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Title of Dissertation: "Understanding the Function of Emotional Eating: Does it Buffer the Stress Response and Help Us Cope?"

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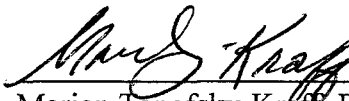

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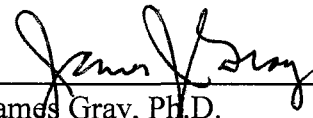

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Understanding the function of emotional eating:

Does it buffer the stress response and help us cope?

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Dissertation submitted to the faculty of the

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ABSTRACT

Emotional eating, or eating in response to negative mood, has been reported in binge eaters, restrained eaters, the obese, and healthy controls as well. Models of coping, defined as specific efforts, both behavioral and psychological, that people employ to master, tolerate, reduce, or minimize stressful events, have not yet been applied in the emotional eating literature, despite clear evidence that some individuals eat during times of stress. The purpose of the present study was to 1) determine if the act of eating buffers the stress response to a stressful mood induction more for individuals who report greater tendency to emotionally eat across three domains (cognitive: attention/distraction, physiological: heart rate/blood pressure/galvanic skin response, and affective: mood); 2) compare comfort food (food that evokes a psychologically comfortable or pleasant state) with non-comfort food on the stress response after eating; 3) understand the behavioral aftereffects of stress and eating for emotional eaters; and 4) understand the function of emotional eating in the context of coping. Participants were 117 healthy, overweight women ranging in age from 19-61 years, with no major medical or psychological diagnoses. Participants were randomly assigned to one of two films (stressful film or neutral film), and one of two foods (comfort food or non-comfort food). The sample was highly diverse, with most being active copers, experiencing minimal depressive or anxiety symptoms, and moderate alexithymia. Results on physiological outcomes suggest that eating a comfort food buffers systolic blood pressure reactivity compared to eating a non-comfort food. Emotional eaters were also highly distracted from the stressor by eating. Finally, eating improved mood during the

stressor. Results suggest that emotional eaters may use food to distract themselves from stressors, and that eating is a powerful mood regulator. Comfort food improved mood more than the non-comfort food, despite the fact that participants preferred the non-comfort food. Future research should examine the relationship between emotional eating, coping style, and the function of eating to regulate mood.

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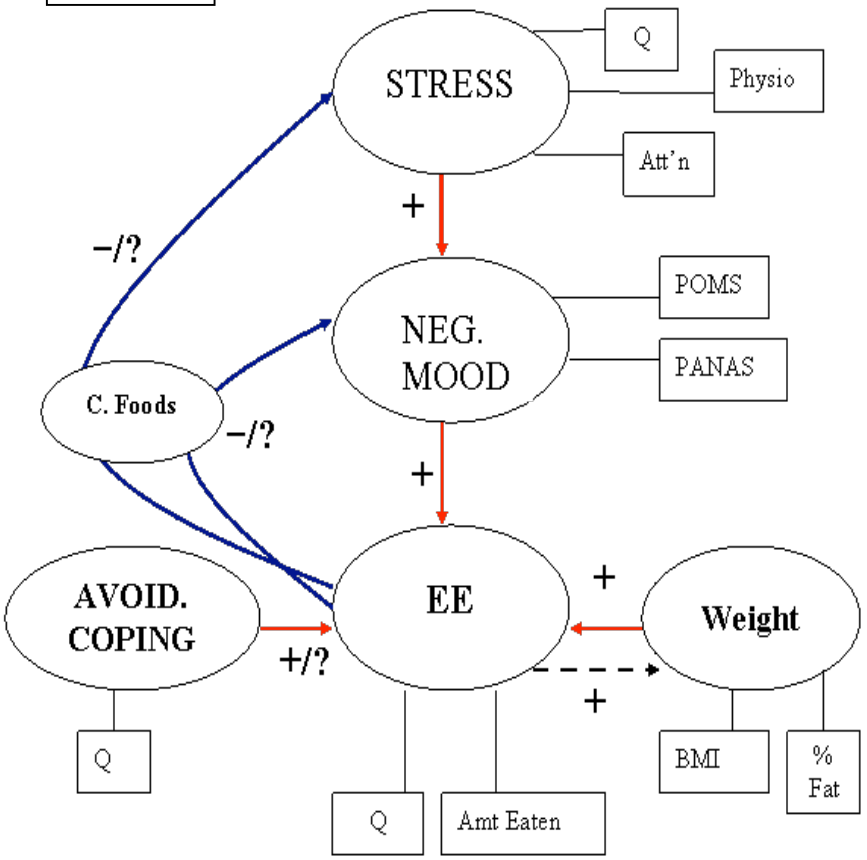
I. Introduction

Evidence supporting the relationship between food and mood is growing. Specifically, eating in response to negative mood, or emotional eating, has been reported in obese individuals (Ganley, 1989), binge eaters (Abraham & Beumont, 1982; Heatherton & Baumeister, 1991), restrained eaters (Polivy & Herman, 1999) and non clinical individuals as well (E. Stice, Ziemba, Margolis, & Flick, 1996). Affect regulation models of eating in response to stress suggest that individuals use food to improve their mood. If individuals do use food as an attempt to improve mood, then this type of eating may be considered a type of coping mechanism. Coping is defined as "any effort at stress management" (Cohen & Lazarus, 1979) or "specific efforts, both behavioral and psychological, that people employ to master, tolerate, reduce, or minimize stressful events" (Folkman & Lazarus, 1985). If individuals use emotional eating as a coping mechanism over time, then this behavior may ultimately result in weight gain and subsequent health risks.

There has been little research bridging the fields of emotional eating and coping among emotional eaters. Rather, most studies of eating behavior and coping style have been done in the area of eating disorders such as Anorexia Nervosa, in which eating is severely restricted. Understanding how, or if, emotional eating serves as a type of coping mechanism could help us better understand the function of this behavior. And, since coping mechanisms function by minimizing the effects of stressors on a person's resources, it is important to determine if emotional eating serves this function. The following sections provide an overview on (1) stress and

eating; (2) emotional eating; (3) Comfort food; and (4) Coping style. These sections provide a selective review of the evidence supporting the underlying model of this dissertation (see Figure 1).

Figure 1.



A. Stress, Eating, and Mood

1. Definition of stress

Stress has many different definitions, but it is generally accepted to be an aversive state, marked by increased sympathetic nervous system arousal, in response to a threatening or demanding situation (Selye, 1956). And although both positive and negative events can be experienced as stressful, much of the work on

the relationship between stress and eating has focused on distress, or negative stress experiences. Such experiences lead to negative mood states (Baum, Gatchel, & Krantz, 1997; Feldman et al., 1999) and the two concepts have been used nearly interchangeably in the literature on eating and mood (Greeno & Wing, 1994). Mood is most commonly conceptualized along the dimensions of positive and negative affect, with a negative mood state regarded as something to be avoided, and positive mood state as desirable and something to be maintained (Watson & Clark, 1991). For the purposes of this dissertation, stressful events are defined as processes by which a stressor is perceived as threatening or challenging, resulting in negative mood (Baum et al., 1997).

Stress has direct and indirect adverse effects on health. They may be directly related to conditions such as cardiovascular disease though influences on the autonomic nervous system (Cohen et al., 2000). For example, stress may result in increased activation of the sympathetic nervous system, including surges in heart rate and blood pressure, which may subsequently result in plaque ruptures, myocardium ischemia, or other negative health outcomes (Cohen et al., 2000; Kop et al., 2001; Mittleman et al., 1995). Stress also has indirect adverse effects on health. For example, stressful life events are related to the initiation of cigarette smoking and alcohol use (Little, 2000), which result in health consequences over time. Stress also has been cited as a precipitant to relapse of drug use (Piazza & Le Moal, 1998). And, there is a body of literature that has examined how stress affects eating behavior (Steptoe, Lipsey, & Wardle, 1998). In an era where overweight and

obesity affects over 65% of the U.S. population (Hedley et al., 2004; Ogden et al., 2006), understanding the relationship between stress and eating behavior is critical.

2. Stress and eating

With regard to stress and eating, there are two major paradigms that have been used examined to understand the relationship. First, stress may be an antecedent to eating episodes. In fact, there is a large body of literature that demonstrates how stress increases eating for some individuals, particularly for those who are restrained (Greeno & Wing, 1994; McCann, Warnick, & Knopp, 1990; Michaud et al., 1990; Stroud, Tanofsky-Kraff, Wilfley, & Salovey, 2000; Wallis & Hetherington, 2004). Alternatively, negative mood may be considered a consequence of eating in response to stress. A person, particularly one who is dieting or restricting eating for weight loss purposes, may experience remorse or guilt after eating and subsequently may experience negative mood (L. Dube, J. LeBel, & J. Lu, 2005a; M. Macht & Dettmer, 2006). Although stress is a normal part of everyday life, how an individual responds to stressful events, including their behavior, thoughts, and emotions, affects physical and mental health in both the short and long term (Lazarus & Folkman, 1984).

Stress is considered an antecedent to eating episodes for many clinical populations. For example, stress precipitates binge episodes for bulimics (Abraham & Beumont, 1982) and patients with binge eating disorder (BED) (Arnow, Kenardy, & Agras, 1992), leading to the possibility of weight gain over time. Ganley's (1989) review of emotion and eating revealed that 60-90% of severely obese individuals

and 75% of mildly obese individuals seeking weight loss treatment reported eating in response to negative or stressful life events.

3. Eating and Stress

Principles of reinforcement would suggest that for individuals who repeatedly eat in response to stress, a desired consequence must occur following the behavior. And research has shown that eating after experiencing stress, eating improves mood (L. Dube, J. L. LeBel, & J. Lu, 2005b; Osborn, Sbrocco, Carter, Morris, & Hood, under review). However, eating does not always improve mood. Macht and colleagues (2003) reported that among both normal weight and overweight women who were asked to eat without an antecedent stressor, mood worsened after eating—and the intensity of the stress increased linearly with the number of calories ingested (M. Macht, Gerer, & Ellgring, 2003). Therefore, the same behavior, eating, has markedly different affective consequences depending on the function of that behavior. For those who eat in response to stress, eating may serve to improve mood. However, when eating without an antecedent mood state, it may have the opposite effect.

If an eating episode is initiated without an antecedent stressor, and not in response to a physiological need (e.g., hunger), eating may result in worsened mood state (M. Macht et al., 2003). In these eating episodes, eating may be appraised as negative because of the perceived relationship between eating and weight gain. This negative appraisal then results in a negative mood consequence. However, the literature suggests that this assumption only holds true under certain conditions. For example, this outcome is more likely in restrained eaters (Polivy & Herman, 1999)

who consciously attempt to limit their food intake for the purposes of weight control. Dieters have been found to have higher levels of negative affect than non-dieters (Dykens & Gerrard, 1986) and dieting has been linked prospectively to increased stress levels by some researchers (Rosen, Tacy, & Howell, 1990). Specifically, dieters who are not successful at maintaining dietary restraint experience negative affect through feelings of ineffectiveness and failure (Heatherton & Polivy, 1992).

On the other hand, if a person initiates an eating episode in response to stress, then eating appears to have a different function. That is, eating may serve to improve mood, at least temporarily (Dube et al., 2005a). And, it seems that this process may occur through one of two pathways. First, eating may serve to improve mood by moving a person along the continuum towards a positive mood state—literally mood improvement. Alternatively, it is also possible that eating may serve to buffer the effect of a stressor such that a person does not ever reach the lowest mood point. In other words, a person may use food to buffer his/her stress response, ultimately resulting in an improved mood state, compared to level of negative affect that may have been reached without the buffer. In this sense, eating may be viewed as a coping mechanism or an attempt at managing negative affect in response to stress. In fact, some researchers have described eating in response to negative affect as "coping with negative emotions," (Boon, Stroebe, Schut, & Ijntema, 2002) despite a lack of empirical support for the use of emotional eating as a coping mechanism.

It is important to consider, however, that the function of food as a buffering mechanism for the stress response may only occur for individuals who have learned

associations between eating and mood. Mood consequences of eating are anticipated and remembered from past experiences (M. Macht, Meininger, & Roth, 2005; Rozin, 1999). Therefore, the function of eating for individuals who use food to improve mood (i.e., emotional eaters) may differ from the function of eating for individuals who do not. One purpose of the present study was to determine if food buffers the stress response for emotional eaters—or those who are presumed to have a history of eating in response to stress.

B. Measuring stress

One important function of the stress experience is to produce appropriate anticipatory responses to improve chances of survival. In order to help us survive, one of the hallmarks of the stress response is rapid mobilization of energy, such as the release of glucose, along with an increase in heart rate, breathing, and blood pressure to help transport these newly released energy stores to the appropriate places (e.g., muscles) (Cannon, 1914; Sapolsky, 1998). And although our bodies react in this way fairly reliably, the process is dependent upon the perception of a stressor.

1. Perception of Stress

One unique challenge of studying the stress and eating relationship is that individuals differ in the stress experience. Something that is experienced as stressful for one individual may be experienced as less stressful or even pleasant to another (Greeno & Wing, 1994; Lazarus & Folkman, 1984). Therefore, it is extremely important when studying stress in the laboratory, to use a stress/mood induction that has a high likelihood of inducing the desired mood state. Difficult to

control mood inductions, such as imagery, may produce ambiguous mood responses (Montoya, Campos, & Schandry, 2005).

Stress is experienced through a variety of mechanisms, including physiological, cognitive, emotional, and behavioral mechanisms—or their combination. Because of difficulties with determining which events or situations are stressful, the field of eating and stress has moved towards subjective measurements, which entail asking people to report how stressed they feel (Cohen, Kamarck, & Mermelstein, 1983). Perceived stress, rather than the stressor per se, therefore has been determined to be more important in predicting health outcomes and stress responses (Goldman, Glei, Seplakii, Liu, & Weinstein, 2005; Greeno & Wing, 1994; van Eck & Nicolson, 1994). Individuals who appraise a situation or event as threatening and stressful commonly experience negative affect (Baum et al., 1997).

2. Physiological Factors

The use of physiological measures can assist in determining a person's level of arousal, or stress response, in response to an aversive event. For example, in response to an acutely stressful event, the body responds through activation of the sympathetic nervous system, as well as the HPA axis. These changes are indicated through increased levels of neurohormones, blood pressure, and heart rate, as well as increased skin conductance and muscle potential (Baum et al., 1997). There is some controversy in the literature whether physiological measures can differentiate mood changes and responses to experimentally induced mood—particularly in response to film mood inductions.

For the purposes of this dissertation, physiological measures of arousal included blood pressure, heart rate, and the galvanic skin response, or GSR. There is a relationship between sympathetic activity and emotional arousal, although one cannot identify the specific emotion being elicited. The GSR is highly sensitive to emotions in some people. Fear, anger, startle response, orienting response and sexual feelings are all among the emotions which may produce similar GSR responses. GSR has been used to measure affective responses to emotional films in previous work (Gomez, Zimmermann, Guttormsen-Schär, & Danuser, 2005; Palomba, Sarlo, Angrilli, Mini, & Stegagno, 2000), and it has been shown to reliably increase in response to stressors compared to neutral stimuli (Gomez et al., 2005; Kohler, Scherbaum, & Ritz, 1995).

3. Psychological Factors

In addition to the physiological associations between stress and eating, there are psychological antecedents and consequences of eating as well. While it is possible that the nutrients in food exert an effect on the body to change mood, it is also possible that the psychological features of eating result in mood improvement. It has been suggested that timing between ingestion and the resultant mood change is the determining factor that can distinguish between nutritionally and psychologically induced changes in mood (M. Macht et al., 2003). For example, the serotonin hypothesis for carbohydrate and chocolate cravings suggests that this craving addresses a serotonin deficiency by increased circulation of tryptophan which passes through the blood brain barrier to be converted into serotonin (G. Parker, Parker, & Brotchie, 2006). Therefore, ingestion of these substances, which

results in increased serotonin, has been labeled a form of “self-medication” for depressed mood (Wurtman & Wurtman, 1989). However, others have argued that even when extreme changes in tryptophan levels are experimentally induced, the result is a series of physiological changes that are too slow to account for mood effects that have been described during or soon after eating (Young, Smith, Phil, & Ervin, 1985). It seems, therefore, that there may be multiple factors involved in mood changes reported after eating and timing is key.

Cognitively, several studies have reported differences in cognitive performance of individuals depending on level of dietary restraint. Typically, restrained eaters show impaired cognitive performance relative to unrestrained eaters, particularly on performance of dual-processing tasks that require individuals to complete some sort of reaction time task while imagining the consumption of their favorite food (Brunstrom & Witcomb, 2004). This phenomenon has been explained through the activation of diet- or weight-related worries that interfere with performance on the secondary task. However, recent evidence contradicts this explanation by finding no differences in cognitive performance of restrained eaters when told that they would or would not have to eat the forbidden food following the task (Higgs, 2006). Therefore, thoughts about the threats to dieting or weight are less likely to fully explain the decreased cognitive performance for restrained eaters. Instead, it is possible that attention to food cues is heightened in certain individuals, such as restrained eaters, which distracts them from giving full attention to the task at hand. This distraction by threats may be akin to a type of avoidance coping style. Avoidance coping has been described as the opposite of attention (Suls & Fletcher,

1985). If restrained eaters experience attentional difficulties in response to food and thoughts of food, it is possible that emotional eaters will experience the same phenomenon. For the purposes of the present study, level of distraction from a film was measured by a series of fact-based questions regarding film content following each film. This information assisted in the classification of emotional eating as a type of avoidance coping mechanism.

Behaviorally, individuals who are faced with an acute stressor may respond in a number of ways. For example, an increase in health-harming behaviors, such as smoking or drinking alcohol, has been reported (Frone, 1999). Data from over 12,000 individuals were examined for associations between stress and several health behaviors. It was reported that both men and women who experienced high levels of stress were more likely to eat high fat diets, exercise less frequently, smoke cigarettes, and report recent increases in smoking behavior (Ng & Jeffery, 2003). Similarly, overeating in response to stress (i.e., emotional eating) is another possible behavioral outcome.

C. Emotional Eating

Emotional eating is defined as a tendency to eat in response to stress or negative mood. It has been considered an inapt response to stress, because the physiological reaction to distress includes inhibition of gastric motility and release of sugar into the bloodstream, which should suppress hunger and eating behavior (van Strien & Ouwens, 2006). The presence of emotional eating has been reported to be higher in those who are dieting (Herman & Mack, 1975; Lindeman & Stark, 2001) and tends to be more common in the context of negative mood. The presence of

emotional eating is reportedly decreased during positive mood (Woodman, 1980), however this area requires further research. The study of emotional eating has delineated several aspects of eating behavior that are potentially affected when an individual eats in response to stress, including amount of food eaten and food selection.

1. Amount of food

How much an individual eats at any given time is affected by current mood state. Some researchers have reported that overweight individuals tend to increase the amount of food they eat under conditions of stress (Lowe & Fisher, 1983; Pinaquy, Chabrol, Simon, Louvet, & Barbe, 2003). For example, using self-reports of eating behavior, overweight individuals were found to report greater food intake during negative mood states (e.g., sad, bored, angry) and negative situations (e.g., arguments, losing money) compared to either normal weight or underweight individuals (Geliebter & Aversa, 2003). However, for underweight individuals, the results were opposite—these individuals reported eating less during negative emotional states and situations.

In addition to differences in the stress and eating relationship by body weight, there is also evidence that degree of dietary restraint changes this relationship as well. A restrained eater chronically limits food intake for the purpose of weight control (Herman & Polivy, 1984; Lowe, 1993). Typically, restrained eaters respond to stress by increasing food intake while unrestrained eaters do not (Cools, Schotte, & McNally, 1992; Herman & Mack, 1975; Zellner et al., 2006).

Eating more food in response to stress may result in subsequent weight gain. In fact, stress-related weight gains of 10 lbs or more have been reported by 79% of obese individuals but only 9% of normal weight individuals (Rand, 1982). Seventy-six percent of severely obese individuals have reported stress-related weight gains of more than 25 lbs (Atkinson & Ringuette, 1967), suggesting that during periods of stress there is a tendency to increase food intake. In the present study, participants were asked to eat 300 calories of either a comfort food or a non-comfort food while experiencing either a stressful or neutral mood induction. This approximate energy intake has been found to produce affective changes in previous work (Cavallo & Pinto, 2001) and still qualifies as more than a "taste" of food which has produced unexpected results (M. Macht et al., 2003).

2. Type of food

Food choice also is affected by many factors, including food availability, personal preferences, cultural factors, and emotion. During periods of self-reported high stress, individuals show an increase in total calories consumed, total fat, saturated fat, and percent of calories from fat (McCann et al., 1990) compared to their intake during self-reported low stress times. These findings hold true in both naturalistic (Crowther, Sanftner, Bonafazi, & Shepard, 2001) and laboratory (Zellner et al., 2006) settings. Sweet and salty foods, as well as foods high in both fat and calories, are among the food types often preferred by binge eaters (Marcus, Wing, & Hopkins, 1988). Fat consumption in particular has been cited to increase on stressful days for girls (Michaud et al., 1990). In fact, in laboratory studies of stress-induced eating, using foods that do not meet the criteria as high-fat, good tasting

foods, have been implicated in lack of consistent findings from study to study (Greeno & Wing, 1994).

Although overall food intake may not change during periods of stress, when considering the properties of the food, it has been found that women eat more sweet food in response to stress, whereas consumption of salty and bland foods do not change (Grunberg & Straub, 1992). Interestingly, for women who rated themselves as emotional eaters, a small taste of a high calorie, sweet food resulted in increased ratings of negative mood (Gibson, 2006), which seems an unlikely consequence for individuals who repeatedly eat such foods during stress. Therefore, the amount of food eaten may play an important role in determining the effect of food on mood such that individuals may have to consume more than a "taste" of the food in order to achieve a reinforcing outcome.

While some foods are considered "foods to avoid" or "forbidden foods" for health reasons and dieting purposes, others are less likely to be regarded as unhealthy or bad for dieting. There is relative homogeneity in the perceptions of what constitutes healthy eating across a number of studies conducted in different countries and involving different age groups, sexes and socio-economic status groups (Aikman, Min, & Graham, 2006; Gibson, 2006; Kampov-Polevoy, Alterman, Kahlitov, & Garbutt, 2006; M. Macht & Dettmer, 2006; Martins & Pliner, 2005; Zellner et al., 2006). Perceptions of healthy eating consistently include fruits and vegetables. Characteristics of food such as naturalness, fat, sugar, and salt contents also are important in people's perceptions of healthy eating (Paquette, 2005). For example, chocolate and potato chips are foods that are considered

unhealthy foods to avoid, whereas grapes and dry roasted peanuts, although relatively high calorie foods, are considered healthy choices (Zellner et al., 2006).

3. Stress and Food Choice

Two studies by Zellner and colleagues (2006) help elucidate the relationship between stress and food choice as it is related to perceived health aspects of food. When stress was experimentally induced among college aged women, the stressed group ate more of the foods determined to be unhealthy, high-caloric, and sweet (M&M chocolate candies) than did the non-stress group. The non-stress group, however, ate more healthy sweet foods (grapes) than the stressed group.

In their second study, men and women were surveyed about their stress and eating behaviors. Forty-six percent of women reported overeating when stressed, compared to only 17% of men. Some also reported under-eating in response to stress (37% women and 54% men) and very few (17% of women and 29% of men) reported no change in eating behavior when stressed—an indication of the pervasiveness of the stress and eating relationship. Because of the low number of men who report overeating when stressed, the remaining discussion relates only to women.

In relation to food choice, 73% of women in this study who indicated overeating when stressed reported that they eat foods that they normally avoid, not just any food (Zellner et al., 2006). For example, when overeating during stress, they reported eating more sweet food when such foods were normally avoided. Chocolate was the most commonly reported sweet eaten when stressed. However, sweet foods were not the only food choice made during stress. High fat/snack/"junk"

foods, perceived to be unhealthy, were other foods eaten during stress for 83% of women who said they eat foods during stress (other than sweets) which are normally avoided. For the purposes of this dissertation, the commonly cited "unhealthy" food choice, M&M candies, were compared to a healthy comparison, grapes. The foods are regarded as having different health properties in previous work (Zellner et al., 2006) yet are both palatable and sweet.

The two food choices are both generally regarded as sweet, whereas one is considered a comfort food and one is not. While some studies have used a combination of sweet and salty or savory items, results have predominantly shown that people eat more of the sweet food than other types (Grunberg & Straub, 1992; Oliver et al. 2000) after stress. Thus, even when given an option of eating sweet or salty foods, people tend to prefer sweet foods both in laboratory settings and as reported in natural settings. In order to account for the fact that both food choices are sweet, hedonic properties and satiety were measured. Also, to determine the degree of flavor satisfaction obtained from both foods, participants were asked to rate sweetness, desire for more, and other outcomes (see Method section).

D. Effect of food on mood

1. *Role of Hunger*

Despite reports that food improves mood or makes people feel better, Larsen and Prizmic (2004) sought to understand the emotional consequences of eating. Although the ingestion of food likely alters affect through influences on blood glucose and hormones, they reported that it is also possible that food exerts an effect on mood through cognitive and psychological mechanisms (R. J. Larsen & Prizmic,

2004). In fact, the impact of food or drink on a person's mood depends on the person's initial state, expectations, and attitudes (Gibson, 2006). For example, when individuals were thirsty, they increased in vigilance when allowed to drink. However, the opposite results were found when they were not thirsty initially (Rogers, Kainth, & Smit, 2001). The same results have been reported regarding hunger (Gibson, 2006), highlighting the importance of controlling for initial levels of hunger before any study on emotional eating. In the present study, hunger was controlled by asking participants to eat a regular meal, followed by a four hour fasting period, prior to arrival to the laboratory. In addition, level of hunger upon arrival to the session was measured for each participant.

2. Guilt and the Perception of Eating

Guertin and Conger (1999) examined the effects of induced mood and food type on perceptions of eating in a sample of females representing a continuum of bulimic symptomatology. They reported that mood worsened when participants evaluated the eating episode as negative. That is, for participants who reported feeling out of control and regarded the eating episode as a binge, mood was negatively affected (Guertin & Conger, 1999). This result highlights the fact that cognitive factors, such as the perception of the eating episode, may mediate the relationship between eating and mood change. Factors that affect perception of eating may include dietary restraint and number of calories consumed. In this study, participants were asked to estimate the number of calories they were asked to eat during the study. In addition, level of dietary restraint was measured for each participant.

A recent naturalistic study on the effects of eating a chocolate bar versus eating an apple on emotions in normal weight, healthy women revealed that both types of foods reduced hunger and changed mood (M. Macht & Dettmer, 2006). Eating both types of foods improved mood; however eating chocolate also resulted in increased guilt feelings while eating the apple did not. The apparent health content of the food choices, one sweet and forbidden, the other seen as a healthy alternative to sweet snacking, seems to have had an impact on the mood consequences. Two limitations to this study which were addressed in the present study include the macronutrient content of the food options and also the emotional eating status of the sample. In the Macht and Dettmer (2006) study, the women the women were not emotional eaters and previous work has shown that the emotional effects of food may vary by such individual differences (Cools et al., 1992). Additionally, the chocolate bar used in this study contained three times the number of calories as the apple (270 vs 90 kcal, respectively). For the purposes of this dissertation, the two food options (chocolate and grapes) given to individuals were portioned to match in caloric value to control for the role of macronutrient composition.

The macronutrient content of food is important to consider because the intensity of negative mood and guilt rated immediately after tasting a number of different foods increased along with the caloric content of the foods. And, these results were more robust in overweight women than in normal weight women (M. Macht et al., 2003). In this same study, women rated the medium and highest energy foods as most dangerous and least healthy, and the authors concluded that

these negative effects were most likely related to their presumed impact on health and weight.

E. Comfort Foods

Emotional eaters typically eat foods high in fat and calories, rather than low calorie, healthier options during an episode of emotional eating. These foods are known as comfort foods, or foods whose "consumption evokes a psychologically comfortable and pleasurable state for the individual" (Wansink, Cheney, & Chan, 2003). However, comfort food preferences are developed over a lifetime and may result from a number of different factors, including prior learning experiences, social contexts, hedonic considerations, and physiological motivations to correct energy or nutrient imbalances.

1. *Comfort Food Preference*

It has been suggested that differences that exist in comfort food preference across gender and age, result from differences in several of these developmental factors. A survey of comfort food preferences revealed that women prefer snack related comfort foods, such as candy and chocolate while men preferred more meal-related food items such as pizza, steak, casseroles, and pasta (Wansink et al., 2003). The same survey revealed that eating comfort foods made females feel less healthy and guiltier than males. The authors suggest that the comfort foods men prefer represent work for women (i.e., women have to prepare the foods), and therefore women are more likely to prefer quick and easy food choices for emotional eating purposes. An alternative conceptualization may be that there are gender differences in attitudes towards food, with women being more likely than men to

have a dieting mentality and consider some foods “forbidden.” In fact, concern for appearance and weight alter dietary choices, with women reporting more concern over choosing low-fat foods for reasons other than health (Steptoe, Pollard, & Wardle, 1995) .

Chocolate is the most commonly craved food and, for most chocolate cravers, non-chocolate substitutes are inadequate (Weingarten & Elston, 1991). And although chocolate craving and emotional eating are considered two separate phenomena, they may coexist in the same individual (G. Parker et al., 2006). Because of this information that food substitutes are inadequate to satisfy cravings, the proposed study assessed what types of foods participants are most likely to want to eat when stressed.

F. Emotional eating and health

Women tend to rate foods higher in caloric value as less healthy than lower calorie foods (M. Macht et al., 2003). And, despite recognizing the health risks of consuming high calorie foods in excess, women also tend to turn to these high calorie, high fat foods during emotional eating episodes. For those who overeat during stressful periods, the health consequences can add up over time with repeated cycles.

For example, long term consequences of overeating during stress may include weight gain resulting from increased caloric intake and greater abdominal fat resulting from increased insulin secretion (Epel et al., 2004). Problems with cholesterol may also occur, as higher LDL and lower HDL cholesterol levels may result from increased intake of foods high in saturated or trans fats common in

baked goods, chocolates, oils, and many other foods commonly chosen during emotional eating episodes. In fact, the Food and Drug Administration (FDA) indicates that nearly 40% of adult American transfat intake comes from products such as cakes, cookies, crackers, pies, and breads (FDA, 2003). There also is evidence that emotional eaters may be at increased risk for metabolic syndrome (Epel et al., 2004). While there is no evidence to date which suggests that emotional eating per se results in overweight and obesity, there is certainly evidence to suggest that emotional eating results in a poorer diet, at least in the short-term.

G. Individual differences

1. Cognitive Dietary Restraint (CDR)

CDR describes a person's desire to restrict food intake in an effort to maintain one's weight or produce weight loss (Herman & Polivy, 1984). Recent evidence has shown that level of CDR is not necessarily correlated with caloric intake or any particular eating style (such as dieting) (E. Stice, Fisher, & Lowe, 2004). However, CDR does play an important role in the effect of mood on food intake. Restraint also may impact mood changes after eating. For example, a highly restrained eater may eat in response to a stressful event or situation but then may experience a surge of guilt or anxiety subsequent to the eating episode because of concerns over caloric intake and weight gain (Dewberry & Ussher, 1994). In contrast, an unrestrained eater who eats in response to stress may not have the same negative emotional consequence, and in fact, may experience a positive affective response (Heatherton & Polivy, 1992; Osborn et al., under review).

2. Weight

Weight class is another variable that has garnered much attention in understanding the relationship between stress and eating. However, results are mixed. Whereas some studies suggest that overweight or obese individuals eat more in response to stress (Pine, 1985), others show no difference between obese and normal weight individuals in stress induced eating (Lowe & Fisher, 1983) and still others show that overweight individuals eat less when stressed than those who are of normal weight (Ruderman, 1983). Lowe and Fisher (1983) found that obese female adolescents were more "emotionally reactive" than normal weight controls and negative affect is a salient predictor of bulimic behaviors in the same population (E. Stice & Agras, 1998).

Weight status may not fully predict vulnerability to stress induced eating. Instead, it is more likely that weight status interacts with, or may be replaced by, other constructs. For example, in a study of dieting and non-dieting obese individuals, it was found that dieting status, not weight status, predicted stress induced eating (Baucom & Aiken, 1981). In this dissertation, dieting status (currently dieting or not) was measured, along with level dietary restraint, which may be linked to mood changes after eating. In addition, all participants in the study were overweight to eliminate the potential differences between groups according to weight.

3. Gender

Women have been reported to use more emotional regulation strategies than do men (J. K. Larsen, van Strien, Eisinga, & Engels, 2006). And, gender differences

in emotional eating have been consistently reported, with women being more emotionally expressive and showing more emotional eating behaviors than men (J. K. Larsen et al., 2006). Additionally, women are more likely to restrict their food intake than men, for both weight loss and health reasons (Rand & Kauldau, 1991). Examining intent to diet or restrict food intake in emotional eating studies is important. If the stress-induced changes in food choices, such as an increasing tendency to eat forbidden foods (Zellner et al., 2006) are brought about by loss of dietary control, then it would be expected that these changes would be seen more strongly in women than in men (Zellner et al., 2006).

Grunberg and Straub (1992) exposed participants to a film to induce negative affect while having snack foods available in the room. They found that consumption increased as a result of negative affect, but only among women. The results were actually reversed for male subjects, who reduced the amount of food intake as a consequence of negative affect. Similarly, it has been reported that nearly 46% of women reported overeating when stressed compared to only 17% of men whereas 54% of men reported undereating when stressed (Zellner et al., 2006). Because more women than men overeat when stressed, and because women are more likely than men to eat comfort foods (or foods normally avoided for weight loss or health reasons) when stressed, the present study used a sample of women only and measured dietary restraint and attempts at dieting.

G. Coping style

Coping has been broadly defined as “any effort at stress management,” (Cohen & Lazarus, 1979) or “overt and covert behavior that are taken to reduce or

eliminate psychological distress or stressful condition" (Fleishman, 1984). Coping styles are viewed as "person variables" that may moderate antecedent stressful events and potential physical and psychological consequences (Billings & Moos, 1981). Coping behavior during stressful events or in stressful settings is thought to be one of the major determinants of individual differences in psychophysiological and physiological stress responses (Aldwin, 1994; Lazarus & Folkman, 1984). It has been argued that positive mental health is the result of adaptive coping strategies (Ryff, 1998).

1. Function of Coping

This discussion of coping highlights one area of interest in this dissertation. If emotional eating can reduce the psychological distress an individual experiences in response to a stressor, then it can be conceptualized as a maladaptive coping mechanism. In other words, emotional eating may serve to buffer the stress consequences that develop in response to stressors. The use of coping mechanisms is a process that individuals employ when faced with a stressor or negative event. Over time, when eating is reliably paired with improved mood during stress, individuals may learn that eating will help them to cope with stressors.

In order to determine if emotional eating can be conceptualized as a coping mechanism, a connection between perceived stress and eating must be demonstrated. The great individual variability in stress perceptions and responses has been discussed previously. In the coping literature, the transactional model of coping posits that stressors are first appraised, through a primary appraisal process, to determine whether the stressor is irrelevant, benign-positive, or stressful. Then,

during secondary appraisal process, individuals determine potential options for coping with the stressor. The manner in which stressors are appraised and coped with is presumed to influence mood (Lazarus & Folkman, 1984). In other words, the way in which individuals selectively attend to and process stressors or threats determines how anxious, aroused, or stressed they become (Miller, 1987).

After appraisal, individual coping strategies vary. Several types of coping styles have been identified in the literature, however there is little consensus about the best way to define sub-categories of coping. Endler and Parker (1990), in a review of the coping literature, described 14 categorizations of coping operationalized in coping scales. Most coping styles involve two dimensions: one representing an orientation toward the stressor and one away (Endler & Parker, 1990). Three different conceptualizations of coping that may have received the most empirical examination include monitoring vs. blunting coping styles (Miller, 1987), problem-focused vs. emotion-focused coping (Folkman & Lazarus, 1980), and approach vs. avoidance coping (Roth & Cohen, 1986). These different coping styles are reviewed below.

2. Monitoring vs. Blunting Coping.

Monitoring and blunting coping styles are often used categorically to describe individuals as either monitors or blunters. Monitoring involves the "extent to which individuals are alert for and sensitized to information about the threat," (Miller, Leinbach, & Brody, 1989). This type of coping is oriented towards the stressor. A blunting coping style, however, is more consistent with the use of distraction and cognitive avoidance when faced with a stressor (Miller, 1987). Individuals who use a

blunting coping style orient away from the stressor. It has been reported that those who engage in blunting strategies show less stress and arousal than those who engage in cognitive scanning or monitoring.

3. Problem vs. Emotion Focused Coping.

Problem-focused coping strategies are efforts to do something active to alleviate stressful circumstances. Techniques to reduce stress may include cognitively reconceptualizing a problem, by minimizing its effects or by solving it (Ryden, Karlson, Sullivan, Torgerson, & Taft, 2003). Emotion-focused strategies, however, involve the regulation of the emotional consequences of stressful events (Folkman & Lazarus, 1980). Examples of emotion-focused coping techniques may include daydreaming, or self-preoccupation (Ryden et al., 2003). Research indicates that people use both types of strategies to combat most stressful events (Folkman & Lazarus, 1980). However, problem focused coping seems to be linked to improved mental health, whereas emotion focused coping may result in increased distress (Endler & Parker, 1990; J. D. A. Parker & Endler, 1992).

The distinction between problem- and emotion-focused coping is an important one. However, the distinction has proven to be too simple. Responses to coping questionnaires, instead, show that people respond to stressful situations in a variety of ways (Carver, Scheier, & Weintraub, 1989) that cannot be neatly divided between these two categories. To account for this problem, Carver and colleagues (1989) conceptualized coping in terms of active and avoidance coping styles. Their categories are similar to the problem- and emotion-focused coping styles described by Lazarus and Folkman (1984). However, they distinguish the two concepts by

expanding problem-focused coping to include such behaviors as planning active coping strategies prior to the event and suppressing other activities to allow full engagement in problem-solving techniques. Emotion-focused strategies are also expanded in this model to include behavioral disengagement and helplessness.

4. Approach vs. Avoidance Coping.

Approach (or active) and avoidance coping styles, as described by Roth and Cohen (1986) and Carver and colleagues (1989), are terms used to describe a person's cognitive and emotional activity in response to a stressor or threat. Unlike the literature on problem- and emotion-focused coping styles active and avoidant coping styles are more easily dichotomized (Carver et al., 1989).

Individuals who use an approach coping style are more likely to orient towards a stressor or arousing stimuli in an attempt to understand, learn more about, or solve the problem. Avoidance copers, on the other hand, tend to orient away from the stressor and seek distraction or otherwise attempt to avoid confronting the stressor or their emotional responses to it. Approach coping strategies are either behavioral or psychological responses designed to change the nature of the stressor itself or how one thinks about it, whereas avoidant coping strategies lead people into activities (such as alcohol use) or mental states (such as withdrawal) that keep them from directly addressing stressful events.

Authors have used different labels to describe conceptually analogous types of coping behavior. For instance, problem-focused, monitoring, and approach coping categories represent strategies such as problem solving and seeking social support. These types of coping behaviors are characterized as active and usually inferred as

adaptive ways of dealing with a stressor. On the other hand, emotion-focused, blunting, or avoidance coping strategies (e.g., denial or distancing) draw attention away from the stressor. It seems as though coping efforts that draw attention away from the stressor can be considered avoidant-type efforts whereas those that channel efforts toward the stressor can be regarded as approach-type strategies (Suls & Fletcher, 1985).

5. Dysfunctional Coping

Generally speaking, active coping strategies, whether behavioral or emotional, are thought to be better ways to deal with stressful events whereas avoidant coping strategies appear to be a psychological risk factor or marker for adverse responses to stressful life events (Holahan & Moos, 1987; Moos, 1997). Avoidant coping strategies have generally been considered dysfunctional (Carver et al., 1989; Moos, 1997). No study to date has applied an approach/avoidance coping framework to understanding emotional eating. Eating, in this context, could be conceptualized as avoidance coping.

There is some evidence that the use of avoidance coping has negative results in relation to eating and weight. Gormally and Rardin (1981) reported that among women completing behavior therapy for obesity treatment, 58% had regained more than 50% of their initial weight loss after seven months. The regainers experienced the same number of unpredictable life events as the maintainers (those who had maintained initial weight losses over time); however, none of the regainers indicated use of active, problem solving coping styles. Eighty-percent of the maintainers indicated effective problem solving skills, such as generating new solutions or

applying concepts learned in treatment when faced with stressful events (Gormally & Rardin, 1981).

Individuals' coping styles tend to be consistent over time and do not appear to be mutually exclusive (Roth & Cohen, 1986). That is, individuals tend to use some strategies from each category at different times. Individual differences in coping style are developed through a number of means, including personal style, type of event, past learning experiences, and physical and emotional health.

Despite disagreements over the best way to study coping, there is a general consensus that studying coping is fundamental for understanding how stress affects people (Skinner, Edge, Altman, & Sherwood, 2003). Coping strategies can either amplify or reduce the stress experience, and therefore can either negatively or positively effect health outcomes. For the purposes of this dissertation, coping was conceptualized on the approach vs. avoidance paradigm, which best describes the use of either a passive, distracted coping style or a problem-solving approach style.

6. Repressive Coping

Repression is defined in the literature as the cognitive and emotional effort to ignore or divert attention from threatening stimuli. Weinberger developed the concept of a Repressive Coping Style, which is operazionalized as a specific combination of anxiety and defensiveness (Weinberger, Schwartz, & Davidson, 1979). Essentially, in response to threat, repressors are individuals who express low anxiety and high defensiveness. There also are nonrepressors, who are either low-anxious individuals, who are low in both anxiety and defensiveness; high-anxious individuals, who are high in anxiety and low in defensiveness; and defensive

individuals, who are high in both anxiety and defensiveness. A repressive coping style may be considered an unconscious intrapsychic defense that is implicated in various personality, cognitive, and behavioral processes. When an individual is a repressive coper, he or she may experience a physiological response to stress but may be unaware (consciously) of the experience of stress.

H. Eating as Coping

To date, much of the literature on eating and coping styles addresses how maladaptive coping strategies are involved in eating disorders, such as Anorexia or Bulimia Nervosa (Troop, Holbrey, Trowler, & Treasure, 1994). Stressful life events have been implicated in the onset and maintenance of bulimia nervosa (Shatford & Evans, 1986). Others have suggested that binge eating behavior is a poor coping mechanism in response to stress (Heatherton & Baumeister, 1991), particularity for the overweight (Hansel & Wittrock, 1997). Less is known about the relationship between coping style and emotional eating, despite the general use of the term coping in the emotional eating literature.

1. Obesity and Coping

One theory of obesity and coping suggests that coping may help buffer the level of distress generated by obesity (Ryden et al., 2003), which is in line with the transactional model of coping (Lazarus & Folkman, 1984). In this theory, obesity is perceived as the stressor, creating distress, which is then moderated by coping style. However, there is mixed evidence as to whether obese individuals experience high levels of distress. While severely obese individuals may display more psychological distress compared to healthy normal weight individuals (Sullivan et al.,

1993), their overall level of distress may be related to many factors, including weight cycling, comorbid disease or illness, or other factors. For example, anxiety and depression have been correlated with weight cycling in overweight and obese individuals (Fontaine, Barofsky, Bartlett, Frankowiac, & Andersen, 2004), rather than weight status per se.

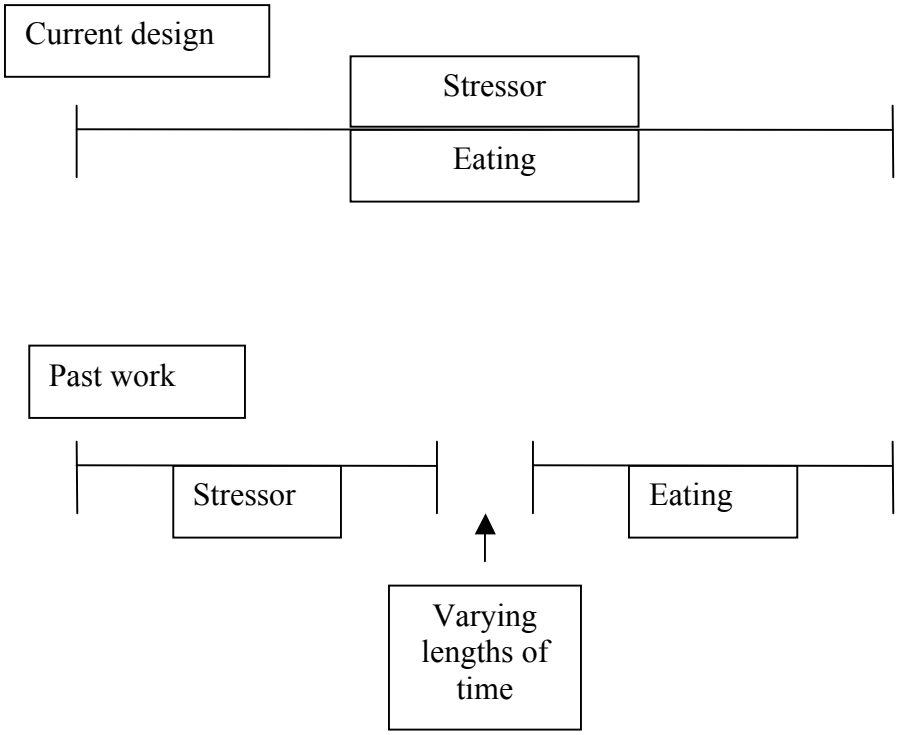
If emotional eating can be conceptualized as a type of avoidance coping, then it must serve the same function as other named avoidance coping methods (e.g., distraction or distancing from the problem). For the purposes of this dissertation, the function of emotional eating was assessed to determine if it can be characterized as an avoidance coping method.

2. Eating to Buffer Stress Response

Antecedents and consequences of emotional eating are readily described in the literature. Importantly, the typical paradigm employs a pre-post design, measuring mood prior to and after eating. Also, mood is conceptualized as an antecedent to an eating episode and eating occurs at the cessation of a stressor. In naturalistic studies, however, the timing of eating and stress is less clear. It could be that individuals initiate eating episodes shortly after a stressful event and that the eating and the stressor overlap or occur simultaneously. For the purposes of this dissertation, the food-mood relationship was examined in a laboratory setting that may more closely represent the timing of a naturalistic setting. Participants ate during the stressor and mood was measured before, during, and after the stressor (see figure 2). This design differs from past work in that the period of time between the stressor and the initiation of the eating episode is eliminated. Examining stress

and eating simultaneously helped to examine eating as a stress buffer, resulting in an attenuated mood and physiological responses.

Figure 2.



The notion that food buffers the stress response for emotional eaters has not been studied exclusively; however a reconceptualization of the literature lends some support. In almost every study, emotional eating is explained as purposeful; where eating serves to somehow counteract or mask the present distress (Lowe & Fisher, 1983; M. Macht & Dettmer, 2006; M. Macht et al., 2003; Polivy, Herman, &

McFarlane, 1994). If the stressor is masked by eating, and eating occurs simultaneous to the stressor, then the result may be an attenuated or buffered stress response.

A review on eating and mood concluded that "eating a meal will reliably alter mood and emotional predisposition, typically reducing arousal and irritability, and increasing calmness and positive affect" (Gibson, 2006). Importantly, no emotional eating theory demands that any relief gained from eating continues long-term (Polivy et al., 1994). In fact, most theories would more likely suggest that the effects of eating are fleeting and that as soon as an individual re-attends to the stressor, the stress response returns in full force if the stressor is still present. For emotional eaters, understanding the duration of mood consequences after eating has important implications. For example, if individuals eat during stress to attenuate their stress response, then it is important to determine if the alleviation of stress is short- or long-term. If only short-term, then a cycle may be created where more and more eating is required to continue the desired mood consequences. While there is some evidence that mood effects after eating are "short lived," (G. Parker et al., 2006; Polivy et al., 1994), it continues to be an area in need of exploration. For the purposes of this dissertation, stress response was easured multiple times, including before, during, and after eating. This repeated measure design helped elucidate the timing of the relationship between eating and mood for emotional eaters.

3. Behavioral After-effects

The previous discussion of timing necessarily leads to consideration of the paradigm developed by Glass and Singer (1972) to examine the behavioral,

cognitive, and physiological aftereffects of stress. Whereas many conceptualizations imply that the effects of stress cease with the cessation of the stressor, that assumption appears to be incorrect (Klein, Faraday, Quigley, & Grunberg, 2004). This time period following a stressor, now commonly referred to as a recovery period (Christenfeld, Glynn, & Gerin, 2000; Klein et al., 2004), is important to examine because sustained responses (either biological or behavioral) have potentially important health implications, including elevated blood pressure and cortisol levels (Klein et al., 2004; McEwen, 1998; Sapolsky, 1998). Work by Klein and colleagues (2004) revealed that there are behavioral aftereffects of stress for women who had been frustrated by an unsolvable puzzle. Those women who were categorized as highly frustrated ate more calories and fat than did women who were less frustrated following the cessation of the stressor (Klein et al., 2004).

For the purposes of this dissertation, the behavioral aftereffects of stress were be assessed by two methods. First, while participants were completing the final set of questionnaires at the end of the study, a bowl containing the same food available during the mood induction was given to participants and they were told to "help themselves to the left over [candy/grapes]." The amount of food eaten during this time period was measured by finding the difference between pre- and post-eating bowl weights measured in grams. Second, participants completed a final mood measurement at the completion of the study. This final time period was considered recovery period, allowing for examination of the mood aftereffects of stress.

I. Specific Aims and Hypotheses

Aim One: Eating will attenuate the stress response for those who report more emotional eating. The first aim of this study is to examine how tendency to emotionally eat relates to affective, physiological, and attention outcomes following a stressor.

Hypothesis 1a: Higher levels of self-reported emotional eating will result in lower physiological stress responses (lower change in heart rate, blood pressure, skin response amplitude from baseline) for those in the stressful film condition across food conditions.

Hypothesis1b: Higher levels of self-reported emotional eating will predict lower scores on the attention task across food conditions.

Hypothesis 1c: Higher levels of self-reported emotional eating will predict lower negative mood change scores for those in the stressful film condition.

Aim Two: Comfort food attenuates stress more than non-comfort food. The second aim of the proposed study is to examine whether "comfort food" attenuates the stress response more than a matched calorie food. The proposed study will compare mood, physiological, and attention outcomes for those who eat a comfort food (chocolate) during an acute stressor with those who eat a non-comfort food (grapes).

Hypothesis 2a: It is expected that self-reported emotional eating will moderate the stress-comfort food relationship. That is, stress will be reduced (buffered) among those in the comfort food condition more so for those who report high levels of emotional eating.

Hypothesis 2b: Higher levels of self-reported emotional eating will predict lower negative mood change scores for those in the comfort food condition.

Aim Three: Emotional eating is a type of avoidance coping.

The Approach Avoidance coping model will be employed to conceptualize the relationship between emotional eating, coping style, and mood. Although emotional eating has been described as a maladaptive coping mechanism, to our knowledge no study to date has examined emotional eating in the context of formal coping models, such as the Approach Avoidance model.

Hypothesis 3: Higher scores on emotional eating will predict an avoidant coping style.

Aim Four: Exploring the aftereffects of stress on eating.

The final aim of this study is to examine how the aftereffects of stress are related to eating different types of foods. Specifically, emotional eating tendency is expected to predict amount of food eaten at the completion of the stressor (during the final phase of the study).

Hypothesis 4: Higher self-reported emotional eating scores will be predict the amount of food eaten during recovery period.

Hypothesis 5: Higher levels of self-reported emotional eating will predict higher self-reported negative mood at the end of the recovery period.

II. Research Design and Methods

A. Overview

Psychological, behavioral, and physiological parameters were assessed in participants during a single laboratory visit to the Uniformed Services University of the Health Sciences. Participants were involved in the study procedures for approximately one and a half hours. During that time, participants completed self-report questionnaires, had several physiological measures taken, watched one of two video segments (a neutral or stressful clip), and ate either a comfort food or a non-comfort food. The design of the study was a 2 (film: stress or neutral) x 2 (food: comfort or non-comfort) mixed design. The between subject factors were film and food and the within subject factor was time.

B. Participants

Inclusion criteria to be eligible for this study included: female, age 18 years or older, overweight (BMI>=25). Several exclusion criteria also applied. First, participants had to be in good physical health determined by self-report. Any participant self-reporting a diagnosis of diabetes mellitus and a history of heart problems other than controlled hypertension, were excluded from the study. Because participants were randomly assigned to comfort food condition, it was possible that they would have been asked to eat a food high in sugar or fat, which may have negatively affected anyone with diabetes mellitus. Also, the nature of the stressor was expected to be intense, and any history of heart conditions may have put individuals at increased risk for negative events with the expected increase in sympathetic nervous system activation. Recent studies have suggested that mental stress is as or more likely to result in dangerous heart rhythms in patients prone to irregular rhythms (Kop et al., 2004). Second, individuals indicating a current

diagnosis or treatment for depression, as determined by self-report during the phone screen were excluded from participation. Third, potential participants were told during the screening process that the study involved watching a video segment containing images of domestic violence. Individuals who reported a history of domestic violence were excluded from participation. A full list of exclusion criteria can be seen below:

Exclusion criteria:

- History of heart disease
- History of thyroid disease
- Diabetes
- Current tobacco use
- Pregnancy
- Mental Health Disorders
- Current use of anti-depressant of anti-psychotic medication
- Uncontrolled hypertension
- Preference for salty foods during emotional eating
- History of major medical condition (such as stroke)
- Current use of medications for psychological disorder
- Food allergies to chocolate, grapes, or peanuts
- Lactose intolerance
- History of exposure to domestic violence

Inclusion criteria include: female, age 18 years or older, and overweight (BMI>=25).

C. Procedures

Participant testing and all data collection were completed at the Uniformed Services University of the Health Sciences, located in Bethesda, Maryland. Participants were recruited through newspaper advertisements in the greater Washington DC area, along with flyers and posters advertising the study in several locations around the University as well as online at www.craigslist.com.

1. Screening and Assessing Participant Eligibility

Prospective participants were phone screened prior to arrival. During the phone screen, prior to gathering any demographic information, the exclusion criteria were assessed. Participants will be asked to verify health status criteria were met

and were asked about food allergies. Any participant endorsing food allergies to grapes, chocolate, or peanuts (because manufacturers of M&M candies warn that peanuts are processed in the same plant as the candy) were excluded from participation. Upon meeting criteria, participants were scheduled to come to the University for a 1.5 - 2 hour appointment scheduled to begin between the hours of 10:30am and 2:00pm. They were asked to refrain from eating for a period of 4 hours prior to arrival at the University.

Upon arrival, participants were informed of the nature of the project including types of assessment and study procedures. Participants then completed the study's consent form before participating (see Appendix E). Body weight and composition were assessed with self-report and then measured with a Tanita BF-350 Body Composition Analyzer and Scale. Body mass index (BMI) was calculated from the weight and height measurements.

2. Random Assignment

Participants were randomly assigned to one of two food conditions (either a comfort food or non-comfort food) and one of two film conditions (either a neutral or stressful video). Each participant completed a battery of self-report questionnaires (see Methods section), including questions about demographics, eating behaviors, current mood state, and current menstruation status. It is important to measure menstrual cycle because it has been reported that women increase food intake during the premenstrual period and may choose different foods during this time than during the rest of the month (Jas, 1994). Although participants were not restricted

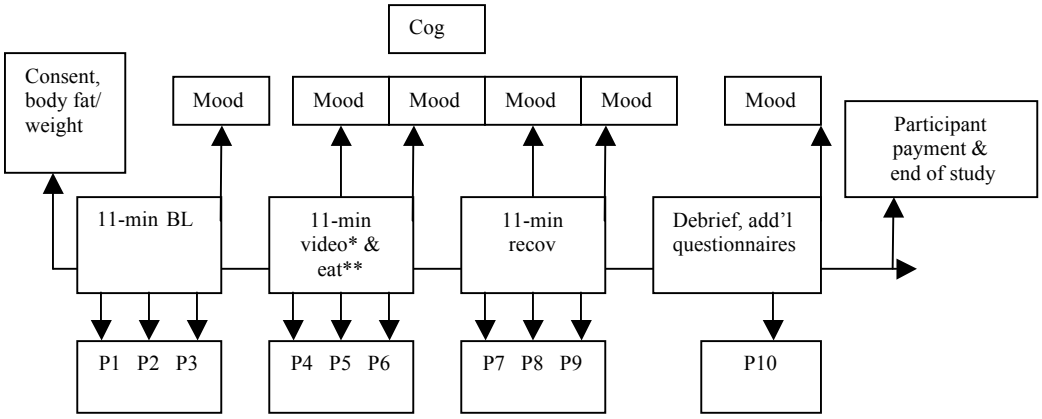
from participating based on menstrual cycle, this factor was measured and controlled for with statistical procedures when appropriate.

The study purpose and procedures were conveyed to study participants. Participants were told to eat all of the food available to them during the film. Prior to starting the film, participants were fitted with a blood pressure monitor and the galvanic skin response meter (see Methods).

3. Timeline of Participation

As is described below, the stressful film clip used in this study has been used in previous work on emotions and eating. In order to equate the amount of time of the stressful film condition to the neutral film, the neutral film was matched at 11-minutes. And, in order to keep the amount of time consistent throughout the phases of the study, 11-minutes was used for each segment. A timeline showing the procedures a participant will experience can be seen below in Figure 3.

Figure 3



P = physiological measurements taken at 3 intervals (3.5, 7, 10.5 min)
BL = Baseline
Recov = Recovery period for aftereffects measurement
Cog = Film questionnaire to measure attention to film
Mood = PANAS
* = Either stressful or neutral film, depending on group assignment
** = Either comfort or non-comfort food, depending on condition assignment

After completing the self-report questionnaires, an 11-minute baseline period ensued during which participants were instructed to rest quietly while the study materials were prepared. Initial physiological readings were taken at three time points during the rest period and averaged to obtain a "baseline" measurement. Following the rest period, participants viewed the video clip and were asked to eat the assigned food during the film. During the video segment, three additional physiological readings were taken. At the 7-minute reading, the video was paused and participants completed the PANAS mood measurement. At this 7-minute break, the experimenter recorded the amount of food eaten (e.g., none, some, or all). Upon

completion of the PANAS, participants finished watching the film and another mood measurement was taken at the end of the film.

A rest period of 11-minutes followed the completion of the video. During this rest period, three additional physiological measurements were taken. Participants also completed another mood measurement along with a fact-based questionnaire to measure attention to the film. Participants had not been told that they would be asked to answer questions about the film. A final mood measurement was included in a battery of questionnaires completed during the final debriefing period. While completing the final set of questionnaires, a pre-measured and weighed bowl of the same food eaten during the video was made available to participants and they were told to "help themselves to the rest of the leftover food."

4. Deception and Debriefing

Minimal deception was used in this study. Specifically, participants were not told that the amount of "leftover" food they ate during the final phase of the study was being measured. The reason for this deception was that we were interested in understanding how people eat after a stressful event (the aftereffects of stress (Klein et al., 2004)). By telling them that we were measuring their food intake, participants may have been more likely to restrict their food intake. Otherwise, participants were fully disclosed on the reason for the study.

D. Food Conditions

1. Comfort food condition. Individuals in the comfort food condition were asked to eat "all of the M&M's in the bowl during the film" during both the neutral and stressful video clips. The bowl contained 300 kilocalories during the film, the

equivalent of 2.5 ounces. Chocolate was chosen as the comfort food because it is repeatedly indicated as the first choice in comfort food for women (Wansink et al., 2003) and has been shown to improve affect in previous work (M. Macht & Dettmer, 2006; G. Parker et al., 2006). The bite sized pieces of candy allowed for individuals to eat the food without having to look at and manipulate it, reducing the attentional interference that eating could cause.

2. Non-comfort food condition. Individuals in the non-comfort food condition also were asked to eat 300 calories. However, in this condition, the calories came from approximately 13 ounces of grapes. Grapes were chosen for the current study for several reasons. First, they are more likely to be considered a healthy food option, rather than a comfort food (Zellner et al., 2006). Grapes also have the benefit of being small and easy to eat in bite size pieces, similar to M&M's used in the alternate condition. Keeping the size, shape, and eating action required (e.g., bite size pieces) constant across food conditions helped control for the amount of attention required to eat the foods, which was another outcome of interest. Finally, a recent study measured the hedonic properties of snack foods compared to several health food items. Grapes averaged higher hedonic ratings (measured by visual analogue scale ranging from "do not like at all" to "like very much") than some other health foods (Goldfield & Legg, 2005).

The difference between the two portion sizes was large, due to the differing caloric content of the two foods. However, both portions were served to participants on an 8-inch dessert paper plate. Participants in the comfort food condition received 2.5 ounces of M&M's on the plate while those in the non-comfort condition received

13 ounces on the plate. Participants in each condition did not see what was served in the alternative condition. A picture of each serving of food can be seen below. In picture A, the grapes serving was the size of the largest bunch. In picture B, the M&Ms serving size is shown.

E. Stressor

Participants were assigned to one of two conditions. One was a neutral film, which was matched in duration to the stressor film. Numerous stressors have been developed, such as imagination, film/stories, social interaction, and others (Westermann, Spies, Stahl, & Hesse, 1996). With films, the presentation of a film is used to stimulate the participant's imagination. Films are considered to have a relatively high degree of ecological validity in that emotions are often evoked by auditory and visual stimuli outside the laboratory setting (Gross & Levenson, 1995).

There are several reasons to use a film stressor and to measure cardiovascular reactions to the stressor during films. First, better methodological control is achieved by using a standardized film as a stressor, rather than use of other tasks, such as imagery scripts. The effectiveness of imagery scripts in

inducing psychophysiological changes is mediated by subjects' ability to vividly imagine the script and it is not always possible to ensure that emotions of similar intensity are created by differing images (Montoya et al., 2005). Also, because averaging of multiple cardiac cycles is recommended for determining cardiovascular measurements (Sherwood et al., 1990; Sherwood & Turner, 1992), the use of longer-lasting stimuli such as emotional movies allows the experimenter to collect data for a sufficiently long period of time. And, there are data to show that emotion induced changes in heart rate and blood pressure can be achieved (Ekman, Levenson, & Friesen, 1983; Levenson & Ekman, 2002). Using films, Palomba et al., (2000) reported an increase in heart rate during a threatening/anxiety provoking film mood induction when compared to heart rate during a neutral film (Palomba et al., 2000). Increases in skin conductance have also been reported after viewing a negative emotional film compared to a neutral film (Hubert & de Jong-Meyer, 1989).

1. Films as stressors

Film as stressors are used either with or without explicit instruction to "get involved" in the situation and feelings suggested. For the purposes of this dissertation, the film did not employ instructions (Berkowitz & Troccoli, 1986). There were two main reasons for not giving participants instructions along with the film. First, the selected film had been shown to produce strong affective responses without instruction in previous work (Cavallo & Pinto, 2001). Second, there is a debate in the mood induction literature regarding the influence of demand characteristics on the validity of such stressors (Berkowitz & Troccoli, 1986; Buckwald, Strack, & Coyne, 1981; Finegan & Seligman, 1995). If demand

characteristics occur, and participants simply pretend to be in the desired mood state to comply with experimental demands, then such demand effects clearly pose a threat to experimental construct validity (Cook & Campbell, 1979). Such demand characteristics are said to be most likely to occur when participants are explicitly instructed to try to enter the specified mood state (Westermann et al., 1996).

Films have been found to be the most effective procedure for the induction of stress in a meta analysis including 11 different MIPs (Westermann et al., 1996). Although film MIP with instruction produced slightly higher effect sizes than those without instruction, both with and without instruction produced mean weighted effect sizes above 0.5 with confidence intervals between 0.4 and 0.58 (Westermann et al., 1996).

Although it is possible to induce both positive and negative stress, there are several reasons why the present study will induce either a neutral and negative stress only. First, the construct of emotional eating is defined as eating in response to stress and it is most often negative stress (Lindeman & Stark, 2001). Second, stress has been described as a precipitant to binge episodes by many researchers (Heatherton & Baumeister, 1991; E. Stice & Agras, 1998), which is an important clinical behavior to understand. Finally, the effectiveness of stressors is much higher for negative stress than for positive (Westermann et al., 1996), and positive mood states are difficult to induce (Cavallo & Pinto, 2001). Difficulty inducing positive mood may be partially because people generally maintain a positive mood state and a positively biased basic mood state may be harder to enhance than to depress (Westermann et al., 1996).

2. Film Content

For those assigned to the neutral film condition, the video clip was an 11-minute video clip excerpted from the film "Couture Techniques with Roberta C. Carr: For Fine Sewing (2004). This video clip contained a step-by-step tutorial on at home sewing techniques. This film was chosen because although some women may be interested in sewing, the film content was expected to be neutral and unlikely to arouse any particular affective state. The stressful video clip was an 11-minute segment of the television movie "A Cry for Help: The Tracey Thurman Story" (Sullivan, Lloyd, & Nelson, 1989), which was originally aired on Lifetime television. This video highlights a landmark case of domestic violence that led to the adoption of domestic violence legislation and reforms in police responses to domestic violence calls. It is based on a true story and chronicles the maltreatment of a Caucasian woman by her abusive husband. The 11-minute video segment taken from this video included some scenes of violence that were expected to increase stress and therefore negative affect.

This same stressful video has been used in a previous study on stress and eating (see Cavallo & Pinto, 2001 for more details) and resulted in an increase in negative affect scores rated on the Positive and Negative Affect Scale (PANAS) by nearly 10 points. The authors indicated an effect size $\eta^2 = 0.71$, suggesting that the proportion of variance in mood change explained by the mood induction procedure was large.

3. Protection of Participants

For the purposes of this dissertation, all participants were instructed that they were free to leave at any time. In personal communication with Cavallo and Pinto (2001), the authors reported no adverse events associated with the use of the 11-minute video clip. In addition, they reported that no participant refused to watch or stopped watching the video prior to its completion (personal communication, Pinto, 2006).

In anticipation of the strong negative emotional arousal that was expected to result from this mood induction procedure, participants were asked to fill out several questionnaires after viewing the video and were debriefed as to the purpose of the study upon completion. The debriefing and post-experiment questionnaire battery took approximately 15-20 minutes to complete. The Cavallo and Pinto (2001) study using this same video segment reported that within 10 minutes after viewing the video segment, and after having a snack, participants rated their mood equivalent to baseline ratings. This suggests that the negative emotional arousal induced from this video segment had dissipated within 10 minutes. Because the current study included eating, similar to Cavallo and Pinto (2001), and because participants remained active in the study for longer than 10 minutes after the mood induction, no long lasting negative results were expected from this mood induction. Also, the video segment that will be used in this study has been aired on cable television, (on the Lifetime channel), and therefore could have been viewed by any participant prior to the study. In anticipation of any negative results that may result from the mood induction procedure, there were several procedures in place (see Resources and Debriefing sections below).

First, participants were told about the topic of the video during the telephone screen, allowing them to withdraw prior to giving any personal information. Second, upon arrival to the University, it was emphasized that participants could withdraw from the study at any time without consequence. Participants also had the option of avoiding watching the video segment while it was playing. Attention to the film was measured using a fact based questionnaire given as part of the final battery.

4. Resources for Participants

Due to the highly arousing material that participants viewed during the 11-minute video segment, a number of resources were given to all participants. Every participant was given information about the National Domestic Violence Hotline. Using this hotline either through telephone or internet, help is available to interested individuals 24 hours a day, 365 days a year. Hotline advocates are available for victims and anyone calling on their behalf to provide crisis intervention, safety planning, information and referrals to agencies in all 50 states, Puerto Rico and the U.S. Virgin Islands. Assistance is available in English and Spanish with access to more than 140 languages through interpreter services. All calls to the Domestic Violence hotline are anonymous. Every participant also received a list of referrals to local mental health services, including those available at low or no cost. These resources are located throughout the Washington D.C. metro region and can offer services for any individuals who chose to seek such services. A copy of the list of resources given to participants can be found in Appendix B.

III. Measures

A. Self report measures

The Demographic Questionnaire included questions on age, weight, ethnicity/race, level of education, marital status, annual household income, and employment information.

1. Assessment of emotional eating and dietary restraint.

Emotional eating status wasassessed using the Emotional Eating Scale (EES) developed by Arnow and colleagues (1995). This questionnaire assesses relationships between specific negative emotional states and overeating. It is comprised of three subscales (Anger/Frustration, Anxiety, and Depression) assessed with 25 adjectives in response to which participants indicate their desire or urge to eat. The EES subscales have shown coefficient alphas of 0.78 (Anger/Frustration), 0.78 (Anxiety), and 0.72 (Depression). The EES has shown good construct, discriminant, and criterion-related validity as well (Arnow, Kenardy, & Agras, 1995). The EES was developed in samples of obese treatment seeking women who all met criteria for bulimia nervosa, except for the lack of purging behavior. The mean scores on the EES subscales in this population are 26.85 (SD = 8.71) for Anger/Frustration, 16.49 (SD = 7.31) for Anxiety, and 12.96 (SD = 3.62) for Depression. It has been validated in a non-eating disordered population and was found to have high levels of internal consistency and good validity in terms of being able to determine level of emotionally driven eating within non-eating disordered samples (Waller & Osman, 2000). In the non-eating disordered population, mean scores on the EES subscales are 11.2 (*SD* = 8.78) for Anger/Frustration, 6.42 (SD = 5.86) for Anxiety, and 8.10 (*SD* = 4.71) for Depression.

The Stress Food Checklist is a self-report questionnaire developed for the purposes of this dissertation. The checklist has several multipart questions and asks participants to check which types of foods they prefer when eating in response to stress. It was used to measure food preferences, which helped answer the question of whether chocolate is the preferred comfort food for emotional eaters.

The Eating Inventory (EI) (e.g., Three-Factor Eating Questionnaire; TFEQ) (Stunkard and Messick, 1985), consists of 51 items divided between three subscales (i.e., dietary restraint, hunger, and disinhibition), and was used to measure dietary restraint level. Only the restraint subscale, which measures cognitive restraint and conscious attempts to monitor and limit food intake, was used in this study. The restraint subscale is a 21-item scale that contains a mixture of true/false and multiple choice questions, and is reported to measure short-term caloric restriction, although those participants scoring high on this scale may not be in a hypocaloric state (Gorman & Allison, 1995; Heatherton et al., 1988; Lowe, 1993).

In a series of factor analyses on the EI, the restraint factor was quite robust (Allison, 1995). The restraint subscale correlates negatively with the EI disinhibition scale (r = -0.37; Westenhoffer, 1991), and positively with the hunger scale (r = 0.64; Simmons, 1991), the drive for thinness subscale, and the body dissatisfaction subscales of the Eating Disorders Inventory (Garner, Olmsted & Polivy, 1983).

Unrestrained eaters (n = 62) have been reported to have a mean score of 6.0 (SD= 5.5) (Stunkard & Messick, 1985), whereas American college students (n = 901) scored slightly higher, on average, with a mean of 9.0 + 5.8 (Allison et al., 1992). Further breakdown of the college student sample showed that women (n =

617) scored higher, on average, than males (n = 282), with means of 10.2 (SD= 5.6) and 6.1 (SD= 5.1), respectively (Allison et al., 1992).

2. Assessment of mood and psychological symptoms.

The Beck Depression Inventory-II is a 21-item questionnaire designed for adults age 17-80 (Beck, Steer, & Brown, 1996). It is composed of items relating to depression symptoms such as hopelessness and irritability, cognitions such as guilt or feelings of being punished, as well as physical symptoms such as fatigue, weight loss, and lack of interest in sex. Each question is scored on a scale value of 0 to 3. The cutoffs used are: 0-13 - minimal depression; 14-19 - mild depression; 20-28 - moderate depression; and 29-63 - severe depression. Higher total scores indicate more severe depressive symptoms (Beck et al., 1996). The BDI-II was scored immediately after completion, and prior to random assignment to groups. If participants had a score of 20 or higher indicating a potential for clinical depression (Beck, Steer, Ball, & Ranieri, 1996) and/or endorsed item nine (9) indicating suicidality, they were further assessed by a senior clinical psychology graduate student and offered referrals to local community mental health clinics (See Appendix B).

The Beck Anxiety Inventory (BAI) (Beck & Steer, 1990) is a 21-item self-report measure of overall severity of anxiety. Participants are asked to rate severity of each symptom on a 4 point scale ranging from not at all to severely. The BAI is scored by summing all of the 21 symptoms with total scores ranging from0-63. The BAI has displayed concurrent validity with other self-report measures of anxiety (e.g., Hamilton Anxiety Rating Scale r= .56, $p < 0.001$). It has demonstrated 1-week

test-retest reliability of .75 ($p < 0.001$) for outpatients (Beck et al., 1988). Participants scoring 16 or higher, indicating a potential for clinical anxiety, were assessed by a senior clinical psychology graduate student and offered referrals to local community mental health clinics (see Appendix B).

The Toronto Alexithymia Scale (TAS) (Taylor et al., 1997) was constructed after a literature review revealed 5 main content areas thought to reflect the construct. The TAS uses a 5-point Likert type rating scale from 1 (strongly disagree) to 5 (strongly agree). A revised edition to the TAS, the Twenty Item Toronto Alexithymia Scale (TAS-20) was used in this dissertation because it has shown to adequately assess alexithymia while reducing participant burden. The TAS-20 has 3 factors including: difficulty identifying feelings and distinguishing them from bodily sensations, difficulty describing feelings to others, and externally oriented thinking. The reliability and validity of the TAS-20 has been supported by factor analysis, good internal consistency (Cronbach's alpha = 0.81), and high test-retest correlations ($r = 0.77$; $p < 0.01$) over a 3-week period, consistent with the trait perspective of alexithymia (Taylor, Bagby, & Parker, 1992). The TAS and TAS-20 are now the most widely used measures of alexithymia (Taylor, 2000). The construct of alexithymia has been linked to emotional eating in obese women. For example, in one sample of obese women with BED, Pinaquay et al., (2003) reported that alexithymia, measured by the TAS-20, was the "sole predictor" of emotional eating (Pinaquy, Chabrol, Simon, Louvet, & Barb, 2003). These results highlight the notion that obese women who have difficulty identifying and communicating their feelings may also have a tendency to eat in response to emotions.

The Eating Disorder Diagnostic Scale (EDDS) (Stice, Telch, & Rizvi, 2000) is a 22-item scale developed to diagnose Anorexia and Bulimia Nervosa as well as Binge Eating Disorder (BED). Reliability and validity of this scale have been recently demonstrated. The overall level of agreement on eating disorder diagnosis over a one-week test-retest was 98% for Anorexia, 91% for Bulimia, and 89% for BED. The symptom composite test-retest reliability of r = .87. There is also evidence of internal consistency across items (alpha = .89). In terms of validity, agreement between eating disorder diagnoses from the EDDS and those by clinical interview was high: 99% for Anorexia, 96% for Bulimia, and 93% for BED. This one page questionnaire, although relatively newly established, reduced participant burden by being quick to administer and also eliminated the need to train multiple interviewers on the administration of diagnostic clinical interviews for assessing eating disorders.

The Profile of Mood States – Short Form (POMS-SF) (Shacham, 1983) is a measure of subjective mood states, including anxiety, tension, vigor, depression, fatigue and confusion. The Short Form has been shown to have comparable internal consistency estimates to the original POMS (Curran, Andrykowski, & Studts, 1995). It consists of 37 adjectives describing feelings and mood states (e.g. worn-out, energetic, and resentful) measured on a Likert-scale. A Total Mood Disturbance score (TMD) is obtained by summing the five scores on the tension, depression, anxiety, fatigue and confusion subscales and subtracting the score on the vigor subscale. The POMS-SF used in this study asked participants to rate their moods within the past few weeks, which provided information on the more stable mood states over time.

The Positive and Negative Affect Schedule (PANAS) (Watson, Clark, & Tellegen, 1988) consists of 10 positive affects (interested, excited, strong, enthusiastic, proud, alert, inspired, determined, attentive, and active) and 10 negative affects (distressed, upset, guilty, scared, hostile, irritable, ashamed, nervous, jittery, and afraid). Participants are asked to rate items on a scale from 1 to 5, based on the strength of emotion where 1 = "very slightly or not at all," and 5 = "extremely". It has good internal consistency in a non-clinical sample (Cronbach's alpha range .85 to .89). There are several different time frames that have been used with the PANAS, ranging from asking participants to rate how much they have felt a certain way "during the past year" to "at this moment". Using these various time frames, norms have been established. The means and standard deviations for each scale (PA or NA) are similar across time frames; (PA mean values range 31.3 - 33.3 and standard deviation range 7.2 - 7.7; NA mean values range 16.0 – 17.4 and standard deviation range 5.9 – 6.2). For the purposes of this study, the "in this moment" prompt was used to assess present state mood.

3. Coping Style.

The COPE (Carver et al., 1989) questionnaire contains 14 subscales, with a number of scales that may be characterized according to the approach-avoidance dimensions (Finset, Steine, Haugli, Steen, & Laerum, 2002). The COPE has been used in at least three different formats. One is a "dispositional" or trait-like version in which respondents report the extent to which they usually do the things listed, when they are stressed. A second is a time-limited version in which respondents indicate the degree to which they actually did have each response during a particular period

in the past. The third is a time-limited version in which respondents indicate the degree to which they have been having each response during a period up to the present (Carver et al., 1989).

For the purposes of this dissertation, the third version was used, which assessed the degree to which an individual has had each response during the past month. Alpha values obtained using the dispositional and situational versions of the COPE were higher for the situational versions, suggesting that people's ratings of their behavior may have higher internal consistency when rating specific situations as opposed to general tendencies (Carver et al., 1989).

4. Cognitive attention questionnaires.

A questionnaire, developed for the purposes of this study, were used to assess level of attention to each film.

Facts: To determine if attention to the films was affected by the eating activities, upon completion of the film participants were asked to answer a series of fact questions based on each of the films' content. The questionnaires for the two film conditions each contained 12 questions, asking about the films' content. Participants completed one of the two questionnaires, corresponding to the film they watched.

B. Physiological measures.

1. Blood pressure and heart rate. Blood pressure (BP) and heart rate (HR) were assessed using a LifeSource UA-767VL One Step Auto Inflating Monitor with a large cuff. Measurements were taken 3 times during the baseline rest period, three times during the stress/neutral film, and 3 times during the follow up rest period.

Each period was 11 minutes, and pressure was assessed at 3.5 minute intervals within each 11 minute phase using an automated cuff placed on the left arm. The three readings for systolic, diastolic, and heart rate at each phase were then averaged (Fichera & Andreassi, 2000). To achieve blood pressure reactivity scores, baseline mean was subtracted from the mean level of a particular measure during the film (stress or neutral), following the methodology of Fichera and Andreassi (2000).

2. *Galvanic skin response (GSR)*. GSR is a method of measuring the electrical resistance of the skin. There is a relationship between sympathetic activity and emotional arousal that can be detected through GSR, although one cannot identify the specific emotion being elicited. The same is true of all physiological measures included in this study, which is why they were used in concert with self report measures of perceived stress and mood. GSR measurements show the activity of the eccrine sweat glands. Responses are a function of the pre-secretory activity of sweat glands and the filling of the sudorific tubules. GSR were measured using Ag/AgCl electrodes attached to the palmer surface of the middle phalanges of the second and third fingers of the non-dominant hand (Palomba et al., 2000).

When a small, continuous electric current (0.5V) is applied between two electrodes, the manifest electrical conductance varies in inverse proportion to the electric current flowing between the electrodes. The electrical conductance is a function of increasing eccrine activity. For instance, if a person is presented a stimulus and the palms start to sweat, this response indicates a highly-stimulated state. The EDR of this person will be higher than his or her baseline. If another

person receives the same stimulus and the palms remain cool, then the GSR reading will remain unchanged with respect to the baseline. GSR measurements were determined by measuring amplitude responses during baseline and during the stressor.

While tonic responses are considered absolute level of conductance at any given moment in the absence of measurable responses, phasic responses are a result of increases in the standing level of sweat in the ducts (Dawson, Schell, & Filion, 1990), usually in response to sympathetic nervous system activation. Tonic responses are essentially baseline levels of skin conductance in the absence of any particular stimuli. Phasic responses are the changes that occur when an event takes place. However, because the duration of the stressor was long (11-minutes), we chose to use amplitude responses during the film and during the rest period to quantify the changes that may have occurred.

When a sympathetic nervous system activating stimulus is repeated over time or lasts a long period of time, there are several options which can be computed to determine average event-related skin conductance: mean skin conductance amplitude, magnitude, or frequency of nonspecific skin conductance responses (NS-SCR) (Dawson et al., 1990). For the purposes of this dissertation, mean amplitude of NS-SCR was calculated. The use of magnitude has been argued against because it confounds amplitude and frequency (Prokasy & Kumpfer, 1973). Event related amplitude is the difference between the tonic skin conductance level and the conductance level at the peak of the response, which allows for examination of the change in skin conductance. The 11-minute video clip was a long-lasting stimuli,

allowing for measurement of skin conductance over a longer period of time and therefore amplitude averages of NS-SCR was used to calculate tonic and phasic differences.

C. Other measures. Several scales were created to measure participant's perception of food intake, perception of the stressful event, and other factors that may affect outcome variables.

Perception of food intake: Participants rated their perception of the food they ate during the study using a 7-point Likert scale rating. Participants were asked several questions about the eating episode, such as whether the foods just eaten are similar to foods they would have chosen outside the laboratory setting. A copy of this questionnaire can be found in Appendix C.

Perception of stressor: Participants rated their perception of the stressor using a 7-point Likert scale rating. Participants were asked a series of questions regarding the perceived stress level of the film.

Hedonics and satiety ratings. Untasted or bland-tasting meals are less satiating than their nutritionally-identical counterparts having a high sensory impact (Warwick et al., 1993). It was expected that both food choices will have high hedonic ratings, given that they are both sweet. In order to control for hedonics, we measured the following outcomes using a 7 point Likert scale for each food group: sweetness, flavorful, likeability, desire for more. A copy of these outcomes can be found in Appendix C.

IV. Data Analytic Strategy

Several data transformations were performed prior to hypotheses analyses. First, dummy variables were created for the categories of food and film, including the following transformations: comfort food was coded as 1, non-comfort food was coded as 0 and stressful film was coded as 1 and neutral film was coded as 0. The interaction between food and film was created by multiplying the dummy variables for food and film. Next, an additional set of dummy variables was created for the hypotheses targeted at the interaction of food and film with emotional eating variables. Subscales of the EES (anxiety, depression, and anger) were multiplied independently by food, by film, and also by food and film to capture two-way and three-way interaction effects. Finally, two variables of interest were found to be non-normally distributed and were transformed to achieve a normal distribution. EES Anxiety was positively skewed, but was transformed by using 1/x. EES anger was also not normally distributed, and normality was achieved using square root(x).

Also, for analyses using the EES as a predictor, the subscales (anxiety, depression, anger/frustration) were entered as a set into multiple regression. This methodology was adopted from Waller and Osman (1996). Although bivariate correlations between subscales revealed moderate correlations (*r* values ranging from 0.5-0.6), assessment for multicolinearity among subscales revealed Variance Inflation Factors (VIF) ranging from 2.2-3.0, which is lower than the point at which collinearity becomes a concern (i.e., VIF = 10). Therefore, for the hypotheses, the three subscales of the EES (anxiety, depression, and anger/frustration) were entered into multiple regression analyses simultaneously.

Finally, the GSR amplitude data were gathered at 10 second intervals and trimmed mean scores were calculated for each 11 minute segment (baseline rest, film, post film rest), which is a methodology commonly used to analyze GSR data (Levine, Jarrett, Cain, & Heitkemper, 1998). It was not feasible to go through and identify whether artifact was present at each 10 second interval, so to calculate the trimmed mean, the largest 20% of the values and the smallest 20% of the values were discarded to reduce the effect of artifact such as hand movement. Finally, GSR amplitude microohms were calculated by dividing the ohm (measurement of electrical resistance) by mho (measurement of electrical conductance). The ohm (symbol: Ω) is the SI unit of electrical resistance and the transformation of Ohm to uMho was achieved by taking the reciprocal (1/x). The data were analyzed using microohms.

For physiological outcomes, an average of the three physiological readings was calculated for baseline and film time points. Arithmetic change scores were calculated from the baseline average to the film average for diastolic blood pressure, systolic blood pressure, heart rate, and frequency of NS-SCR. To examine how emotional eating affects physiological responsivity, multiple regression was used with emotional eating, film (stressful or neutral), and food (comfort or non-comfort) as independent variables and physiological change scores as dependent variables. Film, food, and their interaction were dummy coded. Beta weights for the interaction term in the regression were calculated to determine the relative predictive power of the effects of emotional eating given specific levels of the categorical variables (e.g., stressful film, comfort food condition).

For mood outcomes, negative mood change scores were calculated from baseline to mid-film and from baseline to post-film PANAS negative subscale scores. To examine the difference in mood change, multiple regression analyses were used with emotional eating subscale scores as the predictor variables and change in negative mood from baseline as the dependent variable.

For moderation analysis, hierarchical regression analysis to test for moderation was used, as it has been recommended for testing interaction effects (Aiken & West, 1991). The regression analyses was used to detect main effects and interaction effects of film and food and the moderator variable (emotional eating) on the physiological measures (change in heart rate, blood pressure, frequency of NS-SCR from baseline). In order to test interaction effects, multiplicative terms were created using coding for the independent variables (Aiken & West, 1991). The independent variables were entered into the equation in successive steps (Aiken & West, 1991) with covariates entered first (e.g., weight and dietary restraint), followed by film and food conditions (dummy coded), followed by the moderator variable (emotional eating), and finally the interactions of the IVs. Significant interaction effects and main effects will be interpreted (main effects in the absence of a significant interaction).

Previously published findings were used to estimate effect sizes for the current investigation. Cavallo and Pinto (2003) reported an effect size of $\eta^2 = .71$ for the interaction of film and time (using the same 11-minute video clip that has will be used in this study). Because the same video clip was used, a large effect size was estimated for the mood induction. Using nQuery regression analysis power

calculation, a sample size of 120 participants was sufficient to examine all hypotheses at a power >80% with a Type I error set at <0.05 (two-tailed).

V. Results

A. Demographics and Baseline Measures

Two-hundred and twelve women were screened for participation in a research study on eating and emotions after responding to internet and newspaper advertisements. A copy of the advertisement used can be found in appendix A. Of those 212 women who expressed interest in the study, 130 were eligible and 121 completed the study. The primary reasons for ineligibility included: BMI < 25 kg/m^2, history of exposure to domestic violence, and health conditions (e.g., diabetes, heart disease). Participants were free from major psychological or medical conditions as determined by self-report questionnaires. All participants signed informed consent prior to participation and were paid $50 upon completion of the study.

Four women were excluded from analyses because their measured weight upon arrival to the study was lower than reported during the phone screen resulting in a BMI < 25 kg/m^2. The final sample consisted of 117 overweight women. The women ranged in height from 4'7" to 6'1" (*M* = 5'4", *SD* = 2.7") with a mean weight of 184.3 pounds (range 128.00 - 294.80). Their BMIs ranged from 25.0 – 49.05 kg/m^2 (*M* = 31.34, *SD* = 5.98). The sample had a mean body fat percentage of 39.23% (*SD* = 7.89). Forty-seven percent were Caucasian, 30% African American, 9% African, 9% Hispanic, 4% Asian. There was a significant difference in body fat percentage by ethnicity ($F(4,115) = 3.92$, $p < 0.01$). African Americans (*N* = 36) had

the highest body fat percentage (*M* = 43.29, *SD* = 7.33), followed by Africans (*N* = 10) (*M* = 38.8, *SD* = 8.65), followed by Caucasians (*N* = 55) (*M* = 37.87, *SD* = 7.67), and then Hispanics (*N* = 10) (*M* = 36.78, *SD* = 5.89). The four Asian participants had the lowest mean body fat percentage (*M* = 33.80, *SD* = 5.10). Participants were required to be at least 18 years of age and they ranged in age from 19-61 years (*M* = 35.26, *SD* = 11.59). Fifty-six percent were single, 23% were married, and the remaining women were either divorced, widowed or living with a partner. Forty-one percent had completed college and 29% had at least some graduate school or professional training. Sixty-seven percent were employed full time and 16% part-time. Demographics can be seen in Table 1 (see Table 1).

1. Psychological outcomes.

Scores on subjective measures of symptoms related to depression, anxiety, and stress-levels revealed that, on average, the sample was experiencing minimal symptoms of distress. BDI-II scores for the current sample ranged from 0-37 (*M* = 8.28, *SD* = 8.48). These values may be compared with normative data for outpatients (*M* = 22.45, *SD* = 12.75) and college students (*M* = 12.56, *SD* = 9.93) (Beck et al., 1996). BAI scores for this sample ranged from 0-42 (*M* = 7.79, *SD* = 7.87), which may be compared to normative data presented for non-disordered populations (*M* = 6.0, *SD* = 8.0) (Gillis, Haaga, & Ford, 1995). Scores on the POMS-SF revealed that participants had relatively low total mood disturbance scores (where higher scores mean more distress) (*M*= 2.80, *SD* = 3.60). Perceived stress levels (*M* = 17.83, *SD* = 7.05), as measured by the PSS, were descriptively lower

than norms reported for women both from college student samples (*M* = 23.57, *SD* = 7.55) and community samples (*M* = 25.60, *SD* = 8.24).

The TAS-20 was given to all participants in the present study and results indicated relatively low levels of alexithymia (*M*= 43.29, *SD* = 10.92). This score was descriptively lower than scores previously reported for non-BED obese women (*M* = 60.5, *SD* = 7.6) and is lower than the suggested cut point for low-level alexithymia (cutoff = 51) (J. D. A. Parker, Bagby, Taylor, Endler, & Schmitz, 1993). However, it is comparable to the norms reported for females in the general community (weight not reported) (*M* = 44.15, *SD* = 11.19) (J. D. A. Parker et al., 1993). Interestingly, in the present sample, TAS-20 global scores were significantly correlated with both the depression and anxiety subscales of the EES, ($r(113) = .21$, $p < 0.05$; $r(105) = .20$, $p< 0.05$, respectively), suggesting a positive relationship between self-reported emotional eating and alexithymic traits. Following the methodology of Larson, VanStrien, Eisinga, and Engles (2006), a median split (median = 43.0) was used on the TAS-20 to categorize those high and low in alexithymia. Using this split, 52% of the sample was categorized as moderately alexithymic and 38% was categorized as low.

Although over 1000 studies have been published on the construct of alexithymia, only three were found to have measured this construct among African Americans. The most relevant of these was by Peters and Lumley, 2007, which used the TAS-20 to assess alexithymia in a community sample of adult African Americans (Peters & Lumley, 2007). They reported scores ranging from 21-75 (*M* = 46.47, *SD* = 11.09). Comparing scores on the TAS-20 in the present sample by

ethnicity, we found no difference between groups, which can be seen in table 2 (see Table 2). Peters and Lumley (2007) and Mitchell and Mazzeo (2004) also reported no differences between Caucasians and African Americans, suggesting that alexithymia, measured with the TAS-20, is a valid construct among diverse populations.

2. Emotional Eating Variables.

Emotional eating was measured by the Emotional Eating Scale (EES) (Arnow et al., 1995). The mean scores on the three subscales were: Anger/Frustration 12.36 (*SD* = 9.26), Anxiety 10.78 (*SD* = 7.13), and Depression 9.05 (*SD*= 4.88). These scores were quite similar to those norms published for a non-eating disordered population (Waller & Osman, 2000), as presented in table 5 (see Table 5). Because the relationship between alexithymia and eating disorders has been well established, it was of interest to examine the relationship between alexitymia and emotional eating. Bivariate correlations between alexithmia total score and the sbuscales of the EES revealed significant, positive correlations. Alexithymia and EES anxiety had a small correlation ($r(115) = .20$, $p < 0.05$), as did alexithymia and EES depression ($r(115) = .21$, $p < 0.05$). The relationship between alexithymia and EES anger/frustration failed to reach significance, but there was a trend for significance ($r(115) = .18$, $p = 0.05$).

Although no participant reported current eating disorder diagnosis or treatment, the Eating Disorders Diagnostic Scale (EDDS) (Stice, Telch, & Rizvi, 2000) results indicated one quarter (26%) of the sample met at least subthreshold diagnostic criteria for an eating disorder. However, most (74%, *N* = 87) did not meet

criteria for an eating disorder diagnosis. Examination of the EDDS results by ethnic group revealed only a trend for difference between groups (χ^2 (1) = 3.40, p = 0.07). Results from the EDDS can be seen in table 3 (See Table 3). Throughout the hypotheses, analyses were performed two ways: one with individuals meeting criteria for an eating disorder were kept in the analyses and a second with those meeting criteria removed.

Food choices made by emotional eaters have been studied both in lab settings (Oliver, Wardle, & Gibson, 2000) and in naturalistic studies (Wardle, Steptoe, Oliver, & Lipsey, 2000). Overall, it appears that there is a tendency to eat sweeter, higher fat foods during times of stress. In the present study, women were asked to indicate things they eat/do when stressed. The list contained 13 sweet and salty foods, along with alcohol and cigarettes. Chocolate was the most commonly endorsed food choice under stress, with 82% (n = 96) endorsing this choice. Fifty-nine percent (n = 69) indicated eating ice cream. Of the salty foods, potato chips were the most commonly endorsed food (49%, n = 57). Only 7% (n = 8) indicated using cigarettes when stressed—a response rate that was likely influenced by our exclusion criteria, which did not allow smokers to participate in the study. Alcohol was endorsed by 27% (n = 31) of the sample. Interestingly, participants were asked if they would still eat something if their preferred food was not available and 80% (n = 93) indicated that they would. More details about what participants indicated they would eat during stress can be seen in table 4 (see table 4).

One of the purposes of the present study was to determine the function of emotional eating. The hypotheses targeted this question from an objective

perspective, but it was also of interest to determine the subjective response from emotional eaters. Participants were asked the reasons why they eat when stressed and were given several options, including: to control hunger or to distract themselves. Only 1.7% of the sample (*n* = 2) indicated that they eat when stressed because they feel hungrier. On the other hand, 35% (*n* = 41) indicated they eat when stressed because eating distracts them from the stressor, 39% (*n* = 46) because it "makes them feel better," and 15% (*n* = 18) weren't sure why they eat when stressed. More detailed results showing participants preferred foods eaten during stress can be seen in table 5 (see Table 5).

Dietary restraint has been linked with binge eating, both as an antecedent and a maintaining factor (Polivy & Herman, 1985). Restraint was measured in the present sample by the 21-item restraint subscale of the EI described above. The mean restraint score of the present sample was 12.13 (*SD* = 5.03). Unrestrained eaters have been reported to have a mean score of 6.0 (*SD* = 5.5) on the same scale, whereas dieters score a mean of 14.3 (*SD* = 3.6) (Stunkard & Messick, 1985). Combined eaters, including those between the extremes of very restrained and very unrestrained, score a mean of 10.5 (*SD* = 6.2), suggesting that the present sample has an eating profile similar to combined eaters. Using the cut-off score of 6.0 on this scale, 90% (*n* = 105) of the sample were classified as restrained (scoring > 6 on the scale).

3. Coping style.

In the present study, the COPE Questionnaire's 14 subscales were used to determine coping styles of the participants. Mean subscale scores of the current

sample, along with published norms from a college student sample can be seen in Table 5. Based on classifications described by Carver, Scheier and Weintraub (1989), avoidance style coping was calculated by combining the subscales of denial, behavioral disengagement, and mental disengagement. Active or approach coping style was calculated by combining the subscales of active coping, planning, and suppression of competing activities. Based on this classification system, 93% of the sample reported greater use of active coping styles, while only 4% reported greater use of avoidance coping styles. The sample scored a mean of 20.89 (*SD* = 4.16) on the avoidance composite scale, which had possible scores ranging from 16-64. On the approach composite scale with the same possible score range, the sample scored 34.75 (*SD* = 6.75), suggesting relatively low use of avoidance coping styles in general. Alexithymic traits were positively correlated with avoidance style coping style ($r(117) = .40$, $p < 0.01$) and negatively correlated with approach coping style ($r(117) = -.35$, $p < .01$).

More recently, a reanalysis of the COPE questionnaire scales has been suggested (Lyn & Roger, 2000). These newly proposed subscales, including rational coping, emotional coping and avoidance coping, may be more psychometrically sound due to improved reliability (Lyn & Rogers, 2000). Using the newer classification, the present sample scored a mean of 57.60 (*SD* = 10.00) on the rational coping composite, which is higher than norms presented by Lyn and Rogers (2000) in a sample of adult community members (90% women, ages ranging from 18-70; *M*= 38.29, *SD* = 8.74). On the emotional coping composite, the sample scored a mean of 21.95 (*SD* = 4.99), which is similar to norms for the community

sample (*M* = 19.97, *SD* = 5.28). Finally, on the avoidance composite, the present sample scored a mean of 19.50 (*SD* = 3.82), which is lower than the community norms (*M* = 33.70, *SD* = 4.74).

Interestingly, using both composite calculations, the present sample was overwhelmingly composed of active/approach style copers. This finding was contrary to what was expected for a sample recruited through advertisements for emotional eaters. It was expected that more avoidance copers would be recruited. Two factors were considered to explain this discrepancy. First, neither type of composite calculation contained the COPE questionnaire items assessing use of religion to cope. The possible scores on this subscale ranged from 4-16, and the present sample scored a mean of 10.90 (*SD* = 4.72). Therefore, it is possible that the present sample used religion coping strategies that were not accounted for in the composite calculations. Importantly, comparisons with other studies are not possible as single subscale norms have not been reported. Second, neither study describing composite calculation methods reported on the ethnicity of the samples. Moreover, a review of studies using the COPE questionnaire revealed no normative data by ethnic group, and the only study located that used the COPE with a diverse sample actually used an adapted and validated Setswana COPE Questionnaire (S-COPE) adapted for Setswana-speaking volunteers (Malana et al., 2006a).

The present sample was highly diverse, with only 55% Caucasian, so ethnic differences in COPE composites were examined. Caucasians were compared to two other groups; one was comprised of African Americans and Africans and the second comprised of the remaining categories. Because of low numbers of

Hispanic, Asian, and "other" ethnicity participants, they were collapsed into a single group. However, there were no differences between groups on COPE composites, which can be seen in Table 6.

4. Hedonics and food-related variables.

The foods selected for the comfort food and non-comfort food conditions in this study were chosen based on previous research (e.g., Wansink et al., 2003; Zellner et al., 2006), which indicated that chocolate is consistently selected as a preferred comfort food while grapes are considered a healthy food option. In the current study, basic hedonics were measured to understand the participants' perceptions of the two foods and can be seen in Table 6. In general, participants rated the comfort food (M&M's) as slightly sweeter than the grapes ($t(115) = 6.42$, $p < 0.01$), however, they also tended to like the non-comfort food (grapes) more than the comfort food ($t(115) = -2.48$, $p < 0.01$). There were no significant differences between participant flavor ratings or between ratings about desire to eat more of the foods.

In order to control for baseline hunger, participants were involved in the study between the hours of 10:30am -2:00pm, and were asked to refrain from eating for 4 hours prior to arriving to the study. And, participants indicated that they had eaten for a mean of 5.5 hours prior to arrival ($SD = 3.5$). Using a 0-7 point likert scale, participants were asked to rate their hunger upon arrival to the study and also how much they would like to eat something at the time of arrival. Participants rated their hunger as a mean of 3.61 out of 7 ($SD = 5.58$) and their desire to eat as a mean of 3.93 out of 7 ($SD = 1.79$).

At the conclusion of the study, participants were also asked to estimate the number of calories they had been asked to eat during the study. The mode of all responses was 300 calories (range 0-1000 calories), but there was a significant difference in number of calories estimated between those in the comfort food and those in the non-comfort food conditions. Despite equal caloric values of both foods (300 calories), those in the comfort food condition estimated a mean intake of 247.11 calories (*SD*= 119.64) while those in the non-comfort food condition estimated a mean intake of 192.31 (*SD*= 169.22) and this difference was significant ($t(113) = 2.00$, $p < 0.05$). Modal responses in the two groups were 300 calories (comfort) and 100 calories (non-comfort). Overall, participants underestimated the number of calories eaten in each group, but were more likely to underestimate the number of calories eaten in the non-comfort food group.

B. Results of stressor.

A stressful film was used to induce a stress response among some participants. A neutral film was used as a comparison group. Participants completed the PANAS prior to the film, in the middle of the film, and immediately following the film. The PANAS yields a Positive Affect subscale and a Negative Affect subscale. Figures one and two detail the self-reported mood using these two subscales over time (see figures 1 and 2). Using repeated measures ANOVA with film (stress and neutral) and food (comfort and non-comfort) as the between-groups variables and repeated measures of the PANAS negative affect subscale as the within-subject variable, there was no significant three-way interaction ($F(1,106) = .03$, p = ns). There was, however, a main effect of film over time ($F(1,106)= 4.20$, p

< 0.05). A priori hypotheses allowed for simple effect analyses, which revealed a significant reduction in negative mood over time for those in the neutral film condition for those who ate comfort food (mean difference = -4.26, *SE* = 1.35, p < 0.05) and also for those who ate non-comfort food (mean difference = -3.12, *SE* = 1.32, p < 0.05). However, there were no significant reductions in negative mood for those in the stressful film condition, regardless of food eaten.

In addition to the PANAS, participants were asked about their perceptions of the film at the end of the study. Using a 0-7 likert scale, they were asked to rate how stressed, anxious, sad, or bored they were during the film. They were also asked to rate how likely it was that they would have continued to watch the film beyond where it was stopped in the study. For participants in the stressful film condition, they rated their stress during the movie as moderate (*M* = 3.47, *SD* = 1.81, mode = 4). Anxiety was rated similarly (*M* = 3.43, *SD* = .2.00, mode = 4) as was sadness (*M* = 3.23, *SD* = 1.95, mode = 4). They reported low levels of boredom (*M* = 1.62, *SD* = 1.65, mode = 0).

For those in the neutral condition, results were much different, as expected. They reported low levels of anxiety (*M* = 1.03, *SD* = 1.58, mode = 0), low levels of stress (*M* = 0.87, *SD* = 1.60, mode = 0), and low levels of sadness (*M* = 0.43, *SD* = 1.13, mode = 0). Boredom was the most commonly reported emotion in the neutral film (*M* = 4.33, *SD* = 2.44, mode = 7). Overall, it appears that those in the stressful film condition did experience a stress response, although it may have been more moderate than reported in a previous study (i.e., Cavallo & Pinto, 2001). In addition,

those in the neutral condition experienced moderate levels of boredom, but did not experience any stress response.

D. Aim One: Eating will attenuate the stress response for those who report more emotional eating. The first aim of this study was to examine how tendency to emotionally eat relates to affective, physiological, and attention outcomes following a stressor.

1. Hypothesis 1a: It was expected that higher levels of self-reported emotional eating would result in lower physiological stress responses (greater change in heart rate, blood pressure, skin response amplitude from baseline) to the stressful film. Using multiple regression analyses for each of the outcome variables, film (dummy coded) was entered into the regression equation along with EES subscales in the first block, and the interaction of film and the EES subscales in the second block.

a. Systolic Blood Pressure

Using averaged scores for systolic blood pressure change, there was a significant main effect of EES anxiety ($B = 2.80$, $\beta = .40$, $t(109) = 2.04$, $p < 0.05$). Expected systolic blood pressure change for those with high EES anxiety was 2.80 mm/Hg less than for those with lower EES anxiety scores. There was no main effect of EES anger ($\beta = -.14$, $t(109) = -.92$, $p = 0.18$), or EES depression ($\beta = -.19$, $t(116) = -1.33$, $p = 0.10$) for systolic blood pressure. In other words, in partial support of the hypothesis, those higher in EES anxiety experienced less systolic blood pressure change, but only for those reporting eating in response to anxiety (i.e., not for those

eating in response to anger or depression). The multivariate interactions of EES subscales and film were non-significant [anxiety: β = -.44, t(109) = -1.05, p = 0.15; anger: β = .07, t(109) = .09, p = 0.87; depression: β = -.16, t(109) = -.50, p = 0.31)]. These findings held when participants who met criteria for an eating disorder were removed from the sample. The Durbin Watson statistic for the model was 1.93, which suggests that the assumption of independent errors required for the analysis had been met.

Using single time point assessment (second of three readings) to calculate the change score rather than the average, there was no main effect of EES anxiety (β = .15, t(109) = .76, p = 0.23), anger (β = -.17, t(109) = -.85, p = 0.19), or EES depression (β = -.01, t(109) = -.06, p = 0.45) for systolic blood pressure. The multivariate interactions of EES subscales and film were non-significant [anxiety: β = -.08, t(109) = -.18, p = 0.42; anger: β = .06, t(109) = .16, p = 0.43; depression: β = -24, t(109) = -.72, p = 0.23)].

b. Diastolic Blood Pressure

For diastolic blood pressure change, there was a significant main effect of film (B = -2.28, β = -.18, t(109)= -1.87, p = 0.03), such that expected diastolic blood pressure for those in the stressful film was 2.28 mm/Hg higher than for those in the neutral film. However, there were no main effects of EES subscales for diastolic blood pressure change, (EES anxiety β = .21, t(109) = 1.05, p = 0.15; EES depression β = -.09, t(109) = -0.48, p = 0.31; EES anger/frustration β = -.02, t(109) = -0.12, p = 0.45). The multivariate interactions of EES subscales and film were non-significant [(anxiety: β = -.48, t(109) = -1.14, p = 0.13; anger: β = -.40, t(109) = -.97,

p = 0.16; depression: β = .30, *t*(109) = .93, *p* = 0.18)]. Again, when removing those individuals who met criteria for an eating disorder, the results did not change. The Durbin Watson statistic for the model was 2.11, which suggests that the assumption of independent errors required for the analysis had been met. Therefore, diastolic blood pressure change did vary by film, but the hypothesis was not supported because level of emotional eating did not affect the outcome.

Using single time point assessment (second of three readings) to calculate the change score rather than the average, there was no main effect of EES anxiety (β = .17, *t*(109) = .85, *p* = 0.20), anger (β = .05, *t*(109) = .25, *p* = 0.40), or EES depression (β = -.20, *t*(109) = -1.05, *p* = 0.15) for diastolic blood pressure. However, similar to the results using the averaged scores, there was a significant main effect of film (*B* = -4.47, β = -.23, *t*(109)= -2.50, *p* < 0.01), such that expected diastolic blood pressure for those in the stressful film was 4.47 mm/Hg higher than for those in the neutral film. The results using the single point assessment showed a heightened magnitude but did not change the direction or the overall findings of the previously reported results. The multivariate interactions of EES subscales and film were non-significant [anxiety: β = -.34, *t*(109) = -.80, *p* = 0.21; anger: β = -.36, *t*(109) = .88, *p* = 0.18; depression: β = -.31, *t*(109) = -.96, *p* = 0.16)].

c. Heart Rate

For heart rate change, there was a significant main effect of EES anxiety (*B* = -2.34, *β* = -.37, *t*(109) = -1.83, *p* < 0.05). Expected heart rate change for those high in EES anxiety was 2.34 beats more than expected for those low in EES anxiety. However, there were no main effects of EES depression (*β* = .18, *t*(109) = 0.93, *p* =

0.17) or EES anger/frustration (β = .18, *t*(109) = .89, *p* = 0.19). The multivariate interactions of EES subscales and film were non-significant [anxiety: β = .49, *t*(109) = 1.14, *p* = 0.13; anger: β = -.40, *t*(109) = -.97, *p* = 0.17; depression: β = .30, *t*(109) = .09, *p* = 0.46)]. The Durbin Watson statistic for the model was 2.04, which suggests that the assumption of independent errors required for the analyses had been met. Contrary to the hypothesis, those higher in emotional eating (anxiety) experienced increased heart rate response.

d. GSR

For GSR amplitude, there was no significant main effect of EES subscales [anxiety: (β = .51, *t*(73) = 1.73, *p* = 0.09); depression: (β = .12, *t*(73) = 0.45, *p* = 0.33) or EES anger/frustration (β = -.47, *t*(73) = -1.57, *p* = 0.12). There also were no significant interaction of EES anxiety and film [anxiety: B= -.08, β = .-1.15, *t*(73) = -1.88, *p* = 0.09); anger: β = .59, *t*(73) = 1.11, *p* = 0.15; depression: β = .08, *t*(73) = .18, *p* = 0.43)]. The hypothesis was not supported as there were no significant changes in GSR during the film.

2. Hypothesis1b: It was expected that higher levels of self-reported emotional eating would predict poorer attention to the stressful film. Because participants only completed the film questionnaire based on the film they had watched (e.g., those assigned to the stressful film did not complete the neutral film questionnaire), all analyses were done separately for each film group. In each multiple regression analysis, amount of food not eaten was included in the first block as a covariate. Next, the EES subscales of anxiety, depression, and anger/frustration were included in the second block. The number of questions

correctly answered about the stressful film was included as the dependent variable for those in the stressful film condition. The inclusion of the EES subscales accounted for 22% of the variance in attention to the film (r^2 = .22, F(3,55) = 4.18, p < 0.01). There was a main effect of EES anxiety (β= -.60, t (55)= -3.47, p < 0.01). There was no main effect of the EES depression subscale (β= .19, t (55)= 1.12, p = .13) nor the Anger/Frustration scale (β= .31, t (55)= 1.53, p = .07). Therefore, those who self-reported a greater likelihood to eat in response to anxiety were more distracted from the stressful film while eating than those who reported a lower likelihood to eat when stressed. Figure 5 shows the relationship between emotional eating scores and the number of fact-based film questions answered correctly for those in the stress film condition after controlling for the amount of food not eaten (see Figure 5).

For those in the neutral film condition, however, EES subscale scores did not significantly predict attention to the film. There were no main effects of the depression subscale (β= .04, t (56) = .16 p = .43, the anxiety subscale (β= -.01, t (56)= -.06, p = .48), or the anger/frustration scale (β= -.10, t (60)= -.47, p = 32). The hypothesis was partially supported because those higher in emotional eating (anxiety) answered fewer fact based questions about the film correctly. However, there was no effect of emotional eating to depression or anger. These results may reflect the nature of the film, which may have increased anxiety more than anger or depression.

Based on data we gathered at the beginning of the study, 35% of the participants had indicated that the primary reason they eat when stressed was to

distract themselves from the stressor. Using this information, we reanalyzed this hypothesis among individuals who had reported the use of distraction. However, because only 21 people (approximately 1/3) of the participants in the stressful film had indicated using distraction as a primary reason to eat when stressed, there were no main effects of EES subscales (anxiety (β= -.55, t (20)= -1.47, p = 0.07); depression (β= .22, t (20)= .69, p = .27); Anger/Frustration (β= .23, t (20)= .61, p = .24). However, because of the small sample size that was created based on using only those who indicated using distraction, the power for the analysis decreased and the trend found for EES anxiety may have been significant if the power had been greater.

3. *Hypothesis 1c:* It was expected that those with lower self-reported emotional eating would increase in stress during the stressful film, while those higher in emotional eating would not. Negative mood change scores were calculated from baseline (pre-film) to post-film PANAS negative subscale scores by subtracting the total negative affect scale score at the end of the film from the total negative affect score prior to the film. Therefore, a positive negative mood change score indicates improvement in mood. To examine the effect of emotional eating on mood change, multiple regression analyses were used with emotional eating subscales entered simultaneously as the predictor variables and change in negative mood from baseline as the dependent variable. Alexithymia was entered into the first block because it was expected that inability to express emotion would affect self-reported negative mood. The EES subscales were entered next into the second block along

with film (dummy coded). The interaction of film and the EES subscales was entered into the third block.

TAS was significantly related to negative mood change (B = -.14, β= -.22, *t* (103) = -2.27, *p* < 0.05). Figure 6 displays the relationship between alexithymia and mood change during film (see Figure 6). Those with low alexithymia had more mood change than those with higher (moderate) alexithymia overall. There was also a main effect of film, (B = -2.79, β= -.19, *t*(102)= -2.10, *p* < 0.05) such that participants in both films had mood improvement. For those in the stressful film, there was a mean mood improvement of +.98 (*SD* = 5.70). For those in the neutral film, mood improvement was greater, with a mean mood improvement of +3.75 (*SD* = 8.23).

There was a significant main effect of EES anxiety on negative mood change during the film (*B* = 2.13, β= .34, *t*(102)= 1.67, *p* < 0.05) as well. However, contrary to the hypothesis, those with lower scores on EES anxiety decreased in negative mood during the film. Those higher in emotional eating did not; rather they maintained higher negative mood during the film and therefore were considered to be more stressed. There were no significant main effects of the other EES subscales [depression subscale (β= -.25, *t* (102) = -1.27 *p* = .10); anger/frustration scale (β= -.03, *t* (102) = -.14, *p* = .44). The multivariate interactions of film and EES subscales were not significant [anxiety: β = -.50, *t*(102) = -1.17, *p* = 0.12; anger: β = -.12, *t*(102) = -.28, *p* = 0.39; depression: β = .41, *t*(102) = 1.25, *p* = 0.11)]. The hypothesis was not supported because emotional eating did not affect negative mood in the predicted direction. Rather, no one experienced an increase in negative mood, regardless of emotional eating. There were no effects for those higher in

emotional eating when depressed or angry. A bivariate correlation between EES anxiety and TAS total (alexithymia) was performed to understand the mood findings. There was a significant, positive correlation between the two variables, ($r(115) = .21$, $p < 0.05$). Therefore, those higher in EES anxiety may have been more alexithymic and therefore did not experience the mood change that was expected.

E. Aim Two: Comfort food attenuates stress more than non-comfort food. The second aim of the study was to examine whether "comfort food" attenuates the stress response more than a matched calorie food.

1. Hypothesis 2a: It was expected that self-reported emotional eating would moderate the stress-comfort food relationship. That is, emotional eaters who ate a non-comfort food were expected to experience a greater stress response than those who ate a comfort food. Regression analysis to test for moderation was used, as it has been recommended for testing interaction effects (Aiken & West, 1991). Hierarchical multiple regression analyses were performed to detect main effects and interaction effects of film, food, and the moderator variable (emotional eating) on the physiological measures. The independent variables were entered into the equation in successive steps (Aiken & West, 1991) with film and food dummy variables entered in the first block, followed by the moderator variable (emotional eating subscales) in the second block, and finally the interaction of film with the EES subscales, food with the EES subscales and the three way interaction between film, food and EES subscales in the final block.

a. Systolic Blood Pressure

For systolic blood pressure change, there was no main effect of film (β= .16, *t*(108) = .58, *p* = .29), no main effect of food (β= -.22, *t*(108) = -.82, *p* = .21), and no main effect of EES subscales [(anxiety; β= .23, *t*(108) = .99, *p* = .16; depression (β= -.13, *t*(116) = -.56, *p* = .29); anger/frustration β= .01, *t*(108) = .04, *p* = .48)]. There was a significant interaction of food and film, (β= .34, *t*(108) = 2.17, *p* < 0.05). This interaction in systolic blood pressure change can be seen in figure 7 (See figure 7). Specifically, those in the stressful film condition who ate non-comfort food experienced a significant increase in systolic pressure while watching the film. This increase in systolic pressure among stressful film watchers was not present among those who ate comfort food. There was also no change in systolic blood pressure for those in the neutral film condition, regardless of food eaten. There were no significant interactions of food and EES subscales, [(anxiety; β= .63, *t*(108) = 1.51, *p* = .16; depression (β= -.01, *t*(108) = -.03, *p* = .49); anger/frustration β= -.52, *t*(108) = 1.38, *p* = .08)] nor between film and EES subscales [(anxiety; β= -.48, *t*(108) = -1.17, *p* = .12; depression (β= -.22, *t*(108) = -.69, *p* = .25); anger/frustration β= .18, *t*(108) = .46, *p* = .35)]. The three way interactions of food by film by EES subscales were not significant [(anxiety; β= .63, *t*(101) = .90, *p* = .19; depression (β= -.38, *t*(101) = -.70, *p* = .24); anger/frustration β= -.45, *t*(101) = -.67, *p* = .25)]. Although the hypothesis was partially supported by the increased systolic blood pressure for those in the stress, non-comfort food condition, it was not fully supported because emotional eating did not affect the outcome.

Using single time point assessment to calculate systolic blood pressure change (second of three assessments during each study segment), there was no

main effect of film (β= .45, *t*(101) = 1.15, *p* = .17). There was a significant main effect of food (β= .67, *t*(101) = 1.89, *p* = .03), such that those in the comfort food condition had a lower systolic blood pressure response than those in the non comfort food condition. There were no main effects of EES subscales [(anxiety; β= .43, *t*(101) = 1.57, *p* = .07; depression (β= -.33, *t*(101) = -1.21, *p* = .11); anger/frustration β= .10, *t*(101) = .36, *p* = .35)]. There was no significant interaction of food and film, (β= -.65, *t*(101) = -1.40, *p* = 0.08). There were no significant interactions of food and EES subscales, [(anxiety; β= -.81, *t*(101) = -1.34, *p* = .09; depression (β= .67, *t*(101) = 1.50, *p* = .07); anger/frustration β= -.62, *t*(101) = -1.22, *p* = .11)]. There was a significant interaction of film and EES (anxiety; β= -1.03, *t*(101) = -1.74, *p* = .04), however no interactions of film and EES depression (β= .26, *t*(101) = .57, *p* = .27) or EES anger/frustration β= -.02, *t*(101) = -.04, *p* = .45)]. The three way interactions of food by film by EES subscales were not significant [(anxiety; β= .44, *t*(101) = .77, *p* = .21; depression (β= .47, *t*(101) = -.59, *p* = .29); anger/frustration β= .49, *t*(101) = 1.01, *p* = .10)].

b. Diastolic Blood Pressure

For diastolic blood pressure change, there was a main effect of film (β= -.19, *t*(104) = -2.11, *p* < 0.05), which can be seen in figure 8 (see Figure 8). Those in the stressful film condition increased in diastolic blood pressure regardless of food type, and those in the neutral film condition did not. There was no main effect of food (β= .11, *t*(104) = .40, *p* = .35) or main effect of EES subscales [(anxiety; β= .32, *t*(104) = 1.29, *p* = .10; depression (β= -.03, *t*(104) = -.12, *p* = .45); anger/frustration β= -.16, *t*(104) = -.61, *p* = .27)]. There were no significant interactions of food and EES

subscales [(anxiety; β= -.34, *t*(104) = -.78, *p* = .44; depression (β= -.17, *t*(104) = -.12, *p* = .60); anger/frustration β= .35, *t*(104) = .88, *p* = .38)] nor between film and EES subscales [(anxiety; β= -.46, *t*(104) = -1.08, *p* = .28; depression (β= .31, *t*(104) = .93, *p* = .36); anger/frustration β= -.39, *t*(104) = -.94, *p* = .35)]. Finally, the three way interaction of food, film, and EES subscales were not significant subscales [(anxiety; β= -.05, *t*(102) = -.10, *p* = .45; depression (β= .03, *t*(102) = .06, *p* = .48); anger/frustration β= -.29, *t*(102) = -.45, *p* = .33)]. Therefore, the hypothesis was not supported for diastolic blood pressure. Despite the effect film stress had on diastolic blood pressure change, there was no moderating effect of emotional eating on the relationship.

Using single time point assessment to calculate diastolic blood pressure change (second of three assessments during each study segment), there was no main effect of film (β= .41, *t*(101) = 1.01, *p* = .15), no main effect of food (β= .26, *t*(101) = .75, *p* = .23), and no main effect of EES subscales [(anxiety; β= .32, *t*(101) = 1.21, *p* = .13; depression (β= -.33, *t*(101) = -1.15, *p* = .12); anger/frustration β= .13, *t*(101) = .44, *p* = .33)]. There was no significant interaction of food and film, (β= -.48, *t*(101) = -.18, *p* = 0.17). There were no significant interactions of food and EES subscales, [(anxiety; β= -.43, *t*(101) = -.67, *p* = .20; depression (β= .25, *t*(101) = .54, *p* = .24); anger/frustration β= -.17, *t*(101) = -.34, *p* = .35)] nor between film and EES subscales [(anxiety; β= -.67, *t*(101) = -1.18, *p* = .14; depression (β= .52, *t*(101) = 1.13, *p* = .13); anger/frustration β= -.58, *t*(101) = -1.00, *p* = .16)]. The three way interactions of food by film by EES subscales were not significant [(anxiety; β= .50,

t(101) = .69, *p* = .28; depression (β= -.33, *t*(101) = -.60, *p* = .27); anger/frustration β= .38, *t*(101) = .55, *p* = .27)].

c. Heart Rate

For heart rate change, there was no main effect of film (β= -.12, *t*(104) = -.43, *p* = .33) food (β= .15, *t*(104) = .52, *p* = .30). There was a main effect of EES anxiety (*B* = -2.58, β= -.40, *t*(104) = - 1.96, *p* <0.05), but not for EES depression (β= -.09, *t*(104) = .36, *p* = .36) or EES anger/frustration β= .31, *t*(104) = 1.18, *p* = .12)]. There were no significant interactions between food and EES subscales [(anxiety; β= .02, *t*(104) = .03, *p* = .48; depression (β= .25, *t*(104) = .75, *p* = .45); anger/frustration β= -.25, *t*(104) = -.63, *p* = .27)] nor between film and EES subscales [(anxiety; β= .52, *t*(104) = 1.20, *p* = .11; depression (β = .01, *t*(104) = .01, *p* = .49); anger/frustration β= -.41, *t*(104) = -.97, *p* = .16)]. The three way interactions of film, food, and EES subscales were not significant [(anxiety; β= -.21, *t*(102) = -.41, *p* = .34; depression (β = .36, *t*(102) = .68, *p* = .24); anger/frustration β= -.66, *t*(102) = -1.00, *p* = .16)]. The hypothesis was partially supported because those high in emotional eating (anxiety) experienced a higher heart rate response, however, this relationship was not moderated by food type.

d. GSR

For GSR amplitude, there was no main effect of film (β= .19, *t*(73) = 38, *p* = .35) or food (β= -.37, *t*(73) = -.75, *p* = .24). There were no main effects of EES subscales [anxiety: (β= .41, *t*(73) = .93, *p* = .17); depression: (β= .12, *t*(73) = .33, *p* = .35); anger/frustration: β= -.44, *t*(73) = -.77, *p* = .22)]. There were no significant interactions between food and EES subscales [(anxiety; β= .57, *t*(73) = .60, *p* = .26;

depression (β= .02, *t*(73) = .04, *p* = .45); anger/frustration β= -.40, *t*(73) = -.50, *p* = .32)] nor between film and EES subscales [(anxiety; β= -.74, *t*(73) = -.87, *p* = .18; depression (β = .29, *t*(73) = .46, *p* = .34); anger/frustration β= .28, *t*(73) = .33, *p* = .36)]. Finally, the three way interactions of film, food, and EES subscales were not significant [(anxiety; β = -.94, *t*(73) = -.89, *p* = .19; depression (β = -.38, *t*(73) = -.48, *p* = .33); anger/frustration β = .79, *t*(73) = .81, *p* = .21)]. The hypothesis was not supported as there were no significant changes in GSR during the film.

2. *Hypothesis 2b:* Higher levels of self-reported emotional eating were expected to predict higher negative mood for those in the non-comfort food condition, moderated by alexithymia. Negative mood change scores were calculated from baseline to film using the PANAS negative affect subscale by subtracting the total negative affect score at the conclusion of the film from the total negative affect score prior to the film. Regressions were used with the following method: the EES subscales, food, and film (dummy coded) were entered in the first block, TAS total score (e.g., alexithymia) was entered in the second block as the moderating variable, and the interaction of food, film, and EES subscales entered into the final block. Negative mood change score was the outcome variable.

There were no main effects of EES subscales, [(anxiety; β= -.13, *t*(101) = -.46, *p* = .35; depression (β= .01, *t*(101) = .03, *p* = .48); anger/frustration β= .21, *t*(101) = 1.37, *p* = .09)]. There also were no main effects of film or food (film: β= .30, *t*(101) = .46, *p* = .32; food: β= .25, *t*(101) = .38, *p* = .35). There was a main effect of alexithymia (β = .43, *t*(101) = 3.14, *p* < 0.01) on negative mood change such that those low in alexithymia experienced greater mood change. There also was a

significant interaction between alexithymia and food (β = -.78, *t*(101) = 1.80, *p* = 0.03). As can be seen in figure 9, those with low alexithymia experienced mood improvement, regardless of food type, whereas those with higher (moderate) alexithymia experienced mood improvement when eating comfort food but not when eating non-comfort food (See Figure 9). There was no significant interaction between alexithymia and film (β= -.56, *t*(101) = -.86, *p* = .19).

There was a significant interaction of EES anxiety and food (β= -1.15, *t*(101) = -2.49, *p* < 0.01), such that for those in the comfort food condition, higher levels of EES anxiety resulted in greater mood improvement. However, for those in the non-comfort food condition, higher levels of EES anxiety resulted in less mood improvement. A scatterplot of this interaction can be seen in figure 10 (see Figure 10). There was no significant interaction of EES depression and food (β= .25, *t*(101) = .72, *p* = .24) nor of EES anger/frustration and food (β= .45, *t*(101) = 1.10, *p* = .13). There were no significant interactions of the EES subscales and film [(anxiety; β= .54, *t*(101) = 1.23, *p* = .11; depression (β= -.28, *t*(101) = -.83, *p* = .21); anger/frustration β= .14, *t*(101) = .33, *p* = .35)]. Finally, there was no significant three way interaction of film, food and alexithymia, (β= -.15, *t*(101) = -.20, *p* = 42). The hypothesis was partially supported by the interaction of food and EES anxiety. However, there was no effect on mood change by EES depression or EES anger.

F. Aim Three: Emotional eating is a type of avoidance coping.

The Approach Avoidance coping model was used to conceptualize the relationship between emotional eating, coping style, and mood. Although emotional eating has been described as a maladaptive coping mechanism, to our knowledge

no study to date has examined emotional eating in the context of formal coping models, such as the Approach Avoidance model. Avoidance coping style was calculated by summing the subscales of denial, behavioral disengagement, and mental disengagement, a procedure recommended by Carver, Scheier and Weintraub (1989).

1. *Hypothesis 3a:* It was expected that weight would be related to avoidance coping style, such that people with higher BMIs would also be more likely to use avoidance coping style. Because avoidance coping style has been linked to depression in studies on people with BED (e.g., Schwarze, Oliver, & Handal, 2003), BDI scores were included as a covariate. BDI scores accounted for 29% of the variance in avoidance coping style, (β = .53, r^2 = .29, $F(1,105) = 42.54$, $p < 0.01$), and BMI added an additional 2% of explained variance to the model (β = .15, r^2 change = .02, $F(1,104) = 3.17$, $p < .05$). Therefore, in support of the hypothesis, BMI was a significant predictor of Avoidance coping. However, the stronger predictor of avoidance coping was BDI score.

2. *Hypothesis 3b:* Higher scores on emotional eating were expected to predict greater use of avoidant coping methods. EES subscales were entered into the model simultaneously, with avoidance coping style as the dependent variable. The overall model was significant and accounted for 8% of the variance in avoidance coping style (r^2 = .08, $F(3,111) = 3.59$, $p < 0.05$). However, similar to results found by Waller and Osman (1996), the independent contributions of the subscales were not significant [depression subscale β = .04, ($t(115) = .27$, p =.39); anxiety subscale β = .04, ($t(115) = .26$, p =.39); anger/frustration subscale β = .24, ($t(115) = 1.61$, p =

0.06). In support of the hypothesis, EES subscales were significant predictors of avoidance coping style. These results suggest that it may be the tendency to eat in response to affect in general that is related to avoidance coping, rather than eating in response to any single emotion. Alternatively, it may be that emotional eating and avoidance coping distinct yet related constructs.

F. Aim Four: Exploring the aftereffects of stress on eating. The final aim of this study was to examine how the aftereffects of stress were related to eating different types of foods.

1. Hypothesis 4a: Higher emotional eating was expected to predict amount of food eaten following the completion of the stressor (during the final phase of the study). Multiple regression was used with EES subscales entered simultaneously as the predictor variable and amount of food eaten during the final phase of study (recovery period) as the dependent variable. The model was not significant overall (r^2 = .02, $F(3,110)$ = .69, p = .55). However, overall, participants ate very little "leftover" food during the final phase of the study in either the comfort or the non-comfort food conditions. Only 26 people total (10 in non-comfort food and 16 in comfort food) ate any of the leftovers at all. Of those who ate comfort food, they ate a mean of 1.31 ounces or approximately 177 calories (*SD* = .76) and of those who ate leftover non-comfort food, they ate a mean of 2.19 ounces or approximately 42 calories (*SD* = 2.33). The hypothesis was not supported because emotional eating was not a predictor of amount of left-over food eaten at the end of the study, however, those in the stressful film were more likely to eat leftovers than were those in the neutral film ($t(112) = 2.66$, $p < 0.01$).

2. Hypothesis 4b: Higher levels of self-reported emotional eating would predict higher self-reported negative mood at the end of the recovery period. Multiple regression analysis was used with EES subscales entered simultaneously as the predictor variables. Because negative mood scores at the final time point could have been affected by post-film scores, a negative mood change score for the recovery period was calculated by subtracting the PANAS negative affect score at post-film from the final PANAS negative affect score. This change score captures the mood change, or recovery of mood, and was used as the outcome variable. The overall model was significant (r^2 = .09, F (3,110) = 3.14, $p < 0.05$). EES anxiety significantly predicted negative mood change at the end of the study (B = -1.4, β = -.29, t(110) = -2.13, p = 0.03), such that those higher in EES anxiety had 1.4 point increase in negative mood at the end of the study. EES anger/frustration also significantly predicted negative mood change (B = 1.7, β = .47, t(110) = 3.11, p = 0.00) but in the opposite direction. Those higher in EES anger/frustration had experienced mood improvement by 1.7 points, or had recovered more, than those lower in EES anger/frustration. EES depression did not predict negative mood at the end of the study (β = -.17, t(110) = 1.25, p = 0.21). These results were in partial support of the hypothesis. While those higher in emotional eating (anxiety) were higher in negative mood at the end of the study as hypothesized, those higher in emotional eating (anger/frustration) were lower in negative mood at the end of the study.

G. Exploratory analyses

The primary exploratory analysis that was completed was an examination of the results using the EES total score, rather than the subscale scores. These analyses were done for each hypothesis as outlined below.

Aim One. Exploratory Analyses.

Hypothesis 1a exploratory. *Hypothesis 1a*: It was expected that higher levels of self-reported emotional eating would result in lower physiological stress responses (greater change in heart rate, blood pressure, skin response amplitude from baseline) to the stressful film. Using multiple regression analyses for each of the outcome variables, film (dummy coded) was entered into the regression equation along with EES total score in the first block, and the interaction of film and the EES total score in the second block.

1. Systolic blood pressure. For systolic blood pressure change, there was no main effect of EES total (β = .06, $t(113)$ = .52, p = 0.29) nor was the interaction of film by EES total score significant (β = -.46, $t(113)$ = -1.88, p = 0.07).

2. Diastolic blood pressure. For diastolic blood pressure change, there was a significant main effect of film (B = -2.41, β = -.19, $t(113)$= -2.07, p = 0.04), such that expected diastolic blood pressure for those in the stressful film was 2.41 mm/Hg higher than for those in the neutral film. However, there was no main effect of EES total score for diastolic blood pressure change, (EES total β = .06, $t(113)$ = .54, p = 0..30). The interaction of EES total score and film also was not significant (β = -.33, $t(113)$ = -1.36, p = 0.09).

3. Heart Rate Change. For heart rate change, there was no significant main effect of film (β = -.10, $t(113)$ = .04, p = 0.42) nor a main effect of EES total score (β

= -.02, $t(113) = .18$, $p = 0.54$). There also was no significant interaction of EES total score and film ($\beta = 0.06$, $t(113) = .26$, $p = 0.36$).

Hypothesis 1b. Attention. There was no main effect of the EES total on number of questions answered correctly from the film for those in the stressful (β= .02, t (58)= .15, p = .43) or neutral film (β= .08, t (56)= .20, p = .51).

Hypothesis 1c. Mood. Using the EES total score, results found in the original hypothesis were reduced to a significant main effect of TAS on negative mood change (β= -.22, t (106) = -2.26, $p < 0.05$). There was no main effect of film, (β= .21, $t(106)$= .88, p = 0..38), no main effect of EES total (β= .01, $t(106)$= -.08, $p = 0.45$), and no interaction of EES total by film (β= .01, $t(106)$= .02, $p = 0.46$).

Aim Two. Exploratory Analyses

2a. Exploratory analyses of the comfort food hypotheses were performed using the EES total score.

1. Systolic blood pressure change. For systolic blood pressure change, there was no main effect of film (β= .16, $t(106) = .58$, p = .29), no main effect of food (β= -.22, $t(106) = -.82$, p = .21), and no main effect of EES total score (β= .01, $t(106)$ = .04, p = .48)]. There was a significant interaction of food and film, (β= .37, $t(106)$ = 2.17, $p < 0.05$), similar to what was found in the original hypotheses. There was no significant interaction of food and EES total score (β= -.21, $t(106) = .87$, p = .34)] nor between film and EES total score (β= .09, $t(106) = .23$, p = .38). The three way interaction of food by film by EES total score was not significant (β= -.31, $t(105)$ = -.60, p = .31).

2. Diastolic Blood Pressure. Similar to the findings in the original hypothesis, there was a main effect of film for diastolic blood pressure (β= -.20, $t(106) = -2.13$, $p < 0.05$). There was no main effect of food (β= .08, $t(106) = .80$, $p = .43$) or main effect of EES total score (β= .12, $t(106) = -.32$, $p = .29$). There was no significant interaction of food and EES total score (β = .21, $t(105) = .67$, $p = .42$), nor between film and EES total score (β= .41, $t(105) = -.34$, $p = .87$). Finally, the three way interaction of food, film, and EES total score was not significant (β= .39, $t(101) = .56$, $p = .53$).

3. Heart rate. For heart rate change, the results were similar to the orginail in that there was no main effect of film (β= -.16, $t(107) = -.55$, $p = .42$), food (β= .22, $t(107) = .61$, $p = .40$). However, there also was no main effect of EES total score (β= .32, $t(104) = .88$, $p = .19$). There were no significant interactions between food and EES total score (β= -.33, $t(104) = .42$, $p = .37$) nor between film and EES total score (β= .29, $t(106) = 1.00$, $p = .14$). Finally, the three way interaction of film, food, and EES total score was not significant (β= -.34, $t(101) = -1.42$, $p = .29$).

Aim Three. Exploratory Analyses

Hypothesis 3. Higher scores on emotional eating were expected to predict greater use of avoidant coping methods. Using the EES total score with avoidance coping style as the dependent variable, EES total was a significant predictor of avoidance coping style ($r^2 = .07$, $F(1,117) = 8.87$, $p < 0.05$).

Aim Four. Exploratory Analyses

Hypothesis 4a. Higher emotional eating was expected to predict amount of food eaten following the completion of the stressor (during the final phase of the

study). Using the EES total score, the model remained not significant overall (r^2 = .01, $F(1,117) = 1.39$, $p = .24$).

Hypothesis 4b. Higher levels of self-reported emotional eating would predict higher self-reported negative mood at the end of the recovery period. Using the EES total score the results indicate that EES total predicted mood at the end of the study such that those with higher emotional eating total scores had higher negative mood at the end of the study EES anxiety showed a trend for predicting negative mood at the end of the study ($\beta = -.16$, $t(117) = -1.69$, $p = 0.05$).

VI. Discussion

There has been limited research bridging the fields of emotional eating and coping, despite the fact that many people eat when stressed or upset. If emotional eating serves as a type of coping mechanism, then it should function to reduce the stress response. The present study sought to address the function of emotional eating for people who report eating when stressed (e.g., emotional eaters), within the context of coping. A comparison was made between comfort and non-comfort foods to determine if eating a healthy, non-comfort food would have the same effects as eating a higher calorie comfort food. Participants were healthy, overweight women who reported at least some history and present use of emotional eating. To our knowledge, this is the first study to examine the function of food for emotional eaters by merging the fields of coping and eating in a community sample of overweight women.

A. Stress is buffered by eating. In aim one, the stress-buffering effect of eating for emotional eaters was expected across physiological, cognitive, and

affective outcomes. It was expected that higher levels of emotional eating would buffer the stress response because emotional eaters would be employing a coping strategy (eating) during the stressor. Our results suggest that eating may serve to buffer the stress response, perhaps most saliently by distracting individuals from the stressor, thereby reducing their stress experience.

1. Physiological Outcomes. In aim one, our findings on physiological outcomes were mixed—only systolic blood pressured responded as predicted. These mixed findings on the relationship between physiological stress response and emotional eating may be related to the overall low level of physiological responsivity of the sample in response to the stressor. While the previous study using the same stressful film segment reported greater changes in blood pressure and heart rate during the film than was found in the present study (Cavallo & Pinto, 2001), differences between the two studies may have resulted in the different results.

These differences include sample selection. The Cavallo and Pinto (2001) study used a convenience sample of college students, which was younger and of variable weight. In addition, their sample included smokers and there is some evidence that smokers may have greater cardiovascular reactivity to stress (Matthews et al., 1986). In addition, they used different blood pressure/heart rate measurement techniques. They only assessed blood pressure and heart rate once during baseline, once during film, and once at the end of the study. They then used these raw scores in their analyses. To be more conservative, we chose to assess blood pressure and heart rate multiple times during baseline, film, and recovery periods and then average these readings. This conservative approach followed

methodology used in other studies of cardiovascular reactivity, such as one examining lab-based cardiovascular reactivity to a public speech stressor (Fichera & Andreassi, 2000). However, this conservative approach, combined with the passive stressor of film watching (in comparison to more active, public speaking or mirror trace tasks), may have contributed to the limited results.

2. Attention. Aim one also targeted the question of attention to stressors. It was expected and supported that higher levels of emotional eating would predict poorer attention to the stressful film. Distraction is defined as the direction of attention from a noxious event or stimulus in the immediate environment, or active attempts to deal with a stressful situation by engaging in an alternative, pleasurable activity (Livneh et al. 2001). Distraction has been studied for its role in pain management by competing for the attention needed to process physical, emotional, and evaluative components of pain perception, leaving less conscious space for processing pain (Farthing, Venturino, Brown, & Lazar, 1997; Melzack, 1987). It is possible that distraction from non-painful stressors works in a similar way.

From a coping perspective, distraction strategies divert the focus of attention away from stressor and are often categorized as a type of avoidance coping. As such, distraction could be considered dysfunctional (Carver et al., 1989; Moos, 1997) whereas more active coping strategies, whether behavioral or emotional, may be better ways to deal with stressful events (Moos, 1997). However, recent research has suggested a more synergistic and beneficial effect of an active coping style combined with distraction on stress responses—precisely the combination that was seen in the present sample. Specifically, a study of job stress reported that

employees who were problem-focused or active copers and who also used distraction as a way of coping with stress had better outcomes on both subjective ratings of mood and objective ratings of job performance at one year follow up (Shimazu & Schaufeli, 2007). Moreover, Shimazu and Schaufeli (2007) reported that even when employees coped with their job stress in an active way, stress responses did not decrease without distraction. The relative benefit of distraction could be explained by its positive effect on the preservation of physical and mental resources necessary for optimal performance (Gaudreau & Blondin, 2004). Therefore, from a short-term perspective, eating as distraction, combined with an active coping style, may be the perfect combination for optimal stress buffering or stress management. However, it is the long-term effects of eating as distraction which are cause for concern in the midst of an obesity epidemic.

3. Mood. Finally, aim one addressed the effect of stress on mood. It was expected that those lower in emotional eating would increase in stress during the stressful film compared to those higher in emotional eating because eating was expected to buffer the stress response and subsequently reduce their stress experience. However, contrary to the hypothesis, we found that all participants experienced improvement in mood, even those in the stressful film condition. And mood, for those higher in emotional eating, improved less, not more.

Three factors may help explain the present findings. First, it may be that the act of eating any food improves mood, even in the face of a stressor. It was expected that participants in the stressful film would experience an increase in stress, but that did not happen as measured by negative mood. Rather, everyone's

mood improved, with participants in the stressful film experiencing an attenuated mood improvement. Timing of the eating episode may play a critical role in these results. Previous work using the same stressor gave participants food after the film had ended (i.e., upon completion of the stressor). And, they reported that mood worsened significantly during the film and then recovered significantly after eating (Cavallo & Pinto, 2001). The present study changed this methodology and asked participants to eat during the stressful film. It may be that the mood improvement which occurs with eating is more powerful than the mood decline that occurs as a result of the stressor. If so, then although the present results did not support the initial hypotheses, this finding would lend some support to the notion of food buffering the stress response on mood.

Second, our findings with alexithymia also may partially explain our results. We found that those higher in alexithymia experienced relatively little mood change, while mood for those lower in alexithymia improved. Previous work reports similar outcomes, with those higher in alexithymia experiencing an attenuated stress response (Lumley, 2004). This reduced stress response may be because those with greater alexithymia have difficulty identifying what is stressful or because they are unable to express their emotional responses to stress.

However, the sample was relatively low in alexithymia overall. These results were surprising given that alexithymia is thought to be highly related to poor interoceptive awareness—a hallmark of eating disturbances (Fassino, Pierò, Gramaglia, & Abbate-Daga, 2004). While the TAS-20 has been the primary measure used to assess alexithymia in the growing body of research on the topic,

recently questions have been raised about the utility of any self-report measure of alexithymia. Lumley (2004) proposes that such a self-report measure may tap into the cognitive aspects of alexithymia and that some people are so alexithymic that they do not realize they have an emotional deficit and therefore score similar to "normal" people might (with relatively low scores). Lumley's (2004) explanation may be one way to understand the low levels of alexithymia in the present sample. By using a self-report questionnaire to assess negative mood, we required participants not only to identify their negative mood but also to express it in written form. It also may be that these women, who did not have high levels of eating pathology overall, may be less alexithymic than expected.

Alternatively, it may be that women are less alexithymic than men. Previous work has reported that obese men report more alexithymia than obese women (J. K. Larsen et al., 2006). The same study reported a stronger association between alexithymia and emotional eating in treatment seeking obese men than women. However, in the present sample of overweight women not recruited for weight loss treatment, there was a high correlation between alexithymia and emotional eating. Clearly the relationship between emotional eating and alexithymia warrants further research, particularly given that emotional eaters who may seek weight loss treatments may benefit from different intervention approaches based on their presenting levels of alexithymia (Lumley, 2004).

Finally, it may be that the results of the attention hypothesis also help explain the results of the mood hypothesis. If the participants were distracted from the stressful film as the present data suggest, then the stressor may not have been as

salient and therefore may not have exerted the same powerful mood changing effect that was expected. When eating is done after the stressor as in previous work, participants wanting to engage in distraction during the stressor are forced to actively engage in mental distraction strategies to avoid the stressor. Examples of this type of strategy include the internal creation of word lists, singing words of a song to oneself, or mentally preparing a list of items for a weekend trip. However, in the present study, eating was done during the stressor. Therefore, in our attempt to study food as a distractor, we may have prevented the stressor from having its desired effect.

B. Comfort food buffers stress more than non-comfort food. In aim two, different food types were incorporated into the stress-buffering hypothesis to determine differential responses by food type. Specifically, it was expected that eating a comfort food would buffer the stress response for emotional eaters more so than a non-comfort food and that this buffering effect would be evident across physiological and affective outcomes.

1. Physiological Outcomes. Again, as in aim one, our findings for physiological outcomes were mixed in aim two. Systolic blood pressure responded as predicted; those who ate a non-comfort food experienced an increase in systolic blood pressure while those who ate the comfort food did not. However, there was no moderating effect of level of emotional eating on physiological outcomes as expected. Rather, the buffering effect occurred for all in the comfort food condition who were stressed. It may be that recruiting for emotional eaters affected these results. While it was expected that those scoring higher on the EES would

experience a greater stress buffering effect when eating a comfort food, it may be that any history of emotional eating, regardless of frequency and intensity of the behavior, results in a stress buffering effect when eating comfort food. Alternatively, it may be that emotional eating status has no effect on stress response, but rather simply eating a comfort food is pleasurable and therefore reduces the experience of stress, at least temporarily.

Interestingly, the results for the physiological outcomes were similar across aims one and two. In both aims, systolic blood pressure responded as predicted to both stress and to the different food choices. These findings the stress reactivity of systolic blood pressure across the two aims have potential health-related implications. Heightened blood pressure reactivity to acute psychological stress has been implicated in the development of cardiovascular disease (Manuck, Kasprowicz, & Muldoon, 1990). Specifically, systolic blood pressure reactivity to mental stress has been found to predict systolic blood pressure at 5-year follow up (Carroll, Ring, Hunt, Ford, & Macintyre, 2003), after controlling for relevant risk factors such as BMI, SES, and age.

In both aims, the effect of the stressor on systolic blood pressure was buffered (systolic pressure rose less) by eating. Nearly identical results were reported in a study which taught mildly hypertensive community adults stress management techniques over 10 sessions and measured their blood pressure stress reactivity to a passive, lab-based stressor before and after the intervention (Johnston et al., 1993). The stress-induced rise in systolic blood pressure for those taught stress management was lower than the rise for those without the stress

management training—results which mirror the present findings for eating. It may be that emotional eating, particularly eating a comfort food, can be conceptualized as a stress-managing or coping strategy which reduces or buffers the stress response similar to more formal stress management techniques. In fact, this very question was examined in aim three.

2. Mood. Similar to aim one, in aim two it was expected those higher in emotional eating to experience greater negative mood when eating a non-comfort food, moderated by alexithymia. Our results suggest that eating a comfort food was particularly powerful mood regulator for emotional eaters with higher levels of alexithymia. Those higher in alexithymia experienced no mood improvement while eating a healthy, non-comfort food. However, eating an unhealthy, comfort food did improve mood among this group of individuals who have difficulty labeling, identifying, and expressing emotions. These results highlight the efficacy of comfort food as a mood changing agent.

Interestingly, the results on the hedonics of the different food choices were unexpected. Previous work reported that M&M's are considered a junk (unhealthy) food while grapes are considered a healthy option (Zellner et al., 2006). Our sample rated the M&M's as slightly sweeter than the grapes, yet they also tended to like the grapes more. It is possible that eating a healthy snack made participants feel good, resulting in a higher likeability rating at the conclusion of the study. Conversely, those asked to eat the portion of M&M's may have been experiencing "buyers remorse," and rated the candy as less likeable after eating them. It has been reported that eating chocolate can increase guilt and decrease positive emotion

(e.g., Macht & Dettmer, 2006). And when chocolate is eaten as an emotional eating strategy for comfort, Parker, Parker and Brutchie (2006) suggest that it may serve to prolong the onset of dysphoric mood, rather than eliminate it.

Combing these results with the positive relationship found between alexithymia and emotional eating provides exciting insight into food choices made by stress eaters. Both research and clinical work suggest that emotional eaters typically eat comfort foods during an emotional eating episode, both in naturalistic (Cartwright et al., 2003) and laboratory settings (Oliver et al., 2000). The present results suggest that those higher in emotional eating, who also may experience more difficulty identifying and expressing emotions, experience mild mood improvement when eating food, but may need to eat the higher calorie, higher fat comfort foods to achieve more powerful mood regulation. Given that the ultimate goal of most attempts at mood regulation is to feel good (Larsen, 2000), it makes sense that people, when stressed, would be more likely to turn to those foods which have the more powerful mood altering results.

However, a distinction between the likelihood to eat a certain food when stressed and the preference people have for particular foods should be made. Until now, an assumption in the literature on emotional eating has been that people's preference for comfort foods explains why they are commonly chosen during stress-eating episodes. In the present sample, however, people preferred the non-comfort food over the comfort food, but experienced a greater mood improvement after eating the comfort food. Translated into daily emotional eating episodes, these results suggest that if hedonics were strictly driving stress-eating food choice,

healthier, non-comfort foods may be chosen more often. However, we know that is not the case. Therefore, mood regulation with food may be a more powerful determinant of food choice than hedonics. And it is the food choices made during emotional eating episodes that may connect repeated emotional eating episodes to important health implications over time.

C. The relationship between avoidance coping and emotional eating. Lending further support to the conclusions reported above for aims one and two, emotional eating was found to be related to avoidance coping style and weight in aim three. Specifically, those with higher BMI's were more likely to use avoidance coping styles, as were those who reported greater symptoms of depression.

Coping style was assessed using the COPE Questionnaire (Carver, Scheier, & Weintraub, 1989), which yielded surprising results. Over 90% of the sample was categorized as active copers. This result was contrary to what was expected and contrary to previous reports using the COPE (e.g., Lyn & Rogers, 2000), which suggest a more even distribution of active and avoidance copers. The original conceptualization was that overweight women would be more likely to be avoidance copers, and that eating when stressed was one type of avoidance coping. Our expectation of high use of avoidance coping strategies grew out of Heatherton and Baumeister's (1991) escape theory of binge eating, which postulated that binge eaters have high levels of negative self-awareness and dysphoric mood states that combine to create a negative view of the self. Individuals were thought to try to escape this negative self-view by directing attention toward immediate sensations and actions of eating. This means of coping through escape or avoidance of

negative self-awareness, led to the hypothesis that our sample of emotional eaters would be more likely to be avoidance copers. Yet, our sample of emotional eaters were low in avoidance coping.

There are several possible explanations for the findings of coping style in the present sample. First, it is possible that use of religion to cope, which is not included in the composites of active or avoidance coping style, may be related to this discrepancy. Puhl and Brownell (2006) report that coping through faith, religion, and prayer is one of the three most commonly reported coping strategies reported among overweight women.

Second, it may be that the ethnic diversity of the present sample affected the results on the COPE. Despite its use with diverse samples, to our knowledge, data have not been reported on the validity or reliability of the measure in a diverse sample (Malana et al., 2006b). There is some evidence of differing coping styles between different ethnic groups. For example, John Henryism (James, Hartnett, & Kalsbeek, 1983) is an active style of coping characterized by a belief that environmental events can be negotiated successfully via hard work and determination. This type of coping style has been found to influence physiological reactivity among African Americans but not among Caucasians (Clark, Adams, & Clark, 2001). Although the COPE subscales did not differ by ethnicity, it is possible that the scale did not assess the full range of coping styles or strategies used by diverse groups.

Finally, an alternative conceptualization which may explain our results is that avoidance and active coping are not mutually exclusive (Roth & Cohen, 1986).

Rather, individuals who emotionally eat may be active copers who use avoidance coping during certain stressful events or situations. One such avoidance coping strategy is distraction, as discussed previously. The question then becomes what factors could drive an active coper to engage in avoidance coping strategies? What situations pose the type of stress that would cause an active coper to use food to cope? There is evidence that for overweight women, the very nature of their condition could be one such stressor.

A recent study by Puhl and Brownell (2006) surveyed over 2000 overweight women and reported that nearly all had experienced some type of stigma related to their weight at least once in their lives. Many engaged in multiple coping strategies to deal with this weight stigmatization. Seventy-nine percent endorsed eating as a means of coping. Eight-six percent endorsed use of religion and prayer to cope. However, they also reported using more active coping strategies, including heading off the negative remarks and using positive self-talk. Although we did not include measures of stigma in the present study, these data suggest that overweight women are subject to stigma and negative stereotypes from friends, family, medical professionals, and others (Puhl & Brownell, 2003). This increased stigma may cause increased stress among overweight women. In response to the stigma, overweight women, particularly those who binge eat or emotionally eat, may make use of adaptive coping strategies as often as normal eaters, but also may use maladaptive (e.g., avoidance) coping strategies as well.

Research suggests that women with BED have increased use of all types of coping strategies. Wolff and colleagues (2000) reported that women with BED used

more coping strategies overall (both active and avoidance) than women without BED (Wolff, Crosby, Roberts, & Wittrock, 2000). Although emotional eating may not be as severe as BED, it may be that emotional eaters experience more stress or are more sensitive to stress. The direction of this relationship, however, remains unclear. Are emotional eaters more stress sensitive or are highly stress-sensitive women more likely to become emotional eaters? These questions remain to be answered.

D. Aftereffects of stress and eating. Finally, the aftereffects of stress were expected to be related to eating different types of foods in aim four. Most participants did not eat any leftover food, however, those in the stressful film were more likely to eat food (either type) than those in the neutral film. It may be that the aftereffects of the stressful film were exhibited through increased consumption after the film. Alternatively, it may be that by chance, participants in the stressful film were hungrier than those in the neutral film. Also, emotional eating was related to negative mood at the end of the study. Those with higher emotional eating scores were more negatively affected by the stressful film even after a rest period following the film. These results may reflect negative cognitions, including guilt responses, which have been described in women after eating (Macht & Dettmer, 2006).

VII. Limitations

There are several limitations with this study that should be addressed. First, the between-subjects, cross-sectional design of the study limits the conclusions of the current study. Although we avoided such problems as carry-over and task order effects by using a between-subjects design, there were other limitations that were

created. For example, it was impossible to determine causality between the variables of interest in the study, such as determining whether emotional eating and alexithymia are related casually or are only correlated as determined from the present data.

Another potential limitation of this study was that participants in different food conditions were asked to eat different portion sizes. In the comfort food condition, they ate 2.5 ounces of food. In the non-comfort food condition they ate 13 ounces of food. The reason for the disparate portion sizes was that the comfort food was much higher in caloric content than the non-comfort food. Importantly, the two food conditions were matched on caloric content, each containing 300 kilocalories. Although there is evidence that increases in portion size results in increases in food consumption (Rolls, Morris, & Roe, 2002; Rolls, 2004; Rolls, Roe, Kral, Meengs, & Wall, 2004), food consumption was not a dependent variable in this study. Rather, food was an independent variable and all participants were asked to eat a set amount of food, with food type manipulated. Alternative food types which would have allowed for more similar portion sizes could eliminate this limitation in future research. For example, the use of peanuts as the "healthy" food option could be a possible future selection. Another possible concern in using grapes and M&M's was that both foods are sweet. An alternative would have been to use a bland tasting food, such as crackers or dry cereal.

The stressor used in the study is another limitation. The domestic violence video clip used in the present study did not induce the negative affect that was expected. These results were surprising, considering the same video clip

significantly raised self-reported negative affect in the Cavallo and Pinto study (2001) measured by the same mood scale. There are several possible reasons why the stressor did not have the same salience to the present sample. Their college student sample may have been more likely to experience demand characteristics which are of concern when using any type of stressor. If demand characteristics do occur, and participants pretend to be in the desired mood state to comply with experimental demands, then such demand effects clearly pose a threat to experimental construct validity (Cook & Campbell, 1979). It also is possible that the community sample in the present study simply did not find the stressor as upsetting as expected. Perhaps the high levels of active coping, the fact that food was eaten during the film or any combination of factors may have affected the results. Also, the high level of diversity of the present sample may have affected the results. The characters in the film were Caucasian and nearly half of the present sample was of African or African American ethnicity. It is possible that the differences in the ethnic background of the sample and the characters in the film affected the salience of the stressor because the sample may have had difficulty relating to the characters.

A second limitation with the choice of the film for stress induction is that it did not change physiological outcomes to the extent that was expected. Several studies had previously reported that films do change physiological measures such as skin conductance (Gomez et al., 2005) and heart rate (Palomba et al., 2000; Gomez et al., 2005). Moreover, a meta-analysis on the effectiveness and validity of 11 different stress induction procedures reported that the presentation of videos had the largest mean weighted effect size (r_m=.5) overall in mood ratings (Westerman et al.,

1996). The Cavallo and Pinto (2001) study calculated an even larger effect size for the use of the chosen film (η^2=.71). Yet again, the present sample did not respond to the extent expected. Research suggests that the magnitude of physiologic responses to stress may be influenced by individual differences (Holmes, Krantz, Rogers, Gottdiener, & Contrada, 2006). Specifically, temperament and health behaviors are two which may be important in determining physiological responsivity to stress but were not measured in the present study.

Also, the measurement of GSR in the present study was initially added as a supplement to the heart rate and blood pressure reactivity. We used the QPET Wireless Computerized Biofeedback System, which is a new system designed to use Bluetooth wireless connectivity. However, GSR data can be affected by many different factors. For example, movement in the hand with the attached electrodes could have produced some of the artifact in the data (Fowles et al., 1981). Although the electrodes were attached to the non-dominant hand in order to reduce the likelihood that participants would use it to eat, it is possible that some did thereby introducing additional noise in the data. The results also may have been influenced by coping strategies used. Thinking of exciting imagery usually causes an increase in conductivity while calm, relaxing thoughts do the opposite (Min, Chung, & Min, 2005). Also, temperature, attention, and fatigue may affect the accuracy of the measure. Finally, individuals show spontaneous phasic responses to varying degrees. Typical values are about 1-3 per minute (Fowles et al., 1981). Some people will be highly reactive with considerable spontaneous generation of GSRs and others will have a relatively steady tonic level of skin conductance without

spontaneous GSRs (Fowles et al., 1981). Although trimmed means were used to try to reduce noise in the data, any of these factors could have influenced the GSR data.

It also is possible that the design of the study is partially responsible for the blunted mood and physiological responses. By asking participants to eat during the stressor, we may have inadvertently caused the reduction in stress response. Unfortunately, we did not include a non-eating control condition to make this comparison. If the Cavallo and Pinto (2001) study results can be used as a comparison, then it would lend support to the notion that eating did blunt these responses because the Cavallo and Pinto (2001) sample experienced larger mood and physiological response when watching the video without eating. However, differences between the samples as discussed prevent a true comparison from being made.

It also is possible that individuals in the present study were repressive style copers, however we did not include a measure of repressive coping. Those high in repressive coping may experience a physiological response to stress but may not report the stress on self-report stress/mood questionnaires (Weinberger et al., 1979). Of interest is how our findings on alexithymia relate might relate to a repressive coping style. Whereas alexithymia is a pervasive deficit in the capacity to experience and describe emotions, repression may be described as the exclusion from conscious awareness of specific conflicts and the associated emotions. In other words, someone with alexithymic traits experiences an emotion but may have difficulty expressing or understanding the emotion whereas a person using

repressive coping may not experience the emotion consciously at all. It may be that our findings related to alexithymia would be better described as a repressive coping style, however we did not include a measure of this coping style in the study, and our conclusions are limited. However, it should be pointed out that recent research suggests that the two constructs may be more related than initially proposed and may differ more in terms of the magnitude of the difficulty with emotional expression rather than being two distinct traits or styles (Lane, Sechrest, Riedel, Shapiro, & Kaszniak, 2000).

Our conclusions regarding eating as a coping mechanism may be confounded because we did not ask participants if they had engaged in other coping mechanisms during the stressor. It is possible that participants used other internal distractions (e.g., preparing a shopping list) or external distractions (e.g., looking around the room or not watching the video). Therefore, it is unclear whether eating per se was the coping strategy used by participants.

Finally, the conclusions we drew about attention and eating were somewhat directional, which may not be possible to conclude using our cross sectional design. We assumed that the distraction individuals experienced from the film was due to the act of eating, however it is possible that participants were distracted by the stressor and therefore ate because they were distracted. Work by Ward and Mann (2000) suggest that a lack of attention simply increases the extent to which people's behavior is influenced by the most noticeable features of their environment, which in the present study was food. In cases where the environment contains highly salient reminders of one's goals (e.g., a scale as a reminder of a diet), individuals who are

distracted may control their behaviors better (e.g., eat less) than if they were not distracted. However, in the present study the most salient cue in the room was the food, and participants were asked to eat the food presented to them, and therefore the interaction may not be a clear cut as we concluded (Ward & Mann, 2000).

VIII. Clinical Implications and Future Directions

A. Clinical Implications

The present study made several contributions to the study of emotional eating and coping from a clinical perspective. First, our community sample of overweight women increases the generalizability of the results over previous studies of stress and eating in college samples (e.g., Cavallo & Pinto, 2001). Specifically, the present sample may reflect the type of clientele likely to seek weight loss treatment in the community. If so, providers may be able to utilize the present findings to increase their understanding of the eating behavior of overweight women who eat when stressed. A recent meta-analysis of weight loss treatments reported that treatment produces more weight loss in samples of obese non-BED compared with obese BED individuals. Although emotional eating and BED are not synonymous, the contribution of emotional eating to binge episodes has been shown: BED subjects have reported a significantly greater tendency to eat in response to stress than controls (Eldregde & Agras, 1996).

Another clinical implication of the study was that it began to elucidate the function of emotional eating in dealing with stress. Results clearly indicate that eating when stressed helps distract emotional eaters from the stressor. From a

strictly coping perspective, these data suggest eating may be an effective coping strategy that provides distraction from stress and subsequent mood regulation and improvement. The use of distraction for coping with stress may be helpful in reducing subjective stress (Shimazu & Schaufeli, 2007), but it also has been linked with subsequent binge episodes among binge eating college women (Yacono Freeman & Gil, 2004). Therefore, it is impossible to ignore the health implications of engaging in eating for coping.

Stress levels in the United States continue to rise. A recent survey from the American Psychological Association reports that one-third of Americans endorse living with extreme stress and nearly half of Americans (48 percent) believe that their stress has increased over the past five years (APA, 2007). Moreover, 43% reported overeating or eating unhealthy foods in response to stress. Therefore, it would be naïve to consider eating a healthy or adaptive coping strategy.

Fortunately, the data from the present study also highlight the overall positive coping style of overweight women who emotionally eat, with over 90% of the sample categorized as active copers. From a clinical perspective, it may be beneficial to capitalize on the use of active coping strategies in helping women reduce emotional eating through reducing stress reactivity. Cognitive behavioral interventions, which promote problem solving and structured approaches to managing emotions, may prove useful at enhancing the active coping skills of participants as well as expanding their repertoire of such skills. Future research should continue to assess the impact of coping style on the management of stress, the likelihood to emotionally eat, and the effect of interventions for reducing binge and emotional eating.

Given the differential stress response of individuals with varying levels of alexithymia found in the present sample, future research should continue to explore different interventions which may be more or less effective at reducing stress and/or emotional eating in people with varying levels of alexithymia.

B. Future Research. Future research should continue to investigate the contribution of emotional eating in weight gain and loss. It has been reported that those who lose weight and maintain the loss are more likely to report active coping styles and effective problem solving skills, such as generating new solutions or applying concepts learned in treatment when faced with stressful events (Gormally & Rardin, 1981). It may be that active copers who emotionally eat could be taught alternative coping strategies other than eating, and would therefore be more successful in weight loss treatments.

Our data on alexithymia also were intriguing and warrant further research. The constructs of emotional eating and alexithymia may prove to be more complex than originally thought. The strong relationship between the constructs in the present sample of overweight women, and the influence of both factors on affective and physiological stress response highlight this complexity. For example, it may be that alexithymia is predictive of emotional eating behavior; yet the cross sectional nature of the present study limits our ability to determine any such causal relationship. Alternatively, it may be that emotional eaters are highly alexithymic but are more willing to acknowledge their emotional eating as problematic because a) they do not fully recognize their emotional deficit (Lumley, 2004) or b) emotional eating is more socially acceptable than a label of alexithymia.

It also would be interesting to use different methods of measuring coping style. The third version of the COPE was used in the present study, which assesses the degree to which an individual has had each response during the past month. Perhaps including additional measures of coping, such as a dispositional coping questionnaire as well as a situational version would help delineate the coping results presented here.

Finally, another interesting line of work would be to use naturalistic and/or longitudinal designs to explore the relationship between emotional eating and coping. The lab based design in the present study is somewhat artificial and cannot replicate the experience of stress eating in the day to day lives of overweight women. Perhaps the use of palm pilots for measuring stress and eating behavior, combined with ambulatory monitoring of physiological outcomes, could provide information on the true stress buffering effects of eating for emotional eaters.

List of Tables

Table 1

Demographics (N= 117)

		M (SD)
Age (years)		35.26 (11.59)
Body Weight (lbs.)		184.26 (42.14)
Body Mass Index (BMI; kg/m^2)		31.34 (5.98)
Ethnicity, N (%)		
	Caucasian	55 (47.0)
	African American	36 (30.8)
	Asian	4 (3.0)
	Hispanic	10 (9.0)
	American Indian	1 (0.7)
	African	10 (9.0)
	West Indian	1 (0.9)

Table 2. TAS-20 by Ethnic Group

Ethnicity (N)	TAS-20 M (SD)
Caucasian (55)	43.42 (12.49)
African/AA (44)	41.34 (9.01)
Other (16)	48.18 (8.62)

Table 3. Eating Disorder Diagnoses

Subthreshold BED Diagnosis	3 N	2.60% Percentage
Anorexia Nervosa	0	0
Bulimia Nervosa	12	10.30%
Binge Eating Disorder	4	3.40%
Subthreshold Bulimia	11	9.40%
Subthreshold BED	3	2.60%

Table 4. Current sample characteristics compared to published norms

Scale	Current sample	Norms
	M (SD)	M (SD)
BDI-II	8.28 (8.48)	12.56 (9.93) college students
BAI	7.79 (7.87)	6.0 (8.0) non-disordered pop
PSS	17.83 (7.05)	25.60 (8.24) community sample
TAS-20	43.29 (10.92)	60.5 (7.6) non BED obese women
EES anger/frust	12.36 (9.26)	11.2 (8.78) non-ED women
EES anxiety	10.78 (7.13)	6.42 (5.86) non-ED women
EES dep	9.05 (4.88)	8.10 (4.71) non-ED women

Table 5. Preferred foods to eat when stressed

Food	N	Percentage
Chocolate	96	82%
Ice Cream	69	59%
Cookies	65	55%
Sweet candy	62	53%

Table 6. COPE Questionnaire Scores

COPE subscale	Current sample	Carver, Scheier, & Wientraub (1989)
	M (SD)	M (SD)
Active	12.18 (2.53)	10.69 (3.18)
Planning	12.86 (2.99)	11.86 (3.08)
Suppress Competing activities	9.67 (2.88)	9.31 (3.38)
Seek Instrumental Social Support	11.79 (3.02)	9.69 (3.39)
Seek Emotional Social Support	11.67 (3.52)	11.08 (3.60)
Positive reinterpretation and growth	12.76 (2.66)	11.35 (2.85)
Acceptance	11.87 (2.69)	11.49 (2.81)
Turn to religion	10.87 (2.72)	7.56 (4.24)
Venting emotions	10.36 (2.81)	10.37 (3.50)
Denial	5.39 (1.91)	5.57 (2.28)
Behavioral Disengagement	5.98 (2.00)	6.03 (2.22)
Mental Disengagement	9.70 (2.35)	8.07 (2.26)
Alcohol/drug disengagement	5.17 (2.32)	1.29 (0.72)

TABLE 7. COPE Scores by Ethnic Group

	Cope Composite by Ethnicity M (SD)
Carver et al., 1989 Composites	
Avoidance	
Caucasian	20.53 (4.16)
AA/African	21.15 (4.07)
Other	23.33 (4.46)
Active	
Caucasian	35.13 (6.46)
AA/African	35.13 (6.69)
Other	33.06 (8.15)
Lyn & Rogers, 2000 Composites	
Rational	
Caucasian	57.31 (10.23)
AA/African	58.33 (9.55)
Other	56.56 (10.94)
Emotional	
Caucasian	22.16 (5.25)
AA/African	20.93 (4.73)

Other	21.42 (4.22)
Avoidance	
Caucasian	18.83 (3.77)
AA/African	20.04 (3.88)
Other	20.33 (4.46)

Table 8. Likert Rating of Foods

	0-7 Likert Rating M (SD)	*t* statistic df = 115
Sweetness		
Comfort	5.93 (1.28)	6.42*
Non-Comfort	4.10 (1.75)	
Flavorful		
Comfort	4.79 (1.67)	.63
Non-Comfort	4.60 (1.58)	
Likeability		
Comfort	4.29 (2.03)	-2.98*
Non-Comfort	5.32 (1.68)	
Desire to eat more		
Comfort	2.29 (2.16)	-.36
Non-Comfort	2.44 (2.29)	

* $p < 0.01$

List of Figures

Figure 1. Positive Mood Ratings Over Time

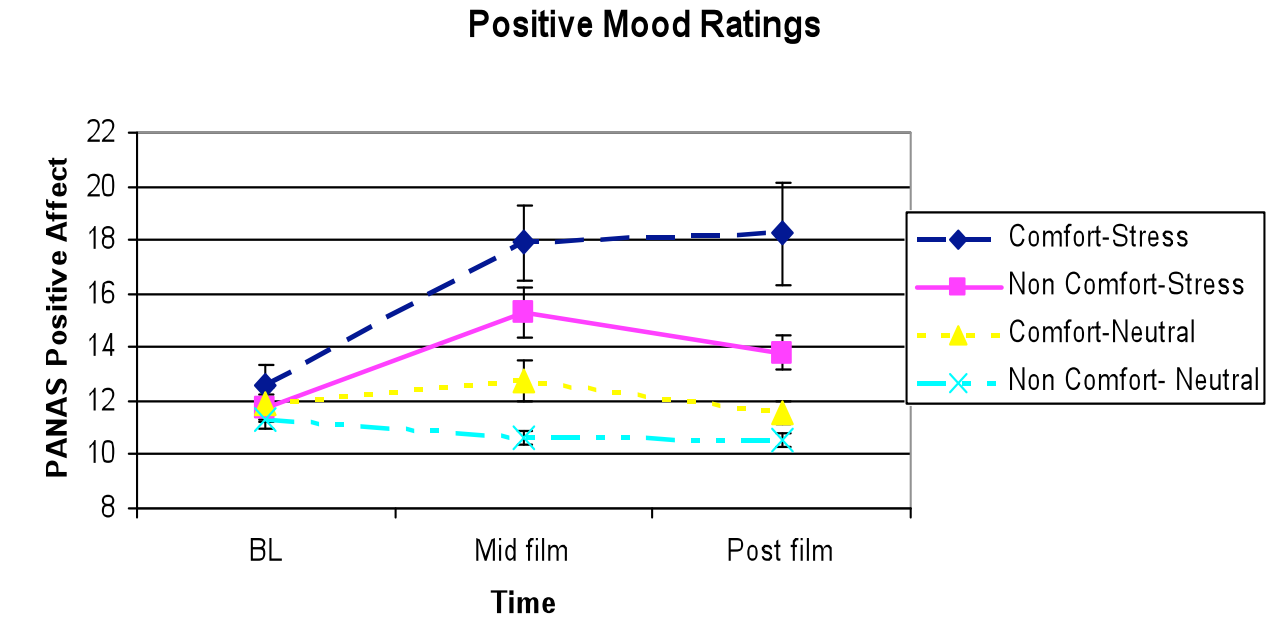


Figure 2. Negative Mood Ratings Over Time

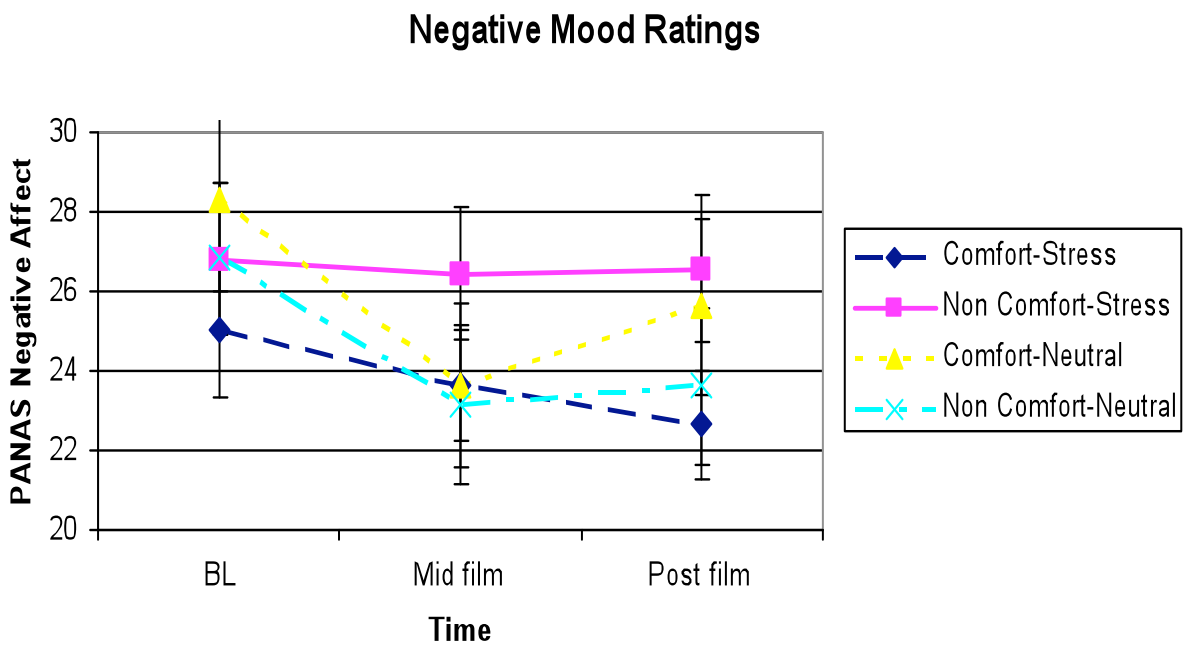


Figure 3. Systolic Blood Pressure Changes Over Time

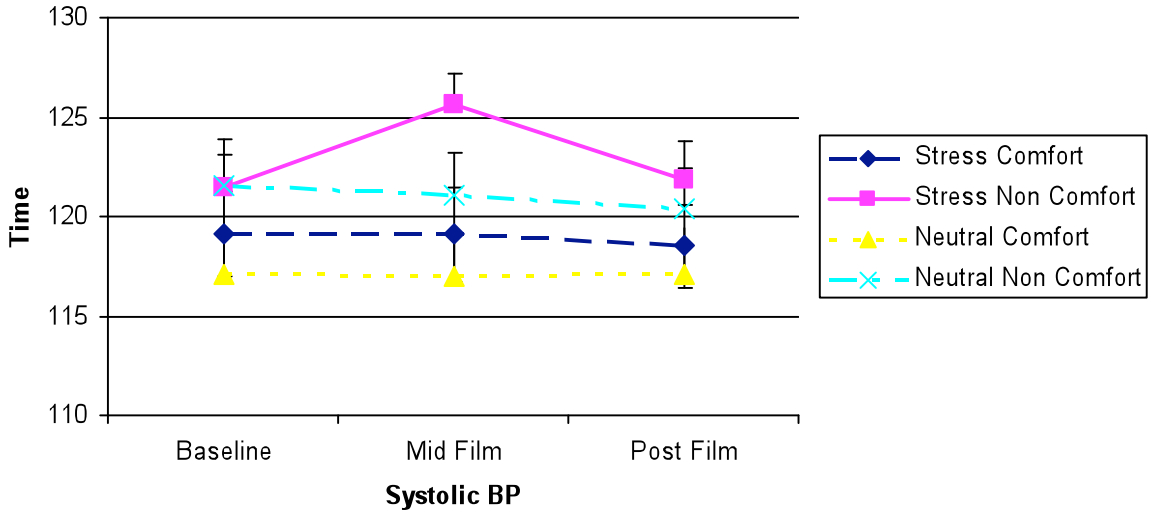


Figure 4. Diastolic Blood Pressure Change Over Time

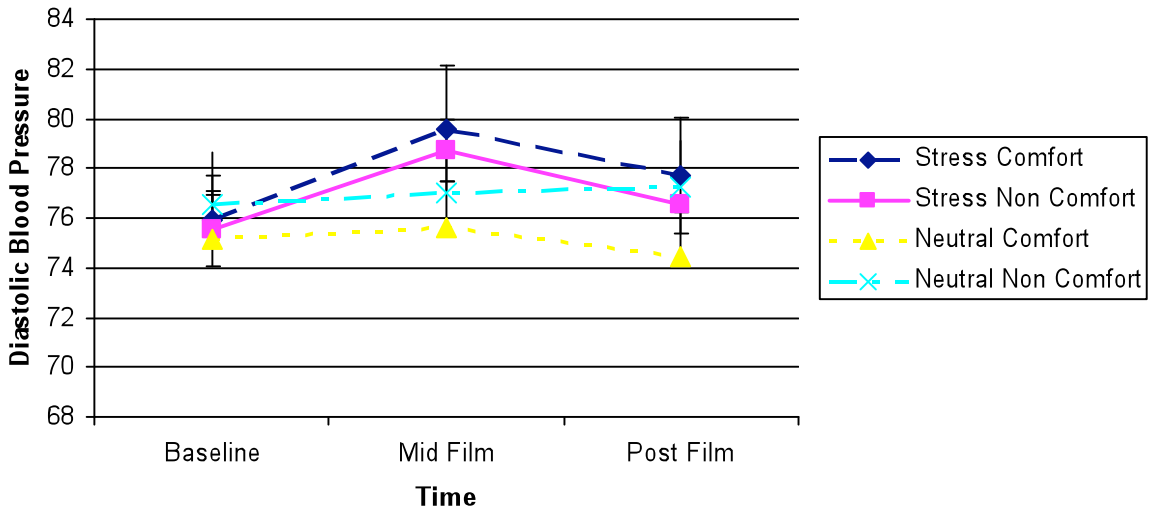


Figure 5. Emotional Eating and Attention in Stressful Film

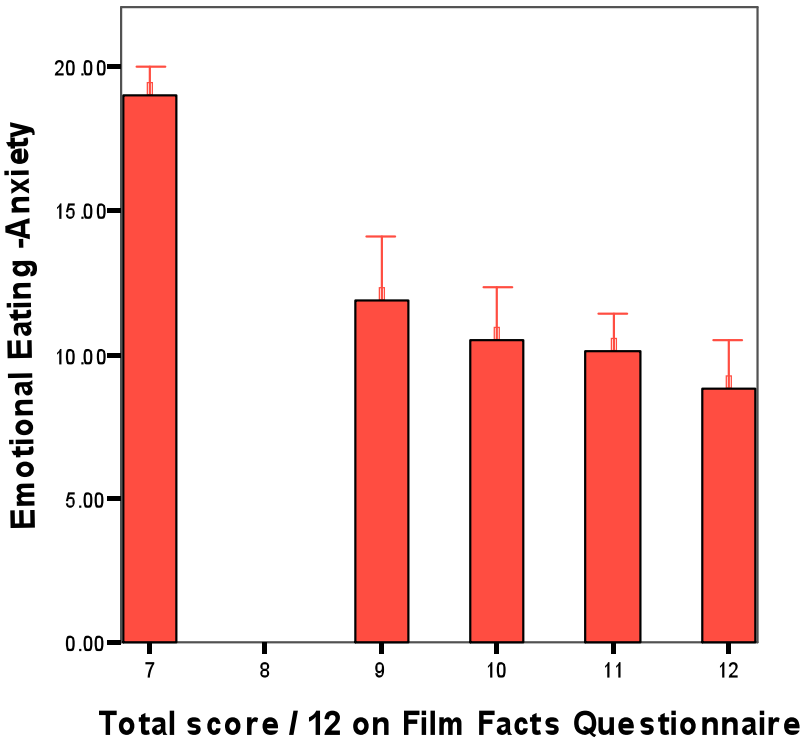

Emotional Eating -Anxiety
20.00
15.00
10.00
5.00
0.00
7
8
9
10
11
12
Total score / 12 on Film Facts Questionnaire

FIGURE 6. Mood Change During Film and Alexithymia

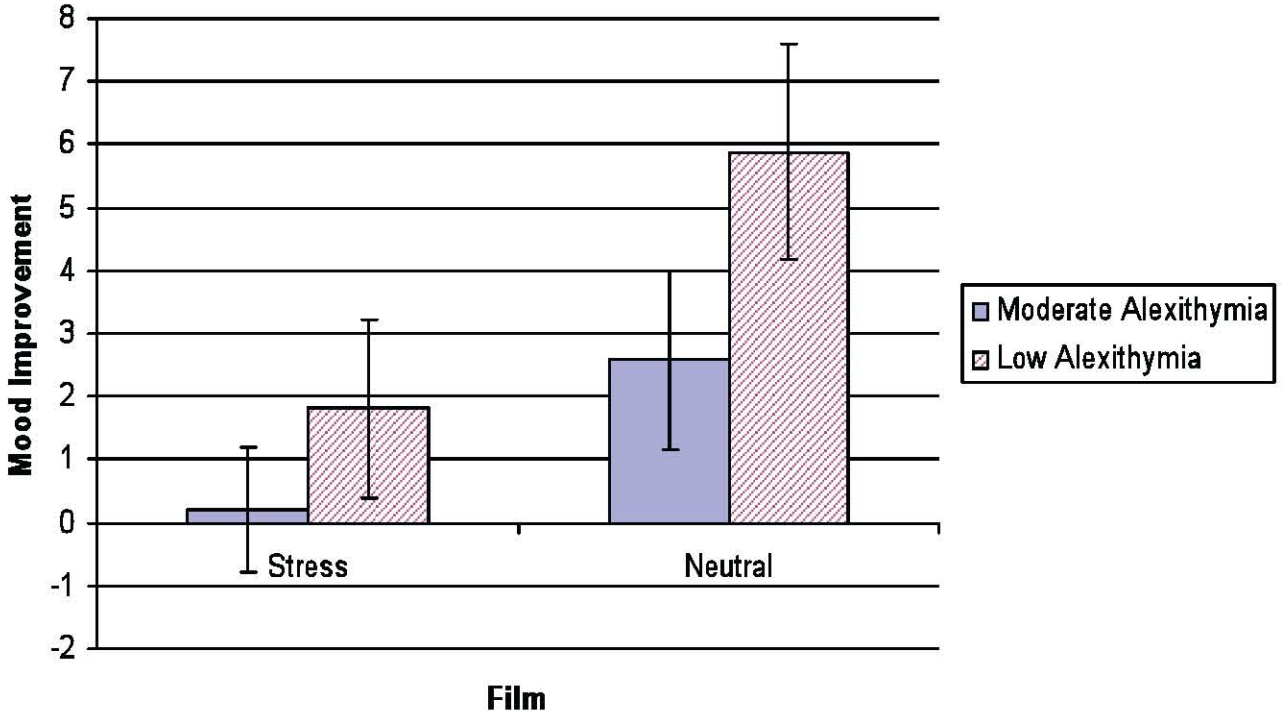


Figure 7. Systolic Blood Pressure Change by Film and Food

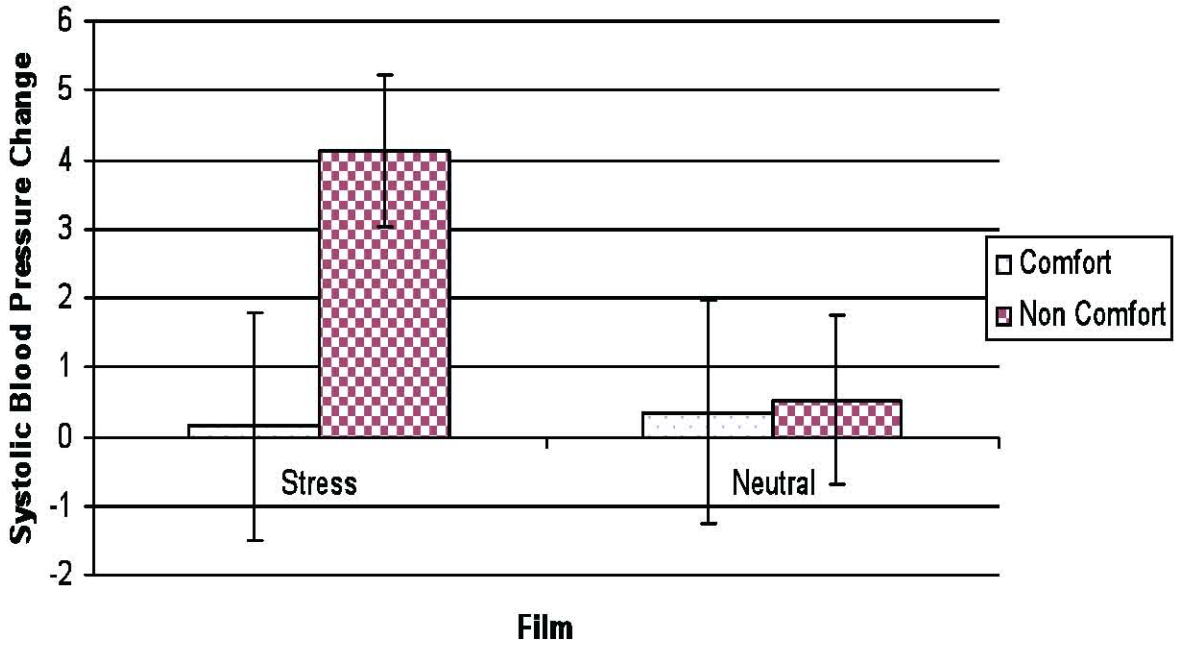


Figure 8. Diastolic Blood Pressure Change by Film and Food

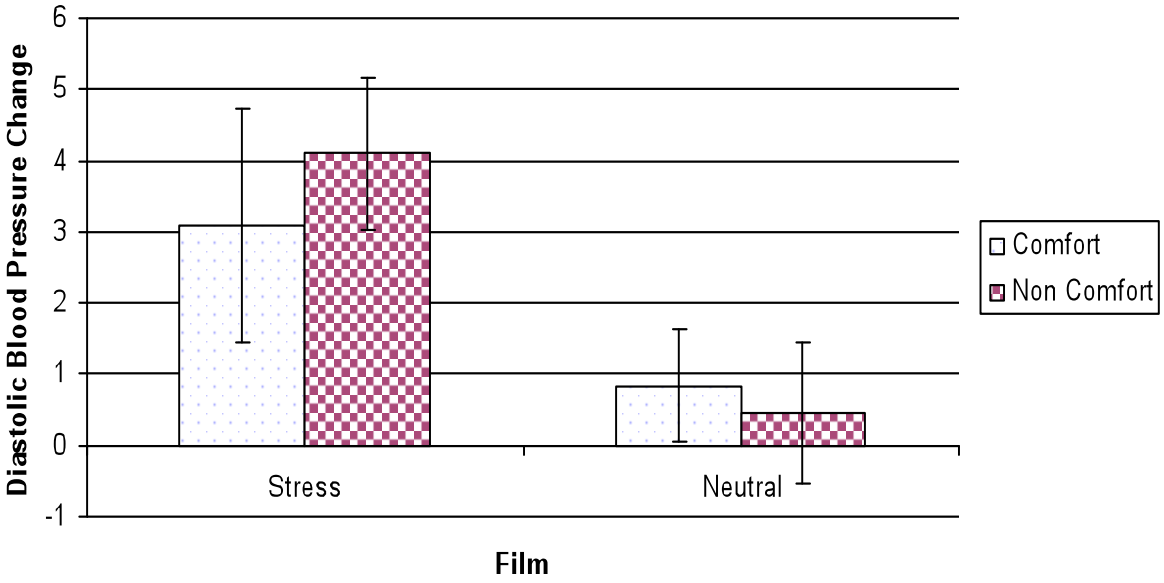


Figure 9. Mood Change by Food and Alexithymia

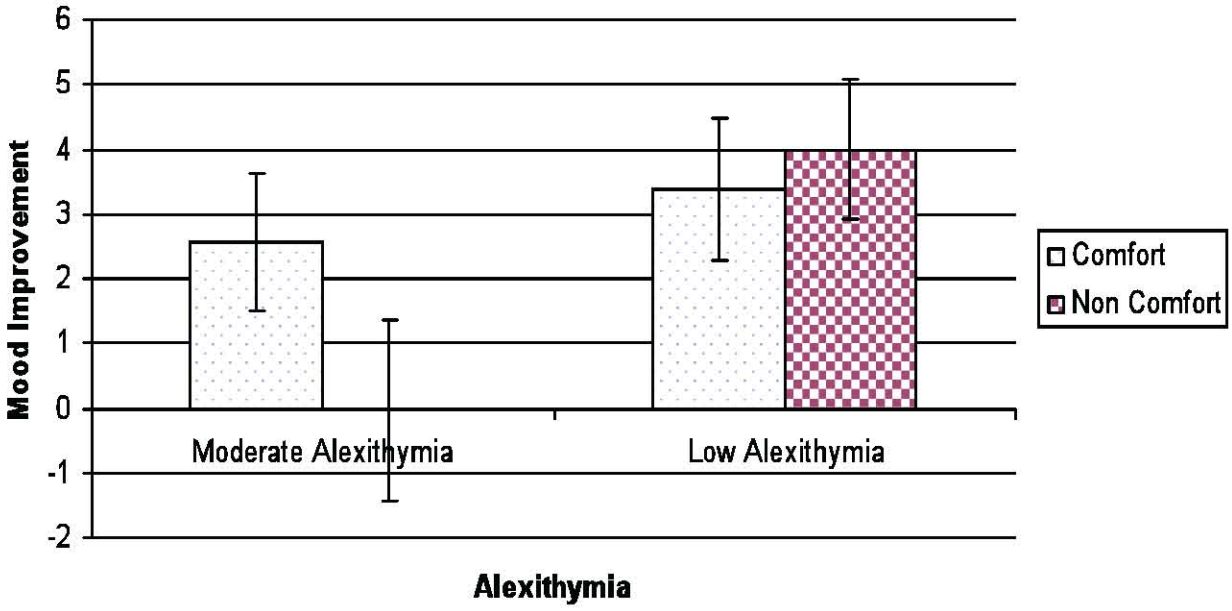
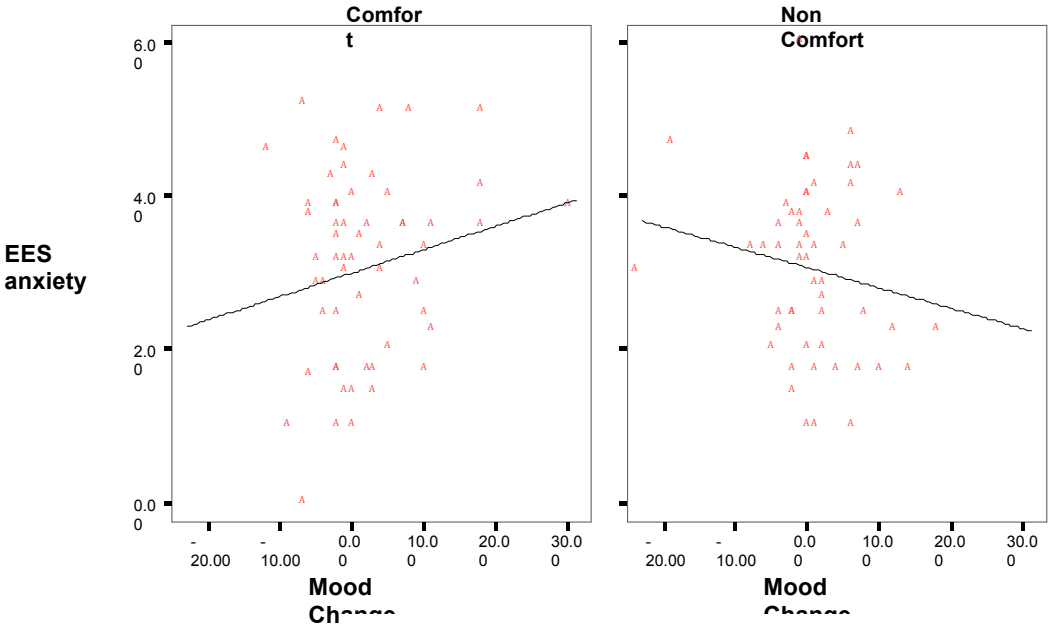


Figure 10. Mood Improvement by EES anxiety and Food



Linear Regression

→ Mood Improvement

List of Appendices

Appendix A: Advertisements

General Advertisement for Newspaper and Craig's list
Targeted Advertisement for Newspaper and Craig's list
General Advertisement for Flyer
Targeted Advertisement for Flyer

Seeking Volunteers

Women are needed for a study on eating and emotions. Must be non-smoking, and without major medical or mental health problems (ages 18 and up). Participation requires a single 1.5 hour visit to Uniformed Services University of the Health Sciences, during which you will watch a film segment, eat, and fill out questionnaires. Blood pressure, heart rate and body composition will be assessed. Participants will receive compensation and feedback on body composition. For more information please call Robyn Osborn at (301) 295-9664.

Emotional eaters needed

Women who eat when stressed are needed for a study on emotional eating. Must be non-smoking, and without major medical or mental health problems (ages 18 and up). Participation requires a single 1.5 hour visit to the Uniformed Services University of the Health Sciences, during which you will watch a stressful film segment, eat, and fill out questionnaires. Blood pressure, heart rate, and body composition will be assessed. Participants will receive compensation and feedback on body composition. For more information please call Robyn Osborn at (301) 295-9664.

Adult women are sought for a study on emotional eating. We are looking for women who eat when feeling stressed out or upset, who have no major medical or mental health problems, and are 18 or older.

The study requires:

- Single (1.5 hour) visit to the Uniformed Services University of the Health Sciences
- Watching a video clip (15 minutes)
- Eating small amount of food
- Assessment of body composition
- Filling out questionnaires

Participants will receive compensation for participation.

Contact Robyn Osborn at (301) 295-9664.

Emotional Eating 301-295-9664
Emotional Eating 301-295-9664
Emotional Eating 301-295-9664
Emotional Eating 301-295-9664
Emotional Eating 301-295-9664
Emotional Eating 301-295-9664
Emotional Eating 301-295-9664
Emotional Eating 301-295-9664
Emotional Eating 301-295-9664
Emotional Eating 301-295-9664

EATING AND EMOTIONS

Adult women are sought for a study on eating and emotions. We are looking for women who have no major medical or mental health problems (ages 18 and older).

The study requires:

- One (1.5 hr) visit to the Uniformed Services University of the Health Sciences
- Watching a video clip (15 minutes)
- Eating a small amount of food
- Assessment of body composition
- Filling out questionnaires

Participants will receive compensation, individualized feedback on their food intake, body composition, and metabolic rate.

Interested individuals please contact

Robyn Osborn at (301) 295-9664

Emotional Eating 301-295-9664 | Emotional Eating 301-295-9664 | Emotional Eating 301-295-9664 | Emotional Eating 301-295-9664 | Emotional Eating 301-295-9664 | Emotional Eating 301-295-9664 | Emotional Eating 301-295-9664 | Emotional Eating 301-295-9664

Appendix B: Resources and mental health options

All participants are being given this information on local resources where you can seek support services if you or someone you know may be interested.

Resources

The National Domestic Violence Hotline
Free, anonymous help available 24-hours a day, 365 days a year.
Help and information are available in English, Spanish, with access to more than 140 languages through interpreter services.
http://www.ndvh.org/index.php

1-800-799-SAFE (7233) OR 1-800-787-3224 (TTY)

Washington DC Mental Health Helpline
The DMH Access HelpLine is staffed by telephone counselors 24 hours a day, seven days a week, to help people of all ages.
1 (888) 793-4357 (7WE-HELP) for Mental Health Services

Meltzer Psychological Services Center
Affiliated with the George Washington University Department of Psychology
Offers a wide variety of low-fee mental health services to adults, adolescents, children, families, and couples in the Washington, DC area.

Counseling services include brief and long-term therapy for a wide variety of psychological disorders, relationship issues, and personal concerns.

(202)- 994-9072 OR
http://www.gwu.edu/~psycdept/view.cfm?page=services

James J. Gray Psychotherapy Training Clinic
Affiliated with the American University Department of Psychology
Sliding Fee Scale
Located at American University
4400 Massachusetts Avenue, NW
Washington DC 20016
202-885-1744

Afro American Counseling and Psychotherapy Institute, Inc.
The Montgomery Center
8630 Fenton Street
Suite 224
Silver Spring, MD 20910
(301) 495-0856

Corporate Office-Headquarters
1717 K Street, N.W.
Suite 600
Washington, D.C. 20036
(202) 723-0030

Counseling and support for African Americans
Fee for service and sliding scale
www.afroamericancounseling.com

Dr. Rachel Freedman
Licensed Clinical Psychologist
1350 Connecticut Avenue, NW
Suite 602
Washington DC 20036
301-529-6944
Sliding scale fee for service individual counseling

Suicide National Hotline
USA National Suicide Hotlines
Toll-Free / 24 hours / 7 days a week
1-800-SUICIDE
1-800-784-2433

1-800-273-TALK
1-800-273-8255

TTY: 1-800-799-4TTY (4889)

Appendix C: Self-Report Questionnaires

BDI-II (Beck, Steer & Brown,1996)
BAI (Beck & Steer, 1990)
EES (Arnow, Kenardy & Agras, 1995)
EDDS (i.e., Eating Screen) (Stice, 2000)
COPE (Carver, Scheier & Weintraub, 1989)
PANAS (Watson, Clark & Tellegen,1988)
POMS-SF (Curran, 1995; Shacham, 1983)
Three Factor Eating Questionnaire (Stunkard & Messick, 1985)
Toronto Alexithymia Scale-Revised (TAS-20) (Taylor, Bagby & Parker, 1992)
CHECK OUT QUESTIONNAIRE (designed for current study)
PERCEPTION OF FILM QUESTIONNAIRE (designed for current study)
STRESS FOOD QUESTIONNAIRE (designed for current study)
TASTE QUESTIONNAIRE (designed for current study)
EATING TYPICALITY SCALE (designed for current study)

BECK DEPRESSION INVENTORY

Instructions: This questionnaire consists of 21 groups of statements. Please read each group of statements carefully, and then pick out the one statement in each group that best describes the way you have been feeling during the past two weeks, including today. Circle the number beside the statement you have picked. If several statements in the group seem to apply equally well, circle the highest number for that group. Be sure that you do not choose more than one statement for any group, including Item 16 (Changes in sleeping Pattern) or Item 18 (Changes in Appetite).

1. Sadness

0 I do not feel sad

1 I feel sad much of the time.

2 I am sad all the time.

3 I am so sad or unhappy that I can't stand it.

2. Pessimism

0 I am not discouraged about my future.

1 I feel more discouraged about my future than I used to be

2 I do not expect things to work out for me.

3 I feel my future is hopeless and will only get worse.

3. Past Failure

0 I do not feel like a failure.

1 I have failed more than I should have.

2 As I look back, I see a lot of failures.

3 I feel I am a total failure as a person.

4. Loss of Pleasure

0 I get as much pleasure as I ever did from the things I enjoy.

1 I don't enjoy things as much as I used to.

2 I get very little pleasure from things I used to enjoy.

3 I can't get any pleasure from the things I used to enjoy.

4. Guilty Feelings

0 I don't feel particularly guilty.

1 I feel guilty over many things I have done or should

6. Punishment Feelings

0 I do not feel I am being punished.

1 I feel I may be punished.

2 I expect to be punished.

3 I feel I am being punished.

7. Self-Dislike

0 I feel the same about myself as ever.

1 I have lost confidence in myself.

2 I am disappointed in myself

3 I dislike myself.

8. Self-Criticalness

0 I don't criticize or blame myself more than usual.

1 I am more critical of myself than I used to be.

2 I criticize myself for all of my faults.

3 I blame myself for everything bad that happens.

9. Suicidal Thoughts or Wishes

0 I don't have any thoughts of killing myself.

1 I have thoughts of killing myself, but would not carry them out.

2 I would like to kill myself.

3 I would kill myself if I had the chance.

10. Crying

0 I don't cry any more than I used to.

1 I cry more than I used to.

2 I cry over every little thing.

have done.

2 I feel quite guilty most of the time.

3 I feel guilty all of the time.

3 I feel like crying, but I can't.

11. Agitation

0 I am no more restless or wound up than usual.

1 I feel more restless or wound up than usual.

2 I am so restless or agitated that it's hard to stay still

3 I am so restless or agitated that I have to keep moving or doing something.

12. Loss of Interest

0 I have not lost interest in other people or activities.

1 I am less interested in other people doing things than before.

2 I have lost most of my interest in other people or other things.

3 It's hard to get interested in anything.

13. Indecisiveness

0 I make decisions about as well as ever.

1 I fine it more difficult to make decisions than usual.

2 I have much greater difficulty in making decisions than I used to.

3 I have trouble making decisions.

14. Worthlessness

0 I do not feel I am worthless.

1 I don't consider myself as worthwhile & useful as I used to.

2 I feel more worthless as compared to other people.

3 I feel utterly worthless.

15. Loss of Energy

0 I have as much energy as ever.

1 I have less energy than I used to have.

2 I don't have enough energy to do very much.

3 I don't have enough energy to do anything.

17. Irritability

0 I am no more irritable than usual.

1 I am more irritable than usual.

2 I am much more irritable than usual.

3 I am irritable all the time.

18. Changes in Appetite.

0 I have not experienced any change in my appetite.

1a My appetite is somewhat less than usual.

1b My appetite is somewhat greater than usual.

2a My appetite is much less than before

2b My appetite is much greater than usual.

3a I have no appetite at all.

3b I crave food all of the time.

19. Concentration Difficult

0 I can concentrate as well as ever.

1 I can't concentrate as well as usual.

2 It's hard to keep my mind on anything for very long.

3 I find I can't concentrate on anything.

20. Tiredness or Fatigue

0 I am no more tired or fatigued than usual.

1 I get more tired or fatigued more easily than usual.

2 I am too tired or fatigued to do a lot of things I used to do.

3 I am too tired or fatigued to do most of the things I used to do.

21. Loss of Interest in Sex

0 I have not noticed any recent change in my interest in sex.

1 I am less interested in sex than I used to be.

2 I am much less interested in sex now.

3 I have lost interest in sex completely.

16. Changes in Sleep Pattern

0 I have not experienced any change in my sleeping pattern.

1a I sleep somewhat more than usual.

1b I sleep somewhat less than usual.

2a I sleep a lot more than usual.

2b I sleep a lot less than usual.

3a I sleep most of the day.

3b I wake up 1-2 hours early & can't get back to sleep.

Beck Anxiety Inventory

Below is a list of common symptoms of anxiety. Please carefully read each item in the list. Indicate how much you have been bothered by that symptom during the past month, including today, by circling the number in the corresponding space in the column next to each symptom.

	Not At All	Mildly but it didn't bother me much.	Moderately - it wasn't pleasant at times	Severely – it bothered me a lot
Numbness or tingling	0	1	2	3
Feeling hot	0	1	2	3
Wobbliness in legs	0	1	2	3
Unable to relax	0	1	2	3
Fear of worst happening	0	1	2	3
Dizzy or lightheaded	0	1	2	3
Heart pounding/racing	0	1	2	3
Unsteady	0	1	2	3
Terrified or afraid	0	1	2	3
Nervous	0	1	2	3
Feeling of choking	0	1	2	3
Hands trembling	0	1	2	3
Shaky / unsteady	0	1	2	3
Fear of losing control	0	1	2	3
Difficulty in breathing	0	1	2	3
Fear of dying	0	1	2	3
Scared	0	1	2	3
Indigestion	0	1	2	3
Faint / lightheaded	0	1	2	3
Face flushed	0	1	2	3
Hot/cold sweats	0	1	2	3

CODE _____

Emotional Eating Scale

We all respond to different emotions in different ways. Some types of feelings lead people to experience an urge to eat. Please indicate the extent to which the following feelings lead you to feel an urge to eat by checking the appropriate box.

	No Desire to Eat	A Small Desire to Eat	A Moderate Desire to Eat	A Strong Urge to Eat	An Overwhelming Urge to Eat
Resentful					
Discouraged					
Shaky					
Worn Out					
Inadequate					
Excited					
Rebellious					
Blue					
Jittery					
Sad					
Uneasy					
Irritated					
Jealous					
Worried					
Frustrated					
Lonely					
Furious					
On edge					
Confused					
Nervous					
Angry					
Guilty					
Bored					
Helpless					
Upset					

CODE _____

CODE _____

Eating Screen

Please carefully complete all questions.

Over the past 3 months . . .	Not at all		Slightly		Moderately		Extremely
1. Have you felt fat?	0	1	2	3	4	5	6
2. Have you had a definite fear that you might gain weight or become fat?	0	1	2	3	4	5	6
3. Has your weight influenced how you think about (judge) yourself as a person?	0	1	2	3	4	5	6
4. Has your shape influenced how you think about (judge) yourself as a person?	0	1	2	3	4	5	6

5. During the past 6 months have there been times when you felt you have eaten what other people would regard as an unusually large amount of food (e.g., a quart of ice cream) given the circumstances? YES NO
6. During the times when you ate an unusually large amount of food, did you experience a loss of control (feel you couldn't stop eating or control what or how much you were eating)? YES NO
7. How many DAYS per week on average over the past 6 MONTHS have you eaten an unusually large amount of food and experienced a loss of control? 0 1 2 3 4 5 6 7
8. How many TIMES per week on average over the past 3 MONTHS have you eaten an unusually large amount of food and experienced a loss of control? 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14

During these episodes of overeating and loss of control did you . . .

9. Eat much more rapidly than normal? YES NO
10. Eat until you felt uncomfortably full? YES NO
11. Eat large amounts of food when you didn't feel physically hungry? YES NO
12. Eat alone because you were embarrassed by how much you were eating? YES NO
13. Feel disgusted with yourself, depressed, or very guilty after overeating? YES NO
14. Feel very upset about your uncontrollable overeating or resulting weight gain? YES NO

15. How many times per week on average over the past 3 months have you made yourself vomit to prevent weight gain or counteract the effects of eating? 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
16. How many times per week on average over the past 3 months have you used laxatives or diuretics to prevent weight gain or counteract the effects of eating? 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
17. How many times per week on average over the past 3 months have you fasted (skipped at least 2 meals in a row) to prevent weight gain or counteract the effects of eating? 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
18. How many times per week on average over the past 3 months have you engaged in excessive exercise specifically to counteract the effects of overeating episodes? 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14

19. How much do you weigh? If uncertain, please give your best estimate. ___lb
20. How tall are you? __ft __in.
21. Over the past 3 months, how many menstrual periods have you missed? 1 2 3 4 *na*
22. Have you been taking birth control pills during the past 3 months? YES NO

COPE QUESTIONNAIRE

We are interested in how people respond when they confront difficult or stressful events in their lives. There are lots of ways to try to deal with stress. This questionnaire asks you to indicate what you *generally do and feel*, when you experience stressful events. Obviously, different events bring out somewhat different responses, but think about what you usually do when you are under a lot of stress.

Then respond to each of the following items by blackening one number on your answer sheet for each, using the response choices listed just below. Please try to respond to each item separately in your mind from each other item. Choose your answers thoughtfully, and make your answers as true FOR YOU as you can. Please answer every item. There are no "right" or "wrong" answers, so choose the most accurate answer for YOU--not what you think "most people" would say or do. Indicate what YOU usually do when YOU experience a stressful event. Circle the appropriate number under each question.

1 = I usually don't do this at all
2 = I usually do this a little bit
3 = I usually do this a medium amount
4 = I usually do this a lot

1. I try to grow as a person as a result of the experience.
   1 2 3 4

2. I turn to work or other substitute activities to take my mind off things.
   1 2 3 4

3. I get upset and let my emotions out.
   1 2 3 4

4. I try to get advice from someone about what to do.
   1 2 3 4

5. I concentrate my efforts on doing something about it.
   1 2 3 4

6. I say to myself "this isn't real."
   1 2 3 4

1 = I usually don't do this at all
2 = I usually do this a little bit
3 = I usually do this a medium amount
4 = I usually do this a lot

7. I put my trust in God.
   1 2 3 4

8. I laugh about the situation.
   1 2 3 4

9. I admit to myself that I can't deal with it, and quit trying.
   1 2 3 4

10. I restrain myself from doing anything too quickly.
    1 2 3 4

11. I discuss my feelings with someone.
    1 2 3 4

12. I use alcohol or drugs to make myself feel better.
    1 2 3 4

13. I get used to the idea that it happened.
    1 2 3 4

14. I talk to someone to find out more about the situation.
    1 2 3 4

15. I keep myself from getting distracted by other thoughts or activities.
    1 2 3 4

16. I daydream about things other than this.
    1 2 3 4

17. I get upset, and am really aware of it.
    1 2 3 4

18. I seek God's help.
    1 2 3 4

19. I make a plan of action.
    1 2 3 4

1 = I usually don't do this at all
2 = I usually do this a little bit
3 = I usually do this a medium amount
4 = I usually do this a lot

20. I make jokes about it.
    1 2 3 4

21. I accept that this has happened and that it can't be changed.
    1 2 3 4

22. I hold off doing anything about it until the situation permits.
    1 2 3 4

23. I try to get emotional support from friends or relatives.
    1 2 3 4

24. I just give up trying to reach my goal.
    1 2 3 4

25. I take additional action to try to get rid of the problem.
    1 2 3 4

26. I try to lose myself for a while by drinking alcohol or taking drugs.
    1 2 3 4

27. I refuse to believe that it has happened.
    1 2 3 4

28. I let my feelings out.
    1 2 3 4

29. I try to see it in a different light, to make it seem more positive.
    1 2 3 4

30. I talk to someone who could do something concrete about the problem.
    1 2 3 4

31. I sleep more than usual.
    1 2 3 4

32. I try to come up with a strategy about what to do.
    1 2 3 4

1 = I usually don't do this at all
2 = I usually do this a little bit
3 = I usually do this a medium amount
4 = I usually do this a lot

33. I focus on dealing with this problem, and if necessary let other things slide a little.
1 2 3 4

34. I get sympathy and understanding from someone.
1 2 3 4

35. I drink alcohol or take drugs, in order to think about it less.
1 2 3 4

36. I kid around about it.
1 2 3 4

37. I give up the attempt to get what I want.
1 2 3 4

38. I look for something good in what is happening.
1 2 3 4

39. I think about how I might best handle the problem.
1 2 3 4

40. I pretend that it hasn't really happened.
1 2 3 4

41. I make sure not to make matters worse by acting too soon.
1 2 3 4

42. I try hard to prevent other things from interfering with my efforts at dealing with this.
1 2 3 4

43. I go to movies or watch TV, to think about it less.
1 2 3 4

44. I accept the reality of the fact that it happened.
1 2 3 4

1 = I usually don't do this at all
2 = I usually do this a little bit
3 = I usually do this a medium amount
4 = I usually do this a lot

45. I ask people who have had similar experiences what they did.
1 2 3 4

46. I feel a lot of emotional distress and I find myself expressing those feelings a lot.
1 2 3 4

47. I take direct action to get around the problem.
1 2 3 4

48. I try to find comfort in my religion.
1 2 3 4

49. I force myself to wait for the right time to do something.
1 2 3 4

50. I make fun of the situation.
1 2 3 4

51. I reduce the amount of effort I'm putting into solving the problem.
1 2 3 4

52. I talk to someone about how I feel.
1 2 3 4

53. I use alcohol or drugs to help me get through it.
1 2 3 4

54. I learn to live with it.
1 2 3 4

55. I put aside other activities in order to concentrate on this.
1 2 3 4

56. I think hard about what steps to take.
1 2 3 4

1 = I usually don't do this at all
2 = I usually do this a little bit
3 = I usually do this a medium amount
4 = I usually do this a lot

57. I act as though it hasn't even happened.
1 2 3 4

58. I do what has to be done, one step at a time.
1 2 3 4

59. I learn something from the experience.
1 2 3 4

60. I pray more than usual.
1 2 3 4

CODE _____

PANAS

Directions

This scale consists of a number of words that describe different feelings and emotions. Read each item and then circle the appropriate answer next to that word. Indicate to what extent you have felt this way during the past week.

Use the following scale to record your answers.

(1) = Very slightly or not at all (2) = A little (3) = Moderately (4) = Quite a bit (5) = Extremely

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

DATE:_____

Below are words that describe feelings and moods people have. Please read EVERY word carefully. Select the answer which best describes how you feel AT THIS MOMENT by placing a check or X in the appropriate box.

FEELING/MOOD	Not at all	A little bit	Moderately	Quite a bit	Extremely
1. Worn-out					
2. Angry					
3. Tense					
4. Confused					
5. Lively					
6. Sad					
7. Fatigued					
8. Peeved					
9. On edge					
10. Unable to concentrate					
11. Active					
12. Blue					
13. Exhausted					
14. Grouchy					
15. Uneasy					
16. Bewildered					
17. Energetic					
18. Hopeless					
19. Weary					
20. Annoyed					
21. Restless					
22. Forgetful					
23. Cheerful					
24. Discouraged					
25. Bushed					
26. Resentful					
27. Nervous					
28. Uncertain about things					
29. Full of pep					
30. Miserable					
31. Bitter					
32. Anxious					
33. Vigorous					
34. Helpless					
35. Furious					
36. Worthless					
37. Unhappy					

FACTOR EATING QUESTIONNAIRE

Part I

Directions: Please answer the following questions by circling true or false.

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 have just finished a meal.	True	False	13. When I am with someone who is overeating, I usually overeat too.	True	False
2. I usually eat too much at social occasions, like parties and picnics.	True	False	14. I have a pretty good idea of the number of calories in common food.	True	False
3. I am usually so hungry that I eat more than three times a day.	True	False	15. Sometimes when I start eating, I just can't seem to stop.	True	False
4. When I have eaten my quota of calories, I am usually good about not eating any more.	True	False	16. It is not difficult for me to leave something on my plate.	True	False
5. Dieting is so hard for me because I just get too hungry.	True	False	17. At certain times of the day, I get hungry because I have gotten used to eating then.	True	False
6. I deliberately take small helpings as a means of controlling my weight.	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
7. Sometimes things just taste so good that I keep on eating even when I am no longer hungry.	True	False	19. Being with someone who is eating often makes me hungry enough to eat also.	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	20. When I feel blue, I often overeat.	True	False
9. When I feel anxious, I find myself eating.	True	False	21. I enjoy eating too much to spoil it by counting calories or watching my weight.	True	False
10. Life is too short to worry about dieting.	True	False	22. When I see a real delicacy, I often get so hungry that I have to eat right away.	True	False
11. Since my weight goes up and down, I have gone on reducing diets more than once.	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
12. I often feel so hungry that I just have to eat something.	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	32. I count calories as a conscious means of controlling my weight.	True	False
27. When I feel lonely, I console myself by eating.	True	False	33. I do not eat some foods because they make me fat.	True	False
28. I consciously hold back at meals in order not to gain weight.	True	False	34. I am always hungry enough to eat at any time.	True	False
29. I sometimes get very hungry late in the evening or at night.	True	False	35. I pay a great deal of attention to changes in my figure.	True	False
30. I eat anything I want, any time I want.	True	False	36. While on a diet, if I eat a food that is not allowed, I often then splurge and eat other high calorie foods.	True	False
31. Without even thinking about it, I take a long time to eat.	True	False			

Part II

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 you 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	seldom	usually	almost always

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

1	2	3	4
unlikely	slightly likely	moderately likely	very likely

45. Do you ever 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 likely	moderately likely	very likely

47. How frequently do you skip dessert because you are no longer hungry?

1	2	3	4
almost never	seldom a week	at least once day	almost every

48. How likely are you to consciously eat less than you want?

1	2	3	4
unlikely	slightly likely	moderately likely	very 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) and 5 means total restraint (constantly limiting food intake and never "giving in,") what number would you give yourself?

0	1	2	3	4	5
eat whatever you want, whenever you want it	usually eat whatever you want, whenever you want it	often eat whatever you want, whenever you want it	often limit food intake, but often "give in"	usually limit food intake, rarely "give in"	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 any number of things that happen during the day, by evening I have given up and eat what I want, promising myself to start dieting again tomorrow."

1	2	3	4
not like me	little like me	pretty good description of me	describes me perfectly

Date: **CODE:**

T A S – 20

Using the scale provided as a guide, indicate how much you agree or disagree with each of the following statements by circling the corresponding number. Give only one answer for each statement.

Circle 1 if you STRONGLY DISAGREE
Circle 2 if you MODERATELY DISAGREE
Circle 3 if you NEITHER DISAGREE NOR AGREE
Circle 4 if you MODERATELY AGREE
Circle 5 if you STRONGLY AGREE

	Strongly Disagree	Moderately Disagree	Neither Disagree Nor Agree	Moderately Agree	Strongly Agree
1. I am often confused about what emotion I am feeling.	1	2	3	4	5
2. It is difficult for me to find the right words for my feelings.	1	2	3	4	5
3. I have physical sensations that even doctors don't understand.	1	2	3	4	5
4. I am able to describe my feelings easily.	1	2	3	4	5
5. I prefer to analyze problems rather than just describe them.	1	2	3	4	5
6. When I am upset, I don't know if I am sad, frightened, or angry.	1	2	3	4	5
7. I am often puzzled by sensations in my body.	1	2	3	4	5
8. I prefer to just let things happen rather than to understand why they turned out that way.	1	2	3	4	5
9. I have feelings that I can't quite identify.	1	2	3	4	5
10. Being in touch with emotions is essential.	1	2	3	4	5

	Strongly Disagree	Moderately Disagree	Neither Disagree Nor Agree	Moderately Agree	Strongly Agree
11. I find it hard to describe how I feel about people.	1	2	3	4	5
12. People tell me to describe my feelings more.	1	2	3	4	5
13. I don't know what's going on inside me.	1	2	3	4	5
14. I often don't know why I am angry.	1	2	3	4	5
15. I prefer talking to people about their daily activities rather than their feelings.	1	2	3	4	5
16. I prefer to watch "light" entertainment shows rather than psychological dramas	1	2	3	4	5
17. It is difficult for me to reveal my innermost feelings, even to close friends.	1	2	3	4	5
18. I can feel close to someone, even in moments of silence.	1	2	3	4	5
19. I find examination of my feelings useful in solving personal problems.	1	2	3	4	5
20. Looking for hidden meanings in movies or plays distracts from their enjoyment.	1	2	3	4	5

STRESS FOOD CHOICES QUESTIONNAIRE

1) Do you ever eat when you feel stressed? **YES** **or** **NO**

If YES, please indicate which of the following foods you would most likely want to eat when you are feeling stressed.
Please check all that apply.

Sweets
a)_____ Chocolate
b)_____ Cake, any kind
c)_____ Cookies, any kind
d)_____ Candy, sweet
e)_____ Candy, sour
f)_____ Ice Cream, any kind

Savory
g)_____ Potato Chips
h)_____ French Fries
i)_____ Crackers
j)_____ Fried food, any kind
k)_____ Burgers
l)_____ Pizza

Other
m)_____ Alcohol, any kind
n) _____ Cigarettes

2) If you were unable to eat your preferred food during a stressful time, would you still eat something? YES or NO

3) Please write down any additional foods or drinks that you would like to eat when you are feeling stressed.

_____

PLEASE CIRCLE THE NUMBER OF YOUR ANSWER CHOICE:

How much do you like or dislike the food you just ate?

9	8	7	6	5	4	3	2	1
Like extremely	Like very much	Like moderately	Like slightly	Neither	Dislike slightly	Dislike moderately	Dislike very much	Dislike extremely

PLEASE PUT AN "X" IN THE BOX FOR YOUR ANSWER CHOICE:

	Extremely	Very much	Moderately	Slightly	Not at all	Not Applicable
How similar is the eating you just completed to a normal snack you might eat at home?						
How similar is the eating you just completed to a snack you might eat when stressed at home or work?						
How similar is the type of food you just ate to the type of food you would choose to eat when stressed?						
How similar is the amount of food you just ate to the amount you eat when you feel stressed?						
How similar was your mood while you were just eating to your usual mood when you eat when stressed?						

Perceptions of the Film Questionnaire CODE _____

Please CIRCLE one choice for each question

1) How stressed out did you feel while watching the film segment?

0 1 2 3 4 5 6 7

(not at all) (extremely)

2) How sad did you feel while watching the film segment?

0 1 2 3 4 5 6 7

(not at all) (extremely)

3) How much anxiety did you feel while watching the film segment?

0 1 2 3 4 5 6 7

(not at all) (extremely)

4) How angry did you feel while watching the film segment?

0 1 2 3 4 5 6 7

(not at all) (extremely)

5) How likely is it that you would have continued to watch this film if you were not in the laboratory setting?

0 1 2 3 4 5 6 7

(not at all) (extremely)

4) Had you ever seen this movie before? (Circle one) Yes OR No

CODE _____ **Film questionnaire: STR**
Please circle one response for each question

1) Near the beginning of the film clip, Buck comes home angry because:

   a) He can't find work
   b) He missed dinner
   c) The team he bet on lost the game
   d) He had a flat tire

2) What state do Tracey and Buck move to at the beginning of the film clip to save money, so he can "work with the guys"?

   a) Georgia
   b) Florida
   c) Texas
   d) Mississippi

3) What style shirts are most of the guys wearing during the poker game?

   a) Striped
   b) Tank tops
   c) Plaid button down shirts
   d) Their not wearing shirts

4) What is the room number in the motel where Buck is playing poker?

   a) 300
   b) 140
   c) 200
   d) 001

5) What food is Tracey eating when at the motel when he yells at her and the baby?

   a) fried chicken
   b) hamburgers
   c) candy
   d) ice cream

6) When Tracey runs away to stay with a friend, she travels to what state?

   a) New Hampshire
   b) Connecticut
   c) Maine
   d) Rhode Island

7) What chore is Tracey doing when Buck surprises her at her friend's home?

a) ironing
b) cooking
c) dishes
d) laundry

8) Buck is mad at Tracey when they are in the police department because …

a) She stole his car
b) He wants to see his son and get back together with her
c) He needs money
d) She took his wallet

9) Tracey held a job at the….

a) Laundry mat
b) Bank
c) Day care
d) Diner

10) When Buck takes the baby out of the house and runs away, he goes to the _____, where the police find him and pick him up.

a) The diner
b) The movie theatre
c) The YMCA
d) The park

11) At the police station, the police officers respond to Tracey's call by…

a) Arresting Buck and putting him in jail
b) Arresting Tracey and putting her in jail
c) Telling Tracey she should help calm him down
d) Telling Buck that he should leave the state

12) At the end of the clip, Tracey talks to Buck and tells him:

a) She will never get back together with him
b) They can talk about getting back together
c) She wants a divorce
d) She is moving out of state

CODE _____ **Film questionnaire: NEU**
Please circle one response for each question

1) Near the beginning of the film clip, Bobbie describes this type of pocket…

a. Single faced pocket
b. Double faced pocket
c. Round faced pocket
d. Face front pocket

2) Bobbie uses her own dress as an example of a pocket. She describes her dress as this type of fabric…

a. Cotton
b. Raw silk
c. Wool Crepe
d. Polyester

3) She uses a particular grid pattern when designing the pocket. She recommends drawing the grid 1 inch above the opening of the pocket. How long is the actual opening of the pocket she describes?

a. 5 inches
b. 6 ½ inches
c. 12 inches
d. 2 inches

4) What is the color scheme of the dress she wore during the lesson?

a. Green and purple
b. Red and yellow
c. Red, green, white
d. Black and blue

5) What is on the wall behind Bobbie during her lesson on button holes?

a. Artwork
b. Pictures of models
c. Patterns
d. A window

6) What is the color of the fabric she uses to demonstrate the pocket opening?
a. Blue plaid
b. Green polka dots
c. Yellow
d. Black

7) There is a dress on a mannequin behind Bobbie during the lesson. What color is the dress on the mannequin?

    a. Red
    b. Blue
    c. White
    d. Purple

8) What color is the iron Bobbie uses throughout the video clip
    a. Red and white
    b. Green and white
    c. Black
    d. Blue and Black

9) Bobbie is wearing two rings. One is a band and the other is….
    a. A big pearl with diamonds
    b. A diamond with gold
    c. Black onyx with cameo style
    d. Jade with blue turquoise

10) Bobbie suggests using this method to help keep 2 fabrics acting as 1, to prevent slipping…

    a. Steaming it closed
    b. A light press
    c. Tape
    d. Fabric glue

11) Basting stitches are used to...

    a. Secure the pocket on tightly
    b. Remove the top stitches
    c. Eliminate the need for top stitches
    d. Provide a guide for top stitches

12) This kind of pocket is….
    a. Almost never noticeable
    b. Can always be seen if done correctly
    c. Doesn't hold anything
    d. Is very deep to hold lots of items

Check-out Questionnaire

The purpose of the present study was most likely: (**PLEASE CHECK ONE**)

1. To examine the effects of stress on blood pressure _____
2. To examine the effects of sadness on blood pressure ____
3. To examine the effects of sadness on eating ____
4. To examine the effects of stress on eating ____
5. To examine the effects of eating on mood _____
6. To examine the effects of mood on eating _____
7. Other ? _____

How many calories do you think you were asked to eat during the film? _____

Are you currently menstruating? **YES or NO**

Food Rating Sheet CODE_____

1. How sweet was the food you were asked to eat?

0 1 2 3 4 5 6 7

(not at all) (extremely)

2. How flavorful was the food you were asked to eat?

0 1 2 3 4 5 6 7

(not at all) (extremely)

3. How much did you like the food you were asked to eat?

0 1 2 3 4 5 6 7

(not at all) (extremely)

4. If you could eat more of the food you just ate, how much do you think you would eat?

0 1 2 3 4 5 6 7

(none) (A lot more)

Hunger Rating Sheet

1. Before arriving today, about how many hours ago did you eat something?
_____

2. How hungry are you at this moment?

0 1 2 3 4 5 6 7

(not at all) (extremely)

2. How much would you like to eat at this moment?

0 1 2 3 4 5 6 7

(not at all) (extremely)

EATING TYPICALITY SCALE CODE_____

PLEASE CIRCLE THE NUMBER OF YOUR ANSWER CHOICE:

How much do you like or dislike the food you just ate?

9	8	7	6	5	4	3	2	1
Like extremely	Like very much	Like moderately	Like slightly	Neither	Dislike slightly	Dislike moderately	Dislike very much	Dislike extremely

PLEASE PUT AN "X" IN THE BOX FOR YOUR ANSWER CHOICE:

	Extremely	Very much	Moderately	Slightly	Not at all	Don't know
How similar is the eating you just completed to a normal snack you might eat at home?						
How similar is the eating you just completed to a snack you might eat when stressed at home or work?						
How similar is the type of food you just ate to the type of food you would choose to eat when stressed?						
How similar is the amount of food you just ate to the amount you eat when you feel stressed?						
How similar was your mood while you were just eating to your usual mood when you eat when stressed?						

Appendix D: Demographics and Medical History Questionnaires

DEMOGRAPHICS **CODE _____**
DATE:_____

Date of Birth _____ **Age**: _____
Height_____ **Weight**: _____

Ethnicity:
Please check one or more.

_____ Caucasian
_____ African
_____ Hispanic or Latino
_____ American Indian
_____ Other _____
_____Black or African American, Non-Hispanic
_____West Indian or Caribbean
_____Asian
_____Native Hawaiian or other Pacific Islander
_____Alaskan Native

Marital Status:
Please check one.

_____Single, Never Married
_____Married
_____Divorced
_____Separated
_____Widowed
_____Living Together

Education:
Please check one.

_____Some high school
_____Competed high school/GED
_____Some College
_____Completed College
_____Partial Graduate/Professional school
_____Complete Graduate/Professional school

Occupation: _____

Employment Status:
Please check one.

_____Retired
_____Full-time
_____Part-time
_____Homemaker
_____Disabled
_____Unemployed

Annual Household Income:
Please check next to the amount that most closely indicates your total yearly household income.

_____Below $20,000
_____$20,000-$30,000
_____$30,000-$40, 000
_____$40,000-$50,000
_____$50,000-$60,000
_____$60,000-$70,000
_____Above $70,000

Appendix E: Informed Consent form

Consent for Participation in a Research Study

Title of Project: Understanding the function of emotional eating: Does it buffer the stress response and help us cope?"

Principal Investigator: Robyn L. Osborn, MA, MS

TO PERSONS WHO AGREE TO PARTICIPATE IN THIS STUDY:

The following information is provided to inform you about the research project and your participation in it. Please read this form carefully and feel free to ask any questions you may have about this study and/or about the information given below.

It is important that you understand that your participation in this study is totally voluntary. **You may refuse to participate or choose to withdraw from this study at any time**.

If, during the course of the study, you should have any questions about the study or your participation in it, you may contact:

Robyn Osborn, M.A., M.S. at 301-295-9664
Department of Medical & Clinical Psychology, USUHS, Bethesda, MD 20814-4799

Tracy Sbrocco, Ph.D. at 301-295-9674

Department of Medical & Clinical Psychology, USUHS, Bethesda, MD 20814-4799

Office of Research at (301) 295-3303

USUHS, Bethesda, Maryland 20814

1. INDICATED BELOW ARE THE FOLLOWING:
- **a. THE PURPOSE OF THIS STUDY**
- **b. THE PROCEDURES TO BE FOLLOWED**
- **c. THE APPROXIMATE DURATION OF THE STUDY**

1a. THE PURPOSE OF THIS STUDY:

An estimated 127 million adults in the United States are overweight, 60 million are obese, and 9 million are severely obese (Ogden et al., 2006). These individuals are at a substantially increased risk of morbidity from hypertension, type 2 diabetes, coronary artery

disease, stroke, dyslipidemia, and cancer. Of the nearly 64% of American who are overweight the majority, between 60-90%, report significant problems with emotional eating (Ganley, 1989). A significant number (15-50%) of these emotional eaters seeking weight loss treatment meet criteria for Binge Eating Disorder (BED) (APA, 2000). However, emotional eaters who do not meet BED criteria are an understudied group. The purpose of the proposed project is to compare the effectiveness of eating in managing acute stress and to determine how eating may relate to coping styles.

If you agree to participate in this study, you will be asked to watch a video segment, which may contain stressful footage. You also will be asked to eat. Your mood, heart rate, blood pressure, and galvanic skin response (sweat production) will be monitored. You will be asked to fill out a series of questionnaires as well. The information from these assessments will be measured and the relationship between likelihood to emotionally eat and these outcomes will be assessed.

1b. THE PROCEDURES TO BE FOLLOWED:

Individuals meeting a certain weight range and meeting other criteria (see inclusion and exclusion criteria listed below) will be asked to participate in the study.

Inclusion criteria:

- Adult female aged at least 18 years
- Overweight (BMI >= 25)
- No major medical or mental health conditions

Exclusion criteria:

- History of heart disease
- Diabetes
- Pregnancy
- Mental Health Disorders
- History of thyroid disease
- Current tobacco use
- Current use of anti-depressant of anti-psychotic medication
- Uncontrolled hypertension
- History of major medical condition (such as stroke)
- Current use of medications for psychological disorder (e.g., antidepressants)
- Food allergies to chocolate, grapes, or peanuts
- Lactose intolerance
- History of exposure to domestic violence

Participation in this study includes a single 1-2 hour visit to the Uniformed Services University. The summary of the study can be found below. Each of the sections will be discussed further in the next sections.

Step	Description	Time
Phone Screen	1. Phone Screen a. Inclusion/Exclusion determination b. Categorization based on emotional eating style 2. Schedule for Visit	30 min.
Visit to University	1. Study description and Informed Consent Form (20 min) 2. Height, weight, and body composition (5 – 10min) 3. Baseline questionnaires on mood (5-10 min) 4. Film and eating (11 min) 5. Completion of questionnaires on mood and check-out questionnaires (10-20 min) 8. Debriefing and payment (5-10 min)	56 - 81 minutes
	Total Time:	86-111 minutes

Visit to University

Your on site visit will take from 1 hour – 2 hours. At this visit, we will measure your height, weight, and body composition. The body composition test allows us to calculate how much body fat and muscle you have. You will simply step onto a scale wearing no shoes and a quick, painless measurement is taken. You will not feel the measurement and it is in no way harmful to you.

During this visit we will ask you to watch a video clip, about 11 minutes long. During the videos, you will be asked to eat some food. The food may be a sweet, such as chocolate, or fruits, such as grapes. You will be asked to eat approximately 300 calories of either food, which is the equivalent of 2.5 cups of grapes or 1/3 of a cup of M&Ms.

We will also take several physiological measures during your time here. Specifically, we will measure your heart rate, blood pressure, and galvanic skin response (essentially sweat production) at approximately 3 minute intervals throughout the study duration. These measurements will be taken by connecting you to a blood pressure cuff and some small electrodes worn on your fingers. The measurements are painless and in no way harmful to you.

We also will be asking you to fill out some questionnaires that will provide us information on your lifestyle, background and medical history. Please note that in filling out the medical history form, you are free to answer the questions that you feel comfortable responding to, as well as to skip questions that make you feel uncomfortable.

1c. DURATION OF THE STUDY

The total time you will spend participating will range from approximately 1.5 hours to approximately 2 hours.

2. THIS STUDY IS BEING DONE SOLELY FOR THE PURPOSES OF RESEARCH.

3. DISCOMFORTS AND/OR RISKS THAT CAN BE REASONABLY EXPECTED ARE:

a. The risks associated with this study are minor. You may find the questionnaires ask questions that may make you uncomfortable. You will NOT be forced to do anything you do not want to do. You may feel free to skip questions at any time. Also, you may decline to participate at any time and/or withdraw your participation at any time.

b. You may experience discomfort while watching the video segment because it may contain footage of a domestic violence scene. If this segment contains information that is too disturbing, you may discontinue participation at ANY time.

c. During this study you will be asked to eat one of two types of food: either chocolate or grapes. Although the foods have been chosen because they are generally considered good tasting, you may not like the foods chosen. In the event that you do not like the foods you are asked to eat, you have the right to refuse to eat the food. Also, if you are currently dieting, you may experience guilt related to eating the food chosen for you. Because the amount you are asked to eat is relatively small, it is not expected that you will experience any sort of extreme reaction to eating, however you do have the right to refuse to eat the food if you feel that it would cause you to experience negative emotions.

d. You will be connected to a machine to monitor your blood pressure, heart rate, and galvanic skin response for the duration of the study. It is possible that you will experience discomfort due to the repeated measurement of blood pressure. If you do experience pain or discomfort, you may remove the equipment and discontinue participation at any time.

d. Research designs often require that the full intent of the study not be explained prior to participation. Although we have described the general nature of the tasks that you will be asked to perform, the full intent of the study will not be explained to you until after the completion of the study. At that time, we will provide you with a full debriefing which will include an explanation of the hypothesis that was tested and other relevant background information pertaining to the study. You will also be given an opportunity to ask any questions you might have about the hypothesis and the procedures used in the study.

4. POSSIBLE BENEFITS TO YOU THAT MAY BE REASONABLY EXPECTED ARE:

You may gain a better understanding of your body composition, specifically your body fat percentage and your percentage of lean muscle and total body water. The testing is conducted at no charge and you will be provided with the results of your body composition assessment. Through completing this study, you will be providing information that will be helpful in expanding scientific knowledge about eating behavior and emotions. The results of this study will help us gain a better understanding of how emotions affect eating and how these factors may relate to overweight and obesity. Our ultimate long term goal is to gain a better understanding of what factors are associated with overeating and successful weight loss and/or maintenance.

5. ALTERNATE PROCEDURES THAT MAY BE ADVANTAGEOUS:

There are many commercial programs available for assessing body composition. Other commercial methods for assessing your eating patterns and your body composition include visiting licensed nutritionists.

6. PRIVACY AND CONFIDENTIALITY:

All information you provide as part of this study will be confidential and will be protected to the fullest extent provided by law. Information that you provide and other records related to this study will be accessible to those persons directly involved in conducting this study and members of the Uniformed Services University of the Health Sciences Institutional Review Board (IRB), which provides oversight for protection of human research volunteers. All questionnaires, forms and charts will be kept in a restricted access, locked cabinet while not in use. To enhance the privacy of the answers you provide, data from questionnaires will be entered into a database in which individual responses are not identified. After verification of the database information, paper copies of the questionnaires containing identifiers will be shredded. If you are a military member, please be advised that under Federal Law, a military member's confidentiality cannot be strictly guaranteed.

Note: YOU ARE FREE TO WITHDRAW THIS CONSENT AND TO STOP PARTICIPATING IN THIS STUDY OR ANY ACTIVITY AT ANY TIME FOR ANY REASON.

7. COMPENSATION

The testing is conducted at no charge. You will be paid $50 for completing this study. You will also be given information on your body composition (body fat percentage).

8. RECOURSE IN THE EVENT OF INJURY:

This study should not entail any physical or mental risk beyond those described above. We do not expect complications to occur, but if, for any reason, you feel that continuing this study would constitute a hardship for you, we will end your participation in the study.

In the event of a medical emergency while participating in this study or medical treatment required as a result of your participation in this study, you may receive emergency treatment in the facility you are in or a nearby Department of Defense (military) medical facility (hospital or clinic). Treatment/care will be provided even if you are not eligible to receive such care. Care will be continued until the medical doctor treating you decides that you are out of immediate danger. If you are not entitled to care in a military facility, you may be transferred to a private civilian hospital. The attending doctor or member of the hospital staff will go over the transfer decision with you before it happens. The military will bill your health insurance for health care you receive which is not part of the study. You will not be personally billed and you WILL NOT be expected to pay for medical care at our hospitals. If you are required to pay a deductible you may make a claim for reimbursement through the Uniformed Services University Office of General Counsel.

In case you need additional care following discharge from the military hospital or clinic, a military health care professional will decide whether your need for care is directly related to being in the study. If your need for care is related to the study, the military may offer you limited health care at its medical facilities. This additional care is not automatic.

If at any time you believe you have suffered an injury or illness as a result of participating in this research project, you should contact the Office of Research at the Uniformed Services University of the Health Sciences, Bethesda, Maryland 20814-4799 at (301) 295-3303. This office can review the matter with you, can provide information about your rights as a subject, and may be able to identify resources available to you. If you believe the government or one of the government's employees (such as a military doctor) has injured you, a claim for damages (money) against the federal government (including the military) may be filed under the Federal Torts Claims Act. Information about judicial avenues of compensation is available from the University's General Counsel at (301) 295-3028.

Should you have any questions at any time about the study you may contact the principal investigator, **Robyn L Osborn, M.A., M.S., Department of Medical & Clinical Psychology, USUHS, Bethesda, MD 20814-4799, at 301-295-9664.**

STATEMENT BY PERSON AGREEING TO PARTICIPATE IN THIS RESEARCH PROJECT:

I have read this consent form and I understand the procedures to be used in this study and the possible risks, inconveniences, and/or discomforts that may be involved. All of my questions have been answered. I freely and voluntarily choose to participate. I understand I may withdraw at any time. My signature also indicates that I have received a copy of this consent form for my information.

SIGNATURES:

_____	_____
Signature of Witness	**Signature of Volunteer**
_____	_____
Witness Name (Printed)	**Volunteer Name (Printed)**
Date_____	**Date**_____

I certify that I or my research staff have explained the research study to the above individual,, and that the individual understands the nature and purpose, the possible risks and benefits associated in taking part in this research study. Any questions that have been raised, have been answered.

Investigator's or Designee's Signature _____

Printed Name _____

Appendix F: Payment information form

PAYMENT INFORMATION FORM

Name _____

Address _____

City _____ State _____ Zip Code _____

Home phone _____ Work Phone _____

E-mail _____ Alt. Phone _____

Social Security Number (required for payment): _____-_____-_____

Appendix G: Phone Screen Script

Script for Phone Screen

"Hello, my name is _____. I am calling you back regarding the eating and metabolism study. Do you have about 30 minutes to go through the screening process right now?"

If no: "When can I call you back?"
If yes: *go on*

"I'd like to tell you a few things about the study first and then I'll be glad to answer any questions that you might have, OK? This study is designed to compare emotional eaters with non-emotional eaters on several different outcomes. Emotional eaters are people who eat in response to stress or negative mood, and we are interested in understanding how different eating behaviors affect a number of different variables.

If you are eligible and agree to participate, you will be assigned to an eating condition that may include eating snack food items or fruit. In either group, you will be asked to fill out several questionnaires and you will be asked to eat the food that is presented to you. We will only meet once and this meeting should last about 1 and a half hours. You will be asked to eat a normal meal 4 hours prior to arriving at the study, however we don't want you to eat within that 4 hour time period before the study.

During the study we may ask you to watch a segment of a made-for-tv movie that contains footage related to domestic violence. Some individuals find this footage distressing. The footage you will see has been aired on the cable television station *Lifetime* and it is not expected that you will experience any long-term consequences from watching the video segment. However, it is important that you are aware that this video may be part of the study and if you feel that you would rather not watch the video, you may choose not to participate. If you do decide to participate and you then decide during the video segment that you would rather discontinue your participation in the study, you may feel free to leave at any time without consequence. Your participation in this study is entirely voluntary.

We are located at the Uniformed Services University, which is near the National Naval Medical Center and across the street from NIH in Bethesda, Maryland. The study is being run by a senior graduate student who has a Master's Degree in Clinical Psychology and has had over 5 years of experience in working with individuals with a variety of eating patterns.

If you complete all of this, you will be paid $50. Since we need all of the information requested in order to use your data, you will have to complete all parts of the study before you will be paid.

Does this sound like something you would be interested in?"

If no: "Thank you for your interest."
If yes: "Do you have any questions about the study?

Ok, now I will need to ask you some questions to see if you meet criteria for this study."

COMPLETE PHONE SCREEN.

If the caller does not meet requirements: "I am sorry, but you do not meet the requirements for this study. This doesn't mean that there is something wrong with you, it simply means that we are looking at very specific things. It is very important for research purposes that our groups look as similar to each other as possible.

Thank you for you interest."

If caller meets requirement: "Do you have any questions?"

"I am pleased to inform you that you meet the requirements for this study. We can schedule your appointment now."

"When you come in for your appointment, we would like you to come to USUHS to participate. The room is located in Building B. You can park in the school's underground parking garage for free. Due to heightened security, you must bring a picture ID with you in order to get on base. We will also need to add your name to the visitors list. When you arrive, simply show the guard at the gate your ID and state your name. (Collect pertinent contact information.) Thank you in advance for your participation."

PHONE SCREEN

Interviewer: _____
Date:_____

1. Are you in the military? YES NO
2. How did you hear about the study?_____
3. Age_____
5. Height_____ inches 6. Weight_____ pounds
6. Do you smoke? YES NO
   If yes → exclude from study
7. Do you eat milk chocolate? YES NO
8. Do you eat fruit, such as grapes? YES NO

9. Have you been told by a physician that you had:
   A. Hypertension YES NO
      If yes → is your hypertension controlled? YES NO
      If no → exclude from study
   B. Heart Disease/Problems YES NO
   C. High Blood Sugar/Diabetes YES NO
   D. Thyroid Disease YES NO
   E. Major Medical Problems (such as stroke) YES NO

If yes to B, C, D, or E exclude from study.

10. Have you been told by a psychiatrist or psychologist that you have or had:
    A. Depression YES NO
    B. Eating Disorder YES NO
    C. Anxiety Disorder YES NO
    D. Schizophrenia YES NO
    E. Bipolar Disorder YES NO
    F. Major Psychological/Psychiatric Problem YES NO
       If yes, what was the diagnosis?
       _____
    G. Have you sought treatment for any of these problems? YES NO
       If yes, when?
       _____
    If yes to A, B, C, D, E, or F, exclude from study

11. Are you currently taking any medications? YES NO
    If so, what are you taking? _____

12. Are you currently pregnant or nursing? YES NO

13. MENSTRUAL CYCLE
    A. Do you have regular menstrual cycles? YES NO
    B. Date of Start of Last Period: _____

14. FOOD INTAKE AND EMOTIONAL EATING:

A. Do you have a condition or take any medications that dictate how often or what you should eat? YES NO

B. In the last month, how many meals did you eat per day? _____

C. How frequently do you eat breakfast? _____

D. On average, how many meals per day do you eat? _____

E. Do you ever eat when you feel stressed out or upset? YES NO

IF YES → What types of foods do you normally like to eat when you are stressed out or upset? _____

IF YES → Can you estimate how often your eating is affected by your emotions? (once a day, several times per day, once a week, etc).

_____

F. Does stress make you eat less than usual, more than usual, or about the same as always? MORE OR LESS OR SAME

G. If you were eating when stressed, would you prefer to eat sweet or salty foods? SWEET OR SALTY

If SALTY → Exclude from study. (IF MIXED/BOTH → Retain in study)

15. FOOD ALLERGIES:

A. Do you have any food allergies? YES NO

If yes → what foods are you allergic to? _____

B. Are you lactose intolerant? YES NO

If YES → Can you eat chocolate? YES NO

If NO, exclude from study

C. Do you have an allergy to peanuts? YES NO

If YES → Exclude from study

16. Domestic Violence

Have you ever been exposed to domestic violence, either personally or otherwise? YES NO

If yes → exclude from study

If still eligible to participate:

Name: _____

Address:

_____

Home Phone: _____ Work Phone: _____ Fax:

_____

E-mail: _____

Appendix H: Sample debriefing script

Thank you for your participation in our study. Your participation is important to us and we know that it takes time and energy to be involved. We appreciate your efforts. We recruited you to participate in a study on eating and emotions, and we are specifically interested in understanding how people who emotionally eat differ from those who do not. This study was designed to look at how eating affects mood and physiological variables like heart rate and blood pressure. We also are interested in understanding whether types of foods affect mood differently and if the food-mood relationship differs between people. To test the impact of different foods, some people in our study eat chocolate and others eat grapes. We think that people may respond differently when eating these different foods, and we will be comparing these two groups when we analyze our data. To compare people, we have asked everyone if they use food to cope with emotions. This is why we gave you the questionnaire that asked how you cope with stress. We think that eating may serve as a type of coping mechanism for some people, although this question really hasn't been addressed in previous research. We also asked you to recall details from the film clips. The reason we did that is because we want to know if eating distracts people from the stressor. Sometimes people report that eating does take their attention away from stressful things, so we wanted to measure that outcome. It is likely that eating does take attention, so if you could not answer these questions, you are not alone! * Finally, we told you that the food available to you at the end of the study was "left over" and would be "thrown away". In fact, we have measured the amount of food you ate, if any, from the available food. The reason we did that is because we are interested in understanding the aftereffects of stress-that is, how stress can affect your behavior, such as eating, even after the stress stops. We didn't tell you that we were measuring the amount you ate because often people feel uncomfortable eating when they know that the amount they eat is being monitored. We wanted to make this as true to real-life as possible. In other words, we wanted you to eat what you felt like eating, without feeling embarrassed, worried or concerned about what we were measuring. The amount of food eaten by people assigned to the different types of films will be compared to help us understand how stress affects eating. The specific amount of food you ate will not be analyzed separately—rather your data will be combined with all the other individuals in this experiment to make general statements about eating and mood.

If you have any questions about the study or want more information, you can contact the primary investigator [or myself] directly at the phone number listed on your copy of the consent form. Again, we appreciate your participation.

** If in stressful group, insert:* [Because you were randomly assigned to the stressful video clip, you may find that your mood was affected today. Studies have shown that this video clip does not produce long term mood changes, however, it is important that you know there are many resources available to you if you do experience such results. The list of resources you are being given is given to all participants assigned to that condition, and we hope you will find it useful information.]

Appendix I: Physiological Measurement tracking sheet

Physiological Measurement tracking sheet CODE _____

TIME PERIOD	Heart Rate	Diastolic	Systolic
P1 (3.5 min BL)			
P2 (7 min BL)			
P3 (10.5 min BL)			
P4 (3.5 min Film)			
P5 (7 min Film)			
P6 (10.5 min Film)			
P7 (3.5 min recov)			
P8 (7 min recov)			
P9 (10.5 min recov)			
P10 (3.5 min end)			
P11 (7 min end)			
P12 (10.5 min end)			

Amount eaten at 7 minutes **NONE** OR **SOME** OR **ALL**

Appendix J: Pilot interview questions

Pilot interview questions:

e. Did you feel that you wanted to eat more food than you were given?
YES OR NO

i. If yes→ were you frustrated when you did not have more to eat?
YES OR NO

f. Did you feel you ate the food given to you rather quickly?

YES OR NO

g. Do you think you would have eaten more food if it had been available to you?
YES OR NO

h. Do you feel that eating helped to calm you down?
YES OR NO

i. Did eating distract you from the video?

YES OR NO

j. What do you think was the purpose of this study?

_____

k. Any other comments?

_____

Amount of food left at the end of the 11 minute film _____ wt in grams

Type of food eaten **COMFORT** or **NON-COMFORT**

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