Comfort food: obesity and mood influences on food uptake

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The purpose of this study was to understand the effects of mood (negative vs. neutral) conditions on food consumption and choice, between non-obese and obese people. Mood was manipulated using two film segments; pre-weighed bags of food were offered to participants to eat during the film, which included one fatty choice (popcorn) and one healthy choice (carrots). The amount and type of food consumed was measured directly after each session. Surprisingly, results revealed that people in a negative mood did not consume more or choose fatty foods more often, compared to those who were in a neutral mood. Implications for obesity trends in the U.S. are discussed.

The purpose of eating is taking in nutrients, and the process must be satisfied every day. Eating is normally triggered by hunger, but other conditions can affect eating habits as well (Heatherton & Baumeister, 1991; Johnson, Steinberg, & Lewis, 1988; Polivy & Herman, 1993). Previous studies have found that negative moods such as depression, anxiety, sadness, and anger can trigger eating (Agras, Arnow, & Kenardy, 1995; Aiken & Baucom, 1981; Bachar, Berry, & Canetti, 2002; Cools, McNally, & Schotte, 1992; Fischer, McNally & Shappard, 2000).

The purpose of studying the influence of mood on food intake is to get a better viewpoint on eating behavior within humans when in negative moods. Eating behavior in humans can change according to emotional arousal (Bachar, Berry, & Canetti, 2002; Cools, McNally, & Schotte, 1992). The majority of research in this field has focused on the influence of eating while in a negative mood in people who are bulimic and/or restrained eaters. Bulimia nervosa is a psychological disorder predominantly characterized by recurrent episodes of binge eating, then purging (American Psychiatric Association, 1980). Restrained eaters restrict their food intake to avoid becoming fat, such as in the disorder anorexia (Herman & Polivy, 1984). However, in order to better understand eating behavior in humans, it is important to take a closer look at emotional eating among normal weight and obese people who do not have a diagnosable eating disorder.

This study is designed to help understand the effects of "comfort food" consumption in people in a negative mood, in relation to the consumption of healthy food. Comfort food is usually fast food, junk food, sweets, and greasy items. Lyman (1982) has found that there is a greater tendency to consume healthy foods during positive emotions and a greater tendency to consume junk food during negative emotions. Emotions have a powerful influence on food choice and eating behavior; this effect is particularly strong with comfort food, which is
typically chosen by individuals motivated by the goal of ensuring emotional well being (Dube, Lebel, & Lu, 2005). Comfort food consumption has been primarily considered a strategy to lessen anxiety, sadness, and other negative emotions (Dube, Lebel, & Lu, 2005). The nature of eating while in a negative mood has been and continues to be studied by scholars in psychology and related fields. Understanding the structural causes and results of emotions on food intake will help provide insights into how to solve the problem of overeating.

Past research has examined the associations among affect, restraint, and eating behavior. To do this, food intake in women of varying degrees of dietary restraint was measured during exposure to a neutral film, a comedy, or a horror film (Carpenter, Hill, & Yablans, 1978). Ninety female participants were assigned to one of the films based on the results of their Profile of Mood States (POMS) test or Visual Analogue Mood Scale (VAMS) test. The POM test (McNair, Lorr, & Droppleman, 1971) is a 65-item questionnaire with six mood subscales. The VAMS (Bond & Lader, 1974) is an additional mood measure. The film was viewed by the participants for 20 minutes. They were then given a pre-weighed 400 gram bag of buttered, salted popcorn, which was weighed again after the film. Results showed that the horror film led to greater food intake than the comedy or the neutral film. This supports the idea that people consume more when in a negative mood.

A more recent study was performed by Fischer, McNally, and Sheppard-Sawyer (2000). This research studied the effect of mood manipulations on both restrained and unrestrained eaters. There were 31 female participants who viewed two different films. Here, self-reported mood was measured before and after the films, and again popcorn consumption was measured during each film segment. It was found that food consumption was highest among the restrained group who viewed the sad film.

Other scholars have discussed the effects that mood has on food consumption and weight gain and compared obese women with normal weight women. These studies examined participants in weight reduction programs and found that mild, moderate, and severely obese women increased their food intake in response to a variety of negative emotions such as anxiety, depression and anger (Ganley, 1989; Arnow, Agras, & Kenardy, 1992). Over-eating in response to negative emotions has been found to occur in both obese and normal weight women. Heatherton and colleagues (1998) and Cools and colleagues (1994) have also confirmed that dieters have reported eating more when they are in a negative mood, and obese women find it hard to control their food intake.

For an eating episode to be considered a binge, the person needs to consume a large amount of food, perceive the eating episode as out of control, and perceive the amount of food consumed as excessive (Cooper & Fairburn, 1986). Binge eating is an act to reduce negative distress by serving as an escape from negative self awareness (Heatherton & Baumeister, 1991). Several researchers have found that the base-rate mood for bulimics is more negative than positive and is, therefore, a likely antecedent of binge eating (Levy, Dixon, & Stern, 1989).

Other scholars have found that mood may be an important factor that distinguishes between overeating and binge eating. People who suffer from bulimia reported more negative moods in the hour prior to a binge compared to their moods prior to a meal or a snack. In addition, stress, preoccupation with food, and negative moods were antecedents to binge episodes (Davis, Freeman, & Garner, 1988). Arnow and colleagues (1995) stated that higher levels of binge eating are associated with the desire to eat when experiencing negative moods.

Agras and Telch (1996) hypothesized that participants in their negative mood experimental condition would consume more calories than participants in the neutral mood condition. Participants were informed that the study’s purpose was to examine the effects of a negative and neutral mood state on the subjective experience of eating including the tastiness of the food and the enjoyment of eating. Height and weight measurements were obtained. The experimental manipulation was a procedure described by Wright and Mischel (1982) in which participants evoke various affective states through the generation of vivid imagery. The negative
induction asked participants to remember a past situation or event that resulted in negative feelings, and they were given 30 minutes to come up with the imagery. The participants were asked to recall their original thought, feel the same negative feelings, act as if they were actually there, picture the event happening to them, and to see all of the details of the situation. The neutral induction involved some of the same instructions, except the participants were given fifteen minutes to come up with the imagery and associated mood. The results showed that subjects in the negative mood condition reported a significantly greater negative affect than subjects in the neutral mood condition, and they consumed more food. The mood manipulation appears to have been effective.

The effects of stress and gender have also been examined regarding emotional eating. Grunberg and Straub (1992) proposed that women are more likely to eat under stress than men, particularly with certain foods. Women are more likely to eat more food under stress than men because men are more likely to turn to more healthy food and more active activities. Stress is considered to influence eaters because it interrupts the control that they generally try to use over their eating.

Bruch (1973) suggested that a person will eat in response to "emotional tension" and uncomfortable sensations and feelings. Kaplan and Kaplan (1957) reached the same prediction: An obese person will overeat in response to uncomfortable emotional states. Emotional eating is linked to different emotions depending on the individual, and is distinguished by consuming high calorie foods (Ganley, 1989). Maslow (1968) argued that people have an inherent drive to meet their needs and that as needs are met repeatedly, resources are built to assist in dealing with life stressors. When lack of basic need satisfaction functions as a stressor, it is possible that individuals will be more likely to engage in emotional eating as a substitute for fulfilling their needs, in order to maintain homeostasis. These studies have laid an appropriate ground work for further study.

The purpose of this study is to further investigate if emotions have an effect on food intake (including both choice of food and amount of food) while individuals are in a negative mood. The first hypothesis is that people in a negative mood will eat more food than people in a neutral mood. This will occur because the people in a negative mood are going to look for comfort when they are in a situation that makes them uneasy (Dube, Lebel, & Lu, 2005), and food intake provides a short-term comfortable feeling. The second hypothesis is that people who are in a negative mood will eat more fatty food than people in a neutral mood. In other words, those who are experiencing negative moods will specifically consume “comfort foods.” People turn to these kinds of foods because they have a temporary lifting of mood.

The third hypothesis is that obese people will eat more than non-obese people when in a negative mood. More food consumption will occur among obese people when in a negative mood because food is considered a safe haven for those individuals (Dube, Lebel, & Lu, 2005). The fourth and final hypothesis is that obese people will consume more fatty food than healthy food when they are in a negative mood. This will occur because fatty food is considered a comfort food.

Method

Participants

Participants were 53 undergraduate students (27 men, 26 women) attending a private university in the Midwestern United States. Participants were recruited from introductory psychology courses and were given extra credit for their participation. The demographic break down of the participants was as follows: 28% were African American, 60% were Caucasian, 5.7% were Hispanic, 3.8% were Asian, and 1.9% were Other. The mean age of the participants was 19.13 years ($SD = 1.21$), with a range from 18 to 24. Obesity categories were created using each participant’s Body Mass Index (BMI). A BMI between 19 and 24.9 is considered a “normal” weight. A BMI of 25 to 29.9 is considered overweight, while 30 or above is considered obese (Journal of the American Medical Association, 1999). Thirty-two percent were considered obese, and 68% were considered non-obese. The average BMI was 24.7 ($SD =4.44$).
Independent Variable

Participants were randomly assigned to view one of two seven minute film segments. The neutral film consisted of scenes from the documentary *Chihuly Gardens and Glass* (West, 2004), in which glass art work is demonstrated in a green house. The negative film consisted of scenes from the movie *Halloween*, in which the central characters are stalked by a killer. *Halloween* has been used in past research to manipulate negative mood (Carpenter, Hill, & Yablans, 1978).

As a manipulation check, two different mood questionnaires were completed by the participants. The Profile of Mood States (POMS; McNair, Lorr, & Droppleman, 1971) is a 65 item questionnaire with six mood subscales (tension, anger, fatigue, depression, vigor, and confusion). Research has supported the criterion, concurrent, and construct validity of the POMS (McNair et al., 1971). The questionnaire asked the participants to rate how they felt “right now” on a 5-point Likert scale (1 = not at all, 2 = a little, 3 = moderately, 4 = quite a lot, and 5 = extremely), such that higher scores indicate more negative mood. For the current research, all items were averaged to create a composite measure of negative mood; the scale had good internal consistency, \( \alpha = .83 \). The mean score for the participants was 2.09, \( SD = .51 \).

As an additional measure of mood, the participants completed a modified version of the Visual Analogue Mood Scale (VAMS; Bond & Land, 1974) after the film. The VAMS consists of 16 items (e.g., very drowsy / very alert). Participants respond to each item with a 9-point semantic differential scale with different anchors for each item. All items were scored such that higher numbers indicate a negative mood. All responses are averaged to form a composite score; internal consistency was good, \( \alpha = .83 \). The mean score for the participants was 4.25, \( SD = .93 \).

Dependent Variables

Food intake. Each participant was provided with a pre-weighed bag of approximately 172 g of buttered, salted popcorn and a pre-weighed bag of approximately 69 g of carrot sticks to eat during the film. The amount of popcorn and carrot sticks consumed (within 0.1 g) were the two measures of food intake (choice of food and amount of food consumed). Amount consumed was measured by simply subtracting the weight of each bag after the film from the weight before the film.

Procedure

Participants were recruited in psychology classes, and asked not to eat for two hours before the study began. Participants were randomly assigned to one of the two mood conditions based on the time of their session; in other words, half of the sessions showed participants the negative clip, and half of the sessions showed the neutral clip. Once the participants completed a consent form, they were told that this was a study concerning the effects of film on mood, and that because many people eat while they are watching movies, snacks had been provided. At each participant’s seat, one bag of popcorn and one bag of carrot sticks was supplied. Participants were instructed that they could eat as much or as little as they liked, as long as they ate something. The film clips were then shown, and participants completed the mood measures and demographics sheet. Following the conclusion of the study the participants were thanked for their time and were debriefed regarding the nature of the study. The amounts of popcorn and carrot sticks were weighed directly after each study session.

Results

Manipulation Check

To assess the relative effects of the mood induction procedure for creating the two experimental conditions (negative mood and neutral mood), a t-test was used to compare scores on both of the mood measures in the two film conditions. For the VAMS, it was revealed that participants who viewed the negative film reported more negative emotions (\( M = 3.92, SD = 0.73 \)) compared to the participants who viewed the neutral film (\( M = 3.82, SD = 0.75 \)); however, this difference was not significant, \( t(51) = 0.32, p = 0.75 \). For the POMS, the same pattern occurred, with participants in the negative film condition reporting more negative emotions (\( M = 2.05, SD = 0.40 \)) than the neutral film participants (\( M = 1.71, SD = 0.38 \)). This time, the difference was significant, \( t(51) = 2.51, p = \).
Because the means for both measures were in the correct direction, and for the POMS the difference was significant, the mood manipulation was considered successful.

Hypothesis 1
The first hypothesis expected people in negative mood to eat more food than people in a neutral mood. The total amount of food consumed for each participant was calculated by adding the weight in grams eaten for both carrots and popcorn. There was not a significant difference between amount of food consumed by participants in a negative mood ($M = 133.01, SD = 42.11$) compared to participant in a neutral mood ($M = 127.68, SD = 46.54$), $t(51) = .438, p = .429$. Thus, Hypothesis 1 was not supported.

Hypothesis 2
The second hypothesis suggested that people who were in a negative mood would eat more fatty food than people in a neutral mood. For this hypothesis, only the amount of popcorn consumed (in grams) was used. Going against the hypothesis, participants in a negative mood did not consume significantly more fatty food ($M = 99.40, SD = 23.56$) than participants in a neutral mood ($M = 95.09, SD = 27.81$), $t(51) = .609, p = .634$. Thus, Hypothesis 2 was not supported.

Hypothesis 3
The third hypothesis suggested that obese people will eat more than non-obese people when in a negative mood. Only seventeen of the participants classified as “obese,” using the definition of the BMI. Therefore, instead of comparing two groups, a correlation was used to find the association between BMI and total food consumption (in grams) for participants in the negative mood condition. There was not a significant correlation found to indicate that people with higher BMI scores were more likely to consume large amounts of food, $r(27) = -.17, p = .41$. Thus, Hypothesis 3 was not supported.

Hypothesis 4
Finally, it was hypothesized that obese people will eat more fatty food than un-healthy food while in a negative mood. Because of the low number of obese participants in the sample, anyone who was “overweight” or more was included in this test. Overweight was defined as participants with a BMI of 25 or higher. A repeated measures ANOVA was used to compare grams of healthy food (carrots) to grams of fatty food (popcorn) for overweight or obese people in a negative mood; results were significant, $F(1, 16) = 55.53, p < .001$. Thus, significantly more fatty food was consumed by these participants ($M = 88.34, SD = 33.03$) compared to healthy food ($M = 29.21, SD = 27.67$). Thus, Hypothesis 4 was supported.

Discussion
The results of this study were surprising on a number of factors. The first three hypotheses did not find support in the results. It is possible that the mood manipulation was not as strong as it could have been. Although the priming movie clips did produce different affective reactions for the POMS, scores on the VAMS were not different based on the movies. In future research, perhaps a better manipulation would be to either extend the length of the clips (so that participants have more time to feel the respective emotions associated with the clips) or to compare a happy movie with a sad movie, instead of a horror film and documentary. Exploring specific mood inductions with eating behaviors is an interesting venue for future studies.

In addition, future research could also offer participants different choices for food. For example, fruits could be offered, and may be tempting because of their natural sweetness. It is possible that the current participants simply did not particularly enjoy carrot sticks, and that popcorn was a more appetizing option, regardless of condition and obesity of the individuals involved. It would also be interesting to change the group dynamics of experimental sessions. For example, individuals may change their eating habits when they are in a large group compared to when they are alone. It is possible that obese or overweight people restrict their food intake in larger groups so as to not fulfill negative stereotypes. It may also be the case that people change their food habits in groups of friends versus strangers, or in same-sex versus opposite-sex groupings.
The final hypothesis, that obese people will eat more fatty food than healthy food while in a negative mood, was supported. However, additional analyses showed that everyone preferred the fatty food over the healthy food, regardless of their BMI score and regardless of the mood condition. As stated above, this could have been due to popcorn simply being a more attractive food than carrots. In addition, the specific food of popcorn is often associated with movies. This association may have led the participants to choose this food, simply because it is traditional in movie settings.

Future Research
It would be interesting to study the effect of negative moods on individuals who have eating disorders. In past research it was reported that a negative mood occurred in the hour prior to overeating for individuals with eating disorders (Davis, Freeman & Garner, 1988). Perhaps individuals with eating disorders have very different eating habits (e.g., they might have preferred the carrots in the current study), especially in public settings such as the experimental groups used here. Future research should compare the eating habits of both individuals with eating disorders, such as anorexia, and individuals who are obese, because these two extremes are increasing in the United States. In addition, stereotypes about overweight and obese people are increasingly negative and public in the U.S. It is possible that participants who are obese (and participants with eating disorders) become very aware of their status in experiments dealing with food intake, and therefore they may be likely to change their natural eating habits. Further research is needed to understand the eating habits of individuals in both people who are obese and those with eating disorders.

Conclusion
This study can be used to help understand the eating behaviors of people when given the choice between fatty and healthy food. All the participants in the current study chose the “comfort food” of popcorn over carrot sticks, the healthier option. With growing concerns over obesity and eating disorders, eating habits and choices are a central issue. Future research needs to examine if comfort food plays a role in the culture of unhealthy eating among Americans.

References


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