating were the covariates. Although ANCOVA results showed that women ate more candy in the positive emotions conditions, self-reported positive emotions after the film clip did not predict subsequent candy consumption, $\beta = 0.11$, $t(42) = .65$, $p = .52$. However, emotional eating predicted candy intake, $\beta = 0.32$, $t(42) = 2.03$, $p = .05$. No other covariate significantly predicted eating (all $p$s $>.11$). Substituting the number of hours slept for sleep efficiency in this regression increased hunger’s predictive strength,
$\beta = 0.28, t(42) = 1.74, p = .09$. The substitution did not affect the pattern of any other results.

In the second regression, happiness after the positive film clip was the predictor, candy intake was the outcome, and BMI, sleep efficiency, hunger, restrained eating, emotional eating, and external eating were the covariates. Women's happiness after the film clip did not predict eating, $\beta = .02, t(42) = .13, p = .90$. However, emotional eating marginally predicted intake, $\beta = 0.32, t(42) = 1.94, p = .06$. No other covariates predicted consumption (all $p > .14$). Substituting the number of hours slept for sleep efficiency in this analysis slightly increased emotional eating’s predictive strength, $\beta = 0.33, t(42) = 1.99, p = .05$. Hunger also emerged as a marginal predictor of intake, $\beta = 0.28, t(42) = 1.77, p = .09$. The substitution did not affect the pattern of any other results.

In the third regression, negative emotions after the negative film clip was the predictor, candy consumption was the outcome, and BMI, sleep efficiency, hunger, restrained eating, emotional eating, and external eating were the covariates. Women's negative emotions after the film clip did not predict their later candy intake, $\beta = 0.15, t(42) = 0.84, p = .41$. No covariate predicted eating (all $p > .11$). Substituting the number of hours slept for sleep efficiency in this analysis did not change the pattern of results.

In the fourth regression, sadness after the negative film clip was the predictor, intake was the outcome, and BMI, sleep efficiency, hunger, restrained eating, emotional eating, and external eating were the covariates. Women’s sadness after the film clip marginally predicted their consumption, $\beta = 0.32, t(42) = 1.89, p = .07$. None of the
covariates predicted intake (all $p > .18$). Substituting the number of hours slept for sleep efficiency in this regression did not change the pattern of results.
Chapter 4: Discussion

This study contrasted negative and positive emotions conditions to assess expressive suppression’s effect on food intake. I expected that women who were asked to suppress their emotions would eat more candy in both the negative and positive conditions compared to their counterparts who freely expressed their emotions. Contrary to my predictions, women who watched a positive emotions film clip ate more candy than women who watched a negative emotions film clip, regardless of whether they were told to suppress their emotions or were given no specific viewing instructions. Although this finding did not support my hypotheses, it is consistent with a previous study demonstrating that men who watched an amusing film clip later consumed more chocolate than others who saw a sad film clip (Macht, Roth, & Ellgring, 2002). Additionally, women who reported eating in response to negative emotions ate more candy than their counterparts.

Despite the fact that women consumed more in the positive emotions conditions compared to the negative emotions conditions, neither women's ratings of positive emotions nor happiness after the positive film clip predicted how much candy they ate. Further complicating the effects of specific emotions on intake, women who experienced more sadness ate marginally more candy than women who reported less sadness within the negative emotions conditions. Even though women in the negative emotions conditions consumed less candy than their positive emotions counterparts, it appears that
sadness promoted intake within these conditions. Women who experienced significant sadness may have coped by eating more candy. Women who felt less sadness may not have been as motivated to change their emotions and therefore ate less candy.

Expressive suppression is cognitively taxing and depletes mental resources (Baumeister et al., 1998; Gross, 1998). A prior study demonstrated that female dieters who were told to suppress their emotions subsequently consumed more ice cream than other dieting women who were instructed to naturally experience their emotions (Vohs & Heatherton, 2000). Other research has shown that non-dieting women consumed more snack food after expressive suppression compared to free expression of their emotions (Evers et al., 2010). Given these findings, it is surprising that expressive suppression had no effect on eating in the current study. Several factors may have contributed to the absence of the expected emotion regulation effect.

Although women in the suppression conditions reported suppressing their emotions to a greater extent than women in the control conditions, it is unclear if they actually suppressed their facial displays of emotions. Some of the women may have not bothered to expend significant effort to suppress their emotions during the clip but still reported that they suppressed their emotions. An objective index of emotion regulation would have been desirable; I could have videotaped participants and had raters code their facial expressivity. However previous studies using the same suppression instructions found effects of suppression both when recording and not recording participants' facial expressions (Evers et al., 2010; Gross, 1998).

Alternatively, expressive suppression may not have required significant cognitive resources in this study. I assessed the success of the film clips by comparing emotions
before the clip to emotions afterwards. Indeed, women reported that the negative film
clip heightened their feelings of sadness and the positive film clip increased their feelings
of happiness. Although these changes were statistically significant, the induced emotions
may not have been difficult to suppress. If expressive suppression did not require
noticeable mental effort, it is understandable that it did not affect intake.

In contrast to my data, Evers and colleagues found that suppressing negative
emotions increased intake compared to normal emotional expression (Evers et al., 2010).
Several significant methodological differences between the Evers' study and the current
research may have contributed to the incongruent findings. Evers and colleagues
addressed the negative effects of expressive suppression while watching a violent and
racially motivated assault (Evers et al., 2010). This clip successfully induced general
negative emotions; however these emotions likely differed from the sadness induced in
this study. Although sadness is one possible response to the violent clip used by Evers
and colleagues, their participants likely experienced additional negative emotions, such as
anger and fear (Evers et al., 2010). A prior study reported that anger and fear increased
candy consumption more than sadness, potentially explaining the differing results
between these studies (Macht et al., 2002). These issues highlight a limitation of general
measures of negative emotions.

A strength of this study was its inclusion of the PANAS, a measure of general
positive and negative emotions, and visual analogue scales that assessed happiness and
sadness. I expected women's general positive emotions, as well as their feelings of
happiness, to increase after watching the positive emotions film clip. The women felt
happier after watching the film clip, however their feelings of general positive emotions
did not increase. These differing results indicate a weakness of the PANAS' positive subscale. The PANAS measures positive affect by asking participants to rate how interested, excited, strong, alert, enthusiastic, proud, inspired, attentive, and active they feel (Watson et al., 1988). These questions appear to measure attention, arousal, and perhaps confidence. They do not assess the likely positive emotional response to a comedic film clip. Although the negative subscale of the PANAS includes words that correspond to specific negative emotions (e.g. scared, afraid, guilty), it does not ask about sadness, a fundamental negative emotion. For these reasons, the present study included specific measures of happiness and sadness. Future studies examining the relationships among different emotions and eating should avoid examining general positive and negative emotions and focus on discrete emotions to clarify the ambiguity generated by previous results.

Prior research indicates that sadness can inhibit eating even though other negative emotions often promote eating (Macht et al., 2002; Yeomans & Coughlan, 2009). Thus, women's feelings of sadness may partially explain why women ate less in the negative emotions conditions compared to the positive emotions conditions. Alternatively, happiness can lead to increased food intake. Healthy men who underwent anger, sadness, fear, and joy inductions ate the most chocolate after seeing a comedic film clip and the least chocolate after seeing a sad film clip (Macht et al., 2002). However, women in a different study ate the same amount following a sad or scary film clip as they did following a happy or funny film clip (Evers et al., 2009). Further research is needed to explain these contradictory findings.
During debriefing all women in the positive emotions conditions recognized that the clip was a scene from the show *Friends*. A majority of the participants reported that they enjoyed the show and had watched it before. None of the women in the negative emotions conditions had ever heard of the movie *The Champ*. This difference in personal experience and familiarity with the source material may have affected eating. When women realized they were watching *Friends*, it is likely they were reminded of prior positive experiences with the show and anticipated seeing something funny. As they had no prior experiences with *The Champ*, a discrepancy in anticipatory emotional responses may have contributed to the differences in candy intake. Although it may be logistically daunting, researchers exploring the relationship between emotions and eating should consider using completely novel visual stimuli to elicit positive and negative emotions.

Compared to their counterparts in the other conditions, women in the expressive suppression and negative emotions condition reported that the candy was saltier. A previous study reported that positive and negative emotion inductions can affect people’s ratings of sweetness and bitterness (Platte, Herbert, Pauli, & Breslin, 2013). Further, Ileri-Gurel and colleagues found that people were more sensitive to salt after undergoing a stress induction (Ileri-Gurel, Pehlivanoglu, & Dogan, 2013). In the current study, participants may have found the expressive suppression and negative emotions condition more stressful than the other conditions and thus their sensitivity to salt was heightened. Future researchers should explore the possibility that negative mood combined with expressive suppression increases sensitivity to salt.

Women who suppressed their emotions and saw a sad film reported enjoying the candy less than participants in the other three conditions. However, the results of the
main analyses indicated that expressive suppression did not affect intake, and there was no interaction between suppression condition and emotional valence condition. Emotional valence affected eating such that women in the positive emotion conditions ate more than women in the negative emotions conditions. Despite enjoying the candy significantly less than their counterparts within the same emotional valence condition, women in the expressive suppression and negative emotions condition did not consume less candy. More research is needed to determine the relationships among expressive suppression, negative emotions, and food enjoyment.

Participants were instructed not to eat or drink anything but water for at least two hours before the study. Additionally, women rated how hungry they felt before the emotion induction. However, participants were not asked when they ate their last meal. This is a limitation because women with longer fasting periods may have eaten more food. Although some researchers reported that hunger ratings predicted food intake, others found that self-reported hunger was not a strong predictor of consumption among adults under 36-years-old (Flint et al., 2000; Parker et al., 2004). Researchers conducting studies on eating should ask participants when they last ate, in addition to their current levels of hunger.

The results of this study add to the growing literature suggesting that positive emotions contribute to food consumption. In the future, researchers should examine if specific positive emotions such as happiness act as unique triggers of food intake, or if other factors such as emotion regulation promote eating.
References


Appendix A: Tables
# Table 1

**Demographic Information for Total Sample (n=86)**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Condition 1</th>
<th>Condition 2</th>
<th>Condition 3</th>
<th>Condition 4</th>
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<tbody>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>4.5</td>
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<td>9.1</td>
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<td>4.8</td>
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<td>57.1</td>
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**Means and Standard Deviations**

<table>
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<th>Condition 3</th>
<th>Condition 4</th>
<th>Overall</th>
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<td>Age</td>
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<td>18.81 (0.81)</td>
<td>19.00 (1.72)</td>
<td>19.01 (1.23)</td>
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<td>BMI</td>
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<td>22.13 (2.21)</td>
<td>22.56 (2.86)</td>
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<td>4.42 (0.98)</td>
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<td>2.36 (0.82)</td>
<td>2.66 (0.72)</td>
<td>2.74 (0.60)</td>
<td>2.66 (0.76)</td>
<td>2.60 (0.73)</td>
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<td>1.30 (0.58)</td>
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<td>62.90 (28.56)</td>
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<td>Baseline Sadness</td>
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<td>2.68 (0.92)</td>
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<td>2.80 (0.74)</td>
<td>2.79 (0.76)</td>
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<td>3.35 (0.52)</td>
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<td>3.34 (0.54)</td>
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</table>

*Note. Condition 1 = expressive suppression and positive emotions; Condition 2 = expressive suppression and negative emotions; Condition 3 = normal expression and positive emotions; Condition 4 = normal expression and negative emotions.*
Table 2

ANOVA Statistics for Randomization Checks

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<tr>
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<th>F</th>
<th>p</th>
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<td>.26</td>
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<td>0.09</td>
<td>.97</td>
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<tr>
<td>Baseline Hunger</td>
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<td>0.93</td>
<td>.43</td>
</tr>
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<td>Baseline Positive Emotions, PANAS</td>
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<td>1.19</td>
<td>.32</td>
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<td>Baseline Negative Emotions, PANAS</td>
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<td>Baseline Happiness</td>
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<td>Emotional Eating, DEBQ</td>
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<tr>
<td>External Eating, DEBQ</td>
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Table 3

*Emotions Before and After the Inductions*

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<th>Mean after film clip (SD)</th>
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<th>p</th>
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<td><strong>Positive Emotions Conditions</strong></td>
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<tr>
<td>Positive Emotions</td>
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<td>2.56 (0.88)</td>
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<td>.74</td>
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<td>Negative Emotions</td>
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<td>-3.39</td>
<td>.002</td>
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<tr>
<td>Happiness</td>
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<td>6.82</td>
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<tr>
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<td></td>
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<tr>
<td>Positive Emotions</td>
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<td>-6.92</td>
<td>&lt; .001</td>
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<tr>
<td>Negative Emotions</td>
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<td>&lt; .001</td>
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<tr>
<td>Happiness</td>
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<td>24.84 (27.31)</td>
<td>-8.10</td>
<td>&lt; .001</td>
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<td>6.20 (12.65)</td>
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### Table 4

*ANCOVA Statistics for Primary Analyses*

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<td>.47</td>
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<td>4.73</td>
<td>.03</td>
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<tr>
<td>External Eating</td>
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<td>1.81</td>
<td>.18</td>
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<td>Valence Condition</td>
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<tr>
<td>Error</td>
<td>276.78</td>
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</table>
Appendix B: Self-Report Measures
DEMOGRAPHIC INFORMATION

Instructions: Please answer the following questions about yourself.

1.) What is your age? ______

2.) What is your current height? _____feet _____ inches or _____meters

3.) What is your current weight? _____ pounds or _____ kilograms

4.) Which one of the following groups do you think best represents your race?
   - Asian
   - Black or African American
   - Hispanic or Latino
   - Native American
   - Native Hawaiian/Pacific Islander
   - White
   - Other: ______________________
   - Don’t know/Not sure

5.) What country were you born in?
   - United States of America
   - Other: ______________________

6.) How long have you been at OSU?
   - This is my first quarter
   - First year but not my first quarter
   - Second year
   - Third year or more
Sleep efficiency

Please answer the following questions regarding recent sleep patterns:

1. What time did you get into bed and turn out the lights last night?  
   [ ] : [ ] a.m. [ ] p.m.

2. What time did you wake up this morning for the final time?  
   [ ] : [ ] a.m. [ ] p.m.

3. How many minutes did it take you to fall asleep after you turned out the lights?  
   [ ] minutes

4. How many minutes (if any) would you guess you were awake between the time you fell asleep and the time you awoke for the final time this morning?  
   [ ] minutes

5. How many times would you guess you awoke during last night?  
   [ ]

6. If you woke up last night, please explain the reason(s), and approximately how long you think you were awake. For example: got up to use bathroom (5 minutes), couldn't sleep so got up to watch TV (45 minutes):

   

7. Please rate the soundness of your sleep last night.

   Very restless
   1  2  3  4  5  
   Very sound

8. How rested did you feel upon rising?

   Exhausted
   1  2  3  4  5  
   Refreshed

9. Did you take any medication last night to help you sleep?  [ ] Yes [ ] No

10. People need various amounts of sleep in order to feel well rested. Approximately how many hours of sleep a night do you feel you need in order to feel well rested the next morning?  
    [ ] : [ ] hours per night

11. How many hours did you sleep last night?  
    [ ] : [ ] hours
Hunger Scale

Instructions: People's hunger and desire to eat will change across a day; although feelings like hunger and desire to eat are often linked, sometimes they are not. You can feel like eating when you are not hungry, or you may not feel like eating even though you are hungry. We are interested in your feelings RIGHT NOW.

1. How hungry are you?
   1 2 3 4 5 6 7
   not at all hungry extremely hungry

2. How full do you feel?
   1 2 3 4 5 6 7
   not at all full extremely full

3. How strong is your desire to eat?
   1 2 3 4 5 6 7
   not at all strong extremely strong

4. How satiated do you feel with the amount of food you have eaten (feeling of satisfaction?)
   1 2 3 4 5 6 7
   not at all satisfied extremely satisfied
Positive and Negative Affect Schedule

Directions: 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 each word RIGHT NOW. Use the provided scale to record your answers.

<table>
<thead>
<tr>
<th>Word</th>
<th>Very slightly or not at all</th>
<th>A little</th>
<th>Moderately</th>
<th>Quite a bit</th>
<th>Extremely</th>
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<td>○</td>
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<td>○</td>
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</table>
Emotion Scales

Directions: Place a mark on the following lines to indicate how you feel right now.
Film Clip Summary

Directions: Please write a 1-3 sentence summary of the scene you just watched.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Coding Scheme for Film Clip Summary

Negative emotion condition: If the participant makes any reference to a child crying/grieving due to the death of a boxer/a man/his father, then code as a 1. If the description only includes irrelevant information, code as a 0.

Positive emotion condition: If the participant makes any reference to a man (Ross) learns that his best friend (Chandler) is in a relationship with his sister (Monica), then code as a 1. If the description only includes irrelevant information, code as a 0.
Film Clip Viewing Experience Questionnaire

Please answer the following questions about what you did while watching the film clip.

1. While watching the clip, do you think your facial expressions revealed your feelings?
   1  2  3  4  5  6  7
   not at all a great deal

2. While watching the clip, were you able to suppress your emotions?
   1  2  3  4  5  6  7
   not at all a great deal

3. To what extent did you express your emotions spontaneously while watching the clip?
   1  2  3  4  5  6  7
   not at all a great deal
Taste Scale

Instructions: We are interested in how the candy you just ate tasted. Please answer the following questions.

1. How salty was the candy?

1  2  3  4  5  6  7
not at all  extremely

2. How sweet was the candy?

1  2  3  4  5  6  7
not at all  extremely

3. How savory was the candy?

1  2  3  4  5  6  7
not at all  extremely

4. How pleasant was the texture of the candy?

1  2  3  4  5  6  7
not at all  extremely

5. How much did you enjoy the candy?

1  2  3  4  5  6  7
not at all  extremely

6. Do you think the emotions you felt while watching the film influenced your taste perceptions?

1  2  3  4  5  6  7
not at all  extremely
Dutch Eating Behavior Questionnaire

Instructions: Please answer the following questions about your eating habits.

1. When you have put on weight, do you eat less than you usually do?
   1   2   3   4   5
   never   seldom   sometimes   often   very often

2. Do you try to eat less at mealtimes than you would like to eat?
   1   2   3   4   5
   never   seldom   sometimes   often   very often

3. How often do you refuse food or drink offered because you are concerned about your weight?
   1   2   3   4   5
   never   seldom   sometimes   often   very often

4. Do you watch exactly what you eat?
   1   2   3   4   5
   never   seldom   sometimes   often   very often

5. Do you deliberately eat foods that are slimming?
   1   2   3   4   5
   never   seldom   sometimes   often   very often

6. When you have eaten too much, do you eat less than usual the following day?
   1   2   3   4   5
   never   seldom   sometimes   often   very often

7. Do you deliberately eat less in order not to become heavier?
   1   2   3   4   5
   never   seldom   sometimes   often   very often

8. How often do you try not to eat between meals because you are watching your weight?
   1   2   3   4   5
   never   seldom   sometimes   often   very often

9. How often in the evenings do you try not to eat because you are watching your weight?
10. Do you take into account your weight with what you eat?

11. Do you have the desire to eat when you are irritated?

12. Do you have a desire to eat when you have nothing to do?

13. Do you have a desire to eat when you are depressed or discouraged?

14. Do you have a desire to eat when you are feeling lonely?

15. Do you have a desire to eat when somebody lets you down?

16. Do you have a desire to eat when you are mad?

17. Do you have a desire to eat when you are expecting something unpleasant to happen?

18. Do you get the desire to eat when you are anxious, worried, or tense?
19. Do you have a desire to eat when things are going against you or when things have gone wrong?

1
2
3
4
5
never
seldom
sometimes
often
very often

20. Do you have a desire to eat when you are frightened?

1
2
3
4
5
never
seldom
sometimes
often
very often

21. Do you have a desire to eat when you are disappointed?

1
2
3
4
5
never
seldom
sometimes
often
very often

22. Do you have a desire to eat when you are emotionally upset?

1
2
3
4
5
never
seldom
sometimes
often
very often

23. Do you have a desire to eat when you are bored or restless?

1
2
3
4
5
never
seldom
sometimes
often
very often

24. If food tastes good to you, do you eat more than usual?

1
2
3
4
5
never
seldom
sometimes
often
very often

25. If food smells and looks good, do you eat more than usual?

1
2
3
4
5
never
seldom
sometimes
often
very often

26. If you see or smell something delicious, do you have a desire to eat it?

1
2
3
4
5
never
seldom
sometimes
often
very often

27. If you have something delicious to eat, do you eat it straight away?
28. If you walk past a bakery do you have the desire to buy something delicious?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>never</td>
<td>seldom</td>
<td>sometimes</td>
<td>often</td>
<td>very often</td>
</tr>
</tbody>
</table>

29. If you walk past a convenience store or cafe, do you have the desire to buy something delicious?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>never</td>
<td>seldom</td>
<td>sometimes</td>
<td>often</td>
<td>very often</td>
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</tbody>
</table>

30. If you see others eating, do you also have the desire to eat?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<td>never</td>
<td>seldom</td>
<td>sometimes</td>
<td>often</td>
<td>very often</td>
</tr>
</tbody>
</table>

31. Can you resist eating delicious foods?*

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<td>never</td>
<td>seldom</td>
<td>sometimes</td>
<td>often</td>
<td>very often</td>
</tr>
</tbody>
</table>

32. Do you eat more than usual, when you see others eating?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<td>never</td>
<td>seldom</td>
<td>sometimes</td>
<td>often</td>
<td>very often</td>
</tr>
</tbody>
</table>

33. When preparing a meal are you inclined to eat something?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<td>never</td>
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<td>sometimes</td>
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</table>

*reverse scored