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An Experimental Test of the Escape Theory of Binge Eating

Kathryn H. (Kathryn Hope) Gordon
AN EXPERIMENTAL TEST OF THE ESCAPE THEORY OF BINGE EATING

By

KATHRYN H. GORDON

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The members of the Committee approve the dissertation of Kathryn H. Gordon defended on June 3, 2008.

_______________________________
Thomas Joiner
Professor Directing Dissertation

_______________________________
Patricia Martin
Outside Committee Member

_______________________________
Natalie Sachs-Ericsson
Committee Member

_______________________________
Dianne Tice
Committee Member

_______________________________
Jon Maner
Committee Member

The Office of Graduate Studies has verified and approved the above named committee members.
This manuscript is dedicated to my clients, past and present, who inspire me to conduct psychological research.
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# TABLE OF CONTENTS

List of Figures ........................................................................................................ vi
Abstract .................................................................................................................. vii

**INTRODUCTION** ................................................................................................. 1

**METHODS** .......................................................................................................... 7

**RESULTS** ............................................................................................................. 13

**CONCLUSION** .................................................................................................... 18

**APPENDIX A: INSTITUTIONAL REVIEW BOARD APPROVAL FORM** .......... 20

**APPENDIX B: INFORMED CONSENT FORM** .................................................. 21

**REFERENCES** .................................................................................................... 23

**BIOGRAPHICAL SKETCH** .................................................................................. 27
LIST OF FIGURES

Figure 1. Escape Theory ................................................................. 2
Figure 2. The Four Stages of the Study: The Experimental Conditions ................. 8
Figure 3. State Self-Esteem Across Time By Group ................................... 13
Figure 4. Negative Affect Across Time By Group ....................................... 14
ABSTRACT

Heatherton and Baumeister (1991) proposed that individuals engage in binge eating in an attempt to escape aversive self-awareness (escape theory). The current study sought to test the escape theory prediction that individuals who experience a stressor and blame themselves will consume more food than individuals experience a stressor and blame another person. This hypothesis was tested in an experimental study among 155 female undergraduate students who experienced a stressor and were randomly assigned to one of three groups: an internal attribution group (blame stressor on self), external attribution group (blame stressor on another participant), and a control group (no one to blame the stressor on). Following the stressor, participants were given access to chocolate, and told to consume as much as they needed to complete a bogus taste test. Contrary to escape theory predictions, there were no statistically significant differences between groups in the amount of chocolate consumed. In an adequately powered study, the findings did not conform to escape theory prediction. Limitations of the study include use of a nonclinical population and access to only one type of food (chocolate).
INTRODUCTION

A binge eating episode is defined as a discrete period of time (e.g., two hours) where an individual experiences a sense of loss of control over eating and consumes an amount of food that is definitely larger than most people would eat under similar circumstances (American Psychological Association, 2000). Approximately 4.5% of the population has experienced recurrent binge eating episodes (i.e., episodes that occur an average of 2 times per week for a minimum of 3 months) at some point in their lives (Hudson, Hiripi, Pope, & Kessler, 2007). Recurrent binge eating is relatively common, and associated with many public health concerns such as obesity, comorbid psychiatric disorders, and functional impairment (Gruzca, Pryzbeck, & Cloninger, 2007; Hudson et al., 2007; Rieger, Wilfley, Stein, Marino, & Crow, 2005).

Given the negative health consequences and feelings of shame that are typically associated with binge eating (Didie & Fitzgibbon, 2004), it is puzzling that it is a relatively common phenomenon (Hudson et al., 2007). A prominent theory by Heatherton and Baumeister (1991) proposes that individuals engage in binge eating in an attempt to escape aversive self-awareness (from this point forward referred to as “escape theory”). Specifically, escape theory posits that a six link causal chain (see Figure 1).
In the next section, the six steps proposed by escape theory, as well as available empirical data on each of the steps, are reviewed.

According to escape theory, the first step toward binge eating consists of the individual experiencing a failure or severe disappointment that results from either unrealistically high standards (e.g., perfectionistic standards) or severely unfortunate circumstances (e.g., being laid off from a job), or both. Thus, escape theory predicts that individuals who are more susceptible to falling short of their standards (i.e., people with high levels of perfectionism) are more prone to engage in binge eating than individuals with relatively lower levels of perfectionism. Stice and Shaw (2002) conducted a meta-analysis on risk factors for eating disorders, and concluded that perfectionism was indeed a significant risk factor for the onset of bulimic symptoms (which includes binge eating). Similarly, Pratt, Telch, Labouvie, Wilson, and Agras (2001) found that socially
prescribed perfectionism (perfectionistic standards for how one is perceived by others) was associated with binge eating severity, low self-esteem, and weight and shape concerns.

With regards to the failure to meet one’s standards, body dissatisfaction is another relevant variable that has been studied in relationship to binge eating. Stice and Shaw’s (2002) meta-analysis revealed that body dissatisfaction predicted increases in dieting (an attempt to resolve the discrepancy), negative affect, bulimic symptom onset, and maintenance of bulimic symptoms. Similarly, Pratt et al. (2001) found that negative feelings associated with one’s shape and weight were significantly correlated with binge eating, a finding that is consistent with escape theory. Finally, in two studies testing a diathesis-stress model for bulimic symptoms, women who rated themselves as high in perfectionism and who viewed themselves as overweight were at highest risk for bulimic symptoms (Joiner, Heatherton, Rudd, & Schmidt, 1997).

Once the individual perceives that they have fallen short of their standards, escape theory predicts that the individual must blame her/himself for the discrepancy in order to advance in the sequence toward binge eating. There may be support for the claim that a failure to meet one’s standards, when paired with self-blame, leads to binge eating. While there appears to be no experimental research on the relationships among these variables, there are a series of studies that find that a three-way interaction (perfectionism, self-esteem, and body dissatisfaction) predicts bulimic symptoms in young and middle-aged adults (Bardone-Cone, Abramson, Vohs, Heatherton, & Joiner, 2006; Bardone, Vohs, Abramson, Heatherton, & Joiner, 2000; Holm-Denoma et al., 2005; Shaw, Stice, & Springer, 2004; Vohs et al., 2001). Specifically, these studies found that women who have perfectionistic standards, perceived themselves as overweight, and had poor self-esteem (which may be conceptually linked to self-blame) were at the highest risk for bulimic symptoms. Bardone-Cone et al. (2006) proposed that this finding was consistent with escape theory, in that individuals who had high ideals in general (i.e., were perfectionistic) and dissatisfied with their bodies (had a perceived discrepancy between their ideal and actual body shape), were more prone to develop binge eating, only if they believed that they could not do anything to change their body shape and/or blamed themselves (had low self-esteem).

In another study related to attributional style and eating disorder symptoms, Watkins et al. (2001) found that a sample of community women with low levels of self-efficacy and a tendency for internal, global, and uncontrollable attributions were more likely to have problems with binge eating. In the same vein, two studies have reported higher levels of shame and self-criticism (emotions and cognitions that may reflect internal attribution) among college women with bulimic symptoms and women who meet full criteria for eating disorders that include binge eating (Speranza et al., 2003; Steiger, Gauvin, Jabalpurwala, Seguin, & Stotland, 1999).

However, in contrast, Rotenberg and Flood (2000) gave restrained eaters a preload milkshake, forcing them to break their diet, and then asked them to participate in a bogus taste test in order to measure how much food they consumed. They found that restrained eaters consumed more food in the second task, but contrary to escape theory predictions, this relationship was mediated by external locus of control (blame outside of
the self) rather than internal locus of control. In conclusion, the findings on the relationship between one’s tendency toward self-blame and binge eating are mixed, and few studies have directly assessed this link in the escape theory chain.

Third, according to escape theory, the failure to meet one’s standards, coupled with self-blame, leads to heightened awareness of one’s perceived inadequacy, guilt, and/or incompetence. This aversive self-awareness then purportedly leads to the fourth step, when the individual becomes consumed with powerful negative affect.

In a study relevant to the third and fourth steps of escape theory, undergraduate women who reported “escape” tendencies (defined as binge eating or suicidal ideation by the authors) were predicted to display more negative affect, more irrational thinking, higher levels of self-awareness, more body dissatisfaction, and lower levels of self-esteem than undergraduate women without escape tendencies (Tassava & Ruderman, 1999). The group who reported experiencing both suicidal ideation and binge eating had lower self-esteem, more negative affect, more irrational thinking, more negative feelings about their weight, and higher levels of self-awareness than controls. In contrast, the only difference between the control group and the binge eating group was that the binge eating group reported higher levels of body dissatisfaction. The authors conjectured that the failure to find higher levels of self-awareness could have been due to measuring trait, rather than state, aversive self-awareness. Therefore, an experimental study that examines acute levels of heightened self-awareness following a perceived failure (and its relationship to binge eating) might serve as a more appropriate test of escape theory.

In another study, female undergraduate students who engaged in binge eating scored significantly higher on self-consciousness and lower on self-esteem as compared to women who did not regularly engage in binge eating (Schwarze, Oliver, & Handal, 2003). In addition, individuals who regularly engaged in binge eating had a greater tendency to cope with stress in an avoidant way than the non-binge eating group, which is consistent with the escape theory concept that aversive self-awareness motivates individuals to avoid emotional pain.

Stice (2001) also provided empirical support for the notion that body dissatisfaction predicts binge eating, and that the relationship is mediated by negative affect. This is compatible with the idea, put forth by escape theory, that an individual experiences a failure to meet standards, experiences negative affect as a result, and that the negative affect leads to binge eating. It is important to note that this study did not evaluate some key escape theory variables, such as attribution to the self, to determine if the internal attribution led to binge eating.

In the fifth step, the individual attempts to escape from the painful emotional state by pushing away negative thoughts, and entering into a psychologically “numb” state called cognitive deconstruction. Heatherton and Baumeister (1991) claim that this attempt to cognitively escape the emotional pain is not fully successful, leaving the individual desperate for more powerful means of terminating the painful thoughts and emotions about the self. Studies in college populations indicate that when participants are made to feel socially excluded (e.g., by telling them “you are likely to end up alone in life”), they tend to have an increase in emotional numbing, focus on short-term rather than long-term goals, have slower reaction times, write fewer words, choose fewer
emotion words in an implicit emotion task, agree with the statement “life is meaningless,” choose unhealthy behavior, procrastinate longer, and attempt to escape self-awareness (assessed by the participant turning away from a mirror) more frequently than individuals who are in control conditions (Dewall & Baumeister, 2006; Twenge, Catanese, & Baumeister, 2002, 2003). These findings are consistent with the view that people enter into a state of cognitive deconstruction when facing stressful information, and behave in a way that favors short-term goals (e.g., binge eating to alleviate emotional pain) over long-term goals.

In another relevant study, bulimic and nonclinical control participants completed a computer task which contained either subliminal ego-threat (words such as “lonely” and “abandonment”) or neutral cues [words such as “garage” or “paint”; (Hallings-Pott, Waller, Watson, & Scragg, 2005)]. Following the computer task, there was no effect of condition type (i.e. ego-threat versus neutral) on mood. However, there was an interaction between group membership and condition, such that the bulimic group had an increased state of dissociation during the threat cue condition, while the nonclinical group did not. This finding is consistent with escape theory, which suggests that state of dissociation (cf. cognitive deconstruction) is the immediate response to ego threats. Unfortunately, the authors did not examine whether individuals in the ‘dissociated’ state tended to consume more food than those who were not affected by cue type.

In the final step, the individual in the cognitively destructed state has a reduction in inhibitions and rational thought, and sees binge eating as an effective method of escaping painful self-awareness because it shifts the individual’s focus to the concrete functions of eating, which involve meaningless, thoughtless action. The idea that binge eating becomes appealing as an option when an individual is in a state of emotional pain is supported by self-report findings that binge eating leads to temporary relief from, or regulation of, emotional pain (Davis & Jamieson, 2005; Deaver, Miltenberger, Smyth, Meidinger, & Crosby, 2003).

In addition to reports of psychological relief, it appears that people actively choose to binge eat for the specific purpose of mood regulation. Tice, Bratslavsky, and Baumeister (2001) conducted a study where participants were given access to fattening food following a stress manipulation, in order to examine whether people engage in self-destructive behaviors because they are disinhibited and therefore lack self-control or if they actively choose to engage in self-destructive behavior to regulate mood. One group was told that there was scientific evidence that their mood was unlikely to change by eating fattening foods (the “frozen mood” condition). The individuals in the “frozen mood” condition consumed less fattening food than the control group, suggesting that when individuals were distressed, they actively chose to indulge in fattening foods because they believed it would alleviate their distress. Tice et al. (2001) proposed that the results argue against the notion that distress breaks one’s will down and supports the idea that people strategically choose to engage in activities that they believe will make them feel better. Consistent with these findings, Polivy, Herman, and McFarlane (1994) found that restrained eaters tended to consume more cookies when distressed, even when the cookies tasted bad (perhaps in an effort to regulate mood), and Strauss, Doyle, and Kreipe (1994) found that restrained eaters who consumed a preload milkshake consumed
more food after viewing diet commercials (perhaps in attempt to regulate mood after discrepancies about their dieting behaviors were illuminated).

Finally, one study used structural equation modeling to test the overall fit of the escape theory in the prediction of binge eating among a sample of 129 nonclinical female dieters (Blackburn, Johnston, Blampied, Popp, & Kallen, 2006). They assessed multiple aspects of the escape theory chain: perfectionism, self-awareness, negative affect, cognitive narrowing, and binge eating. They reported that the escape theory had a good fit overall, which provided support for the theory. However, the data were collected cross-sectionally rather than longitudinally, which is a limitation. Furthermore, the study evaluated general states of each variable, rather than examining the sequence of events within a specific situation, so the generalizability to the sequence proposed by escape theory may be limited (Heatherton & Baumeister, 1991).

In summary, available empirical studies tend to support the components of escape theory which propose that unattainable standards, negative affect, and cognitive narrowing are related to binge eating. However, some links in the chain remain ambiguous. In particular, the main thesis of escape theory is that the individual is trying to escape the self. The available evidence suggests that people may engage in binge eating in an effort to escape negative mood and distress, but it is unclear if it the distress must be specifically related to the self.

The current study utilized an experimental design to test the specificity of aversive self-awareness (versus distress directed toward another person) as an antecedent to binge eating in a nonclinical sample of undergraduate women. Based on escape theory, it was predicted that the participants would eat more chocolate chips during a bogus taste test after being placed in a situation that induces aversive self-awareness as opposed to a situation that induces negative mood that is not directed toward the self or a control condition.
METHODS

The original sample consisted of 155 females enrolled in an introductory psychology course at Florida State University. Male participants were not included in the current study, because the majority of individuals who engage in binge eating are women (Hudson et al., 2007). Moreover, use of an entirely female sample allowed for comparison of the current study’s results to earlier empirical work.

Students received required course credit for participation in the study. They were provided with consent forms explaining the general procedures involved and were informed of their right to withdraw at any point without penalty during the experimental process (though none chose to do so). The experimenter then explained that their responses would be separated from any identifying information (i.e., stored anonymously). In an attempt to control for hunger level, all participants were asked to abstain from eating for four hours prior to the experiment and were asked about the last time they consumed food before beginning the study. All procedures were approved by Florida State University’s Internal Review Board.

A total of 27 participants were excluded: 8.3% (n = 13) did not follow the instructions to abstain from eating for four hours prior to the experiment, 5.1% (n = 8) did not believe one or more parts of the experimental deception (as indicated on an experimental impression form administered at the end of the study), 2.6% (n = 4) could not complete the study because of computer problems, and 1.6% (n = 2) had incomplete data. Of the 128 participants that were included in the study, 61.1% (n = 80) identified themselves as Caucasian/White, 19.1% (n=25) as African-American/Black, 14.5% (n = 19) as Hispanic/Latina, and 3.1% (n = 4) as Asian/Pacific Islander. The mean age of the participants was 19.22 (SD = 1.10; range = 18-24), and most were in their first year of college (53.9%, n = 69).

Two participants were simultaneously run in the study in an effort to increase the believability of the manipulation, which involved the participant experiencing distress and making an internal attribution (self-blaming) or external attribution (blaming the other participant). In Stage 1, the participants were told that there were four stages to the experiment, and that the first stage involved filling out a battery of questionnaires. Please see Figure 1 for a diagram of all stages of the experiment.

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1 The number of minimum participants (n = 105) was determined based upon .80 power for an alpha of .05 and a medium effect size between three groups. Each group had to contain a minimum of 35 participants in order to achieve this level of power (Maxwell & Delaney, 2004).
Stage 1
Questionnaire Packet

↓

PANAS and SSES

Stage 2
PASAT

↓

PANAS and SSES

Stage 3
SCAT administration
False feedback for SCAT

↓

PANAS and SSES

Stage 4
Chocolate Chip Taste Test

↓

PANAS and SSES

Figure 2: The Four Stages of the Study: The Experimental Conditions

The questionnaire packet included measures which assess individual difference variables that are theoretically relevant to escape theory. Participants were randomly assigned to one of three group conditions, and questionnaire data were also used to rule out alternative explanations of group differences (i.e., to determine whether potential
group differences are due to the experimental manipulation or due to a confounding variable, such as higher levels of impulsivity, by chance, in one group).

Impulsivity was measured with the Urgency, (lack of) Premeditation, (lack of) Perseverance, Sensation Seeking Impulsive Behavior Scale [UPPS; (Whiteside & Lynam, 2001)]. The UPPS s a 45-item self-report measure that yields 4 subscales: Urgency, (lack of) Premeditation, (lack of) Perseverance, and Sensation Seeking. Whiteside and Lynam (2001) proposed that the construct of impulsivity could be broken down into four distinct pathways to impulsive behavior, and the subscales are designed to represent each of the pathways. Each item on the questionnaire is rated on a 5-point scale ranging from 1 (not true of me) to 5 (very true of me). A sample item is “When I feel bad, I will often do things I later regret to make myself feel better now,” (from the Urgency subscale). The UPPS is widely used, and is a valid and reliable measure of impulsivity (Claes, Vanereycken, & Vertommen, 2005). All subscales used in the current study appeared to have adequate reliability, according to the coefficient alphas calculated for the current sample: .85 for the Urgency subscale and .88 for the Sensation Seeking subscale.

Anxiety symptoms were assessed with the Beck Anxiety Inventory [BAI; (Steer & Beck, 1997)], which consists of 21 cognitive and physiological symptoms related to anxiety. Participants were instructed to indicate the degree to which they were affected by certain anxiety symptoms (e.g., nervous, shaky, faint) during the past two weeks from 0 to 3 (0 = not at all, 1 = mildly, 2 = moderately, 3 = severely). The BAI is also widely used and considered to a reliable and valid measure (Steer & Beck, 1997). In the current sample, the alpha was .84.

Global self-esteem was measured with the Rosenberg Self-Esteem Scale [RSE; (Rosenberg, 1965)]. The RSE is a 10-item scale that includes statements such as “I take a positive attitude toward myself,” on a 5-point scale. Adequate reliability and validity of this measure have been reported (Blascovich & Tomaka, 1991), and the measure was found to have adequate reliability in the current sample (alpha = .85).

Depression symptoms were assessed with the Beck Depression Inventory – Second Version [BDI-II;(Beck, Steer, & Garbin, 1998)]. The BDI-II is a self-report questionnaire that consists of 21 items. The respondent is asked to select one statement from a group of four statements that reflects his/her current level of depression symptom severity (scored from 0 to 3). For example, one item uses the statement “I do not feel sad,” as the least severe (rated as a 0), while the statement that is most severe is, “I am so sad or unhappy that I can’t stand it,” (rated as a 3). The BDI-II is a reliable and valid measure of depression symptoms (Beck et al., 1998). The alpha for the BDI-II in the current sample was .87.

The Eating Disorders Inventory-2 (EDI; 1990) is a frequently used 64-item self-report questionnaire that yields eight subscales: Drive for Thinness, Bulimia, Body Dissatisfaction, Ineffectiveness, Perfectionism, Interpersonal Distrust, Interoceptive Awareness, and Maturity Fears. The subscales have shown adequate internal consistency coefficients and have been well validated (Garner, 1990). For the purposes of this study, only the Bulimia, Perfectionism, Drive for Thinness, and Body Dissatisfaction subscales were used and all had adequate reliability in the current sample (alphas = .79, .81, .90,
and .91, respectively). It should be noted that the EDI does not result in clinical diagnoses; rather, it provides a measure of eating disorder symptoms.

Restraint was measured with the Restraint Scale, a reliable and valid measurement of an individual’s tendency to restrict food intake in an effort to lose weight (Polivy, Herman, & Warsh, 1978). The Restraint Scale is an 11-item questionnaire that inquires about eating habits and weight fluctuation. Sample items include, “How often are you dieting?” and “Do you give too much time and thought to food?” The alpha for the current sample was .82.

After the participants completed their questionnaire packets, participants’ state mood and state self-esteem were assessed in order to establish a baseline of these variables, and to evaluate the effectiveness of the manipulation at later stages of the experiment.

State self-esteem was assessed with the State Self-Esteem Scale [SSES; (Heatherton & Polivy, 1991)]. The SSES is a measurement of short-lived (state) changes in self-esteem, and was designed as a sensitive index of manipulations designed to temporarily alter self-esteem. Heatherton and Polivy (1991) demonstrated adequate reliability and validity of this measure as a manipulation check index (coefficient alphas in the current sample ranged from .90-.92 from Time 1 to Time 4). The scale contains 20 items and asks the participant to rate how they feel “right now” on a 5-point scale (1 = not at all, 2 = a little bit, 3 = somewhat, 4 = very much, and 5 = extremely). Sample items include, “I feel confident about my abilities”, and “I am worried about what other people think of me”.

State mood was assessed with the Positive and Negative Affect Schedule [PANAS; (Watson, Clark, & Tellegen, 1988)]. The PANAS has been used by researchers in a variety of populations and has adequate psychometric properties (Watson et al., 1988). It contains 10 items that comprise the Negative Affect composite score and 10 items that comprise the Positive Affect composite score. In the state version of the PANAS, participants are asked to rate the degree to which they feel each emotion word “right now” on a scale from 1 to 5 (1 = very slightly or not at all, 2 = a little, 3 = moderately, 4 = quite a bit, 5 = extremely). Sample items from the PANAS are “enthusiastic” (positive affect) and “ashamed” (negative affect). The alphas in the current sample ranged from .89-.92 for Time 1 through Time 4 Negative Affect composite scores and .69-.83 for Time 1 through Time 4 Positive Affect composite scores.

Next, the participants were asked to complete a frustrating computer task that was originally developed to assess distress tolerance, the Paced Auditory Serial Addition Task [PASAT; (Lejuez, Kahler, & Brown, 2003)]. The PASAT displays a series of numbers that are presented on a computer screen. The participant is instructed to add the two most recently displayed numbers, and select the sum from a panel of choices. When the participant is incorrect, the game makes a loud, irritating explosion noise. The task is designed so that the participant is likely to make errors, and the time spent persisting on the task is typically measured rather than the number of correct answers. Important in the current context, the PASAT has also been successfully used as a stressor in laboratory experiments (Lejuez et al., 2003). After completing the PASAT, participants were
administered another SSES and PANAS in order to evaluate whether the PASAT had the desired effect (i.e., an increase in negative affect).

In Stage 3, participants completed the Social-Cognitive Aptitude Test (SCAT), which was created to provide false success or failure feedback to research participants in experimental studies (Crocker, Thompson, McGraw, & Ingerman, 1987). Participants were told that the SCAT assesses interpersonal and intellectual competence. The SCAT served as a basis for the key manipulation of the study—feedback to the participant that it was their own fault (internal attribution) or that it is was the other participant’s fault (external attribution) that they had to repeat Stage 2’s distressing task.

The SCAT consists of brief character descriptions of 10 couples and includes instructions to read each pair of descriptions to make a judgment about whether the couple remained in their relationship for more than one year or broke up before that time. Participants were told that the character profiles were based on actual case observations documented by clinicians. The participants were provided with the false rationale that the computer task in Stage 2 was less reliable among people with lower intelligence, and that the participant would have to do the task twice if they scored in the lower range. The participants were informed that if one of the two participants performed poorly on the SCAT, they would both have to repeat the irritating computer task in Stage 2. The false rationale for both participants having to repeat the task when only one participant had a lower social intelligence score was that the participants had to follow identical procedures for the experiment data to be valid. Again, this information was provided in an effort to make participants attribute their distress about repeating the task to either their own inadequate score or the other participant’s inadequate score (depending upon which condition they were in).

Next, the participants were walked into separate experiment rooms where they could not see each other. The participants then completed the SCAT and were under the assumption that the participant was in the other room completing the SCAT as well. After they completed the SCAT, the experimenter took the test from the participants, and pretended to score them.

If the participant was in the internal attribution condition, she was told, “You got 30% correct. Your score was below average, which means that you are somewhat lacking in social sensitivity, intellectually immature, and tend to have a difficult time processing and responding to social and cognitive information. The other participant scored high enough on the test to not have to repeat the math task, but because you scored poorly, you will both have to repeat the computer math task.”

If the participant was in the external attribution condition, she was told, “You got 80% correct. Your score was good enough to not have to repeat the math task. However, the other participant’s score was below average, which means that she is somewhat lacking in social sensitivity, intellectually immature, and tends to have a difficult time processing and responding to social and cognitive information. Since the other participant did not score high enough on the test to not have to repeat the math task, you will both have to repeat the computer math task.”

A third condition was a control group. The participants in this group completed the SCAT, but were not be told that their scores had any influence on whether or not they
had to repeat the computer task in Stage 2. They were simply told that they have to repeat the irritating computer task.

In order to evaluate whether the experimental manipulation had the desired effect, participants’ state self-esteem and mood were again assessed.

In the final stage of the study, participants were told that they would complete a chocolate chip taste test before repeating Stage 2. This was done to gather data for the key question of the study: what is the influence of distress (attributed to the self versus another person) on eating habits? The taste test lab analogue has been used successfully in alcohol (Hendricks, Sobell, & Cooper, 1978) and food research (Polivy, Herman, & McFarlane, 1994) to measure the effect that an experimental manipulation has on the amount consumed in a manner that does not reveal that the quantity of consumption is actually being measured.

In the bogus taste test, the participants were told to sample three different types of chocolate chips (butterscotch, white chocolate, and milk chocolate) which were available in large quantities. They were provided with the false rationale that their ratings would help to determine which chocolate chips should be used in future studies. Then, they were instructed to rate each type of chocolate chip on several different qualities (e.g., texture, sweetness, etc.) on a scale of one to ten, where one = poor, five = neutral, and ten = excellent. The participants were encouraged to eat as many chocolate chips as they needed to rate the qualities on the questionnaire. The experimenters then left the room for 10 minutes while the participants completed the taste test questionnaires. The actual taste ratings for the questionnaire were not computed. Rather, the number of the chocolate chips consumed was calculated for each participant. This was the main dependent variable. Based upon escape theory (Heatherton & Baumeister, 1991), it was predicted that people who were in the internal attribution condition would eat more chocolate, on average, than participants who were in the external attribution or control conditions.

Finally, the participants were assessed for state mood and self-esteem one final time, in order to examine whether the eating had any impact on mood and/or state self-esteem. An experimental impression form was then administered, which asked “What do you think this experiment was about?” for the purpose of assessing the believability of the experimental manipulations. The participants were then told that the experiment was over, and that they did not have to repeat the computer task in Stage 2.

Next, the experimenter thoroughly debriefed the participants about the purpose of the study, and informed them that the feedback that they were given on their SCAT score was completely false. The participants were encouraged to contact the experimenter if they had any questions or concerns about the study. In addition, they were asked to keep the details of the experiment secret, as to not ruin the experiment for future participants.
RESULTS

In order to examine if the manipulation had the intended effect, a mixed design repeated measure analysis of variance (ANOVA) was conducted utilizing two factors: time (a within-subjects factor) and group (a between-subjects factor) predicting the dependent variable of state self-esteem (SSES total score).

According to a Mauchly’s test, the assumption of sphericity for the repeated measures design was violated [Mauchly’s W = .86 (df = 1, 5), p = .003; i.e., there were significant differences between the variances of the differences between conditions]. Thus, the Huynh-Feldt correction was utilized in interpreting the results. The omnibus revealed that there was a significant time by group interaction in the prediction of state self-esteem (F=13.13 (df = 1, 5.73), p<.0001). Follow-up analyses indicated that, consistent with prediction, there was a significant difference in state self-esteem following the SCAT feedback between the internal attribution group and the control group (F=39.90 (1, 120), p<.001), and the internal and external attribution groups (F=65.46 (1, 120), p<.001), but that there were no significant differences between the control and external attribution groups (F=3.15 (1, 120), p=0.08) following the SCAT feedback. Follow-up analyses indicated that all differences were in the expected direction. See Figure 3 for a graph of the SSES mean scores over time by group.

![Figure 3: State Self-Esteem Across Time By Group](image-url)
The same procedure was used to assess differences in negative affect (as assessed by the PANAS) at each time point. The omnibus revealed that there was a significant time by group interaction in the prediction of negative affect \([F = 5.33 \text{ (df = 1, 5.73), } p < .0001\) (again, using the Huynh-Feldt correction)]. Follow-up analyses revealed that, consistent with prediction, there were no significant differences on reported level of negative affect between the external and internal attribution groups after being told that they had to repeat the irritating computer task \((F = 2.80 \text{ (1, 121), } p = .10)\). However, as predicted, the internal and external groups reported significantly greater negative affect than the control group after being told that they had to repeat the irritating computer task \((F = 26.85 \text{ (df = 1, 121), } p < .0001)\); see Figure 4 for a graphical depiction of the SSES mean scores over time by group).

![Figure 4: Negative Affect Across Time By Group](image)

Finally, number of hours since the participant last ate was nearly a significant predictor of the amount of chocolate chips consumed during the taste test \([F = 3.58 \text{ (df = 1, 122), } p = .06]\), a result in support of the validity of the taste test as an appropriate laboratory analogue for real world food
consumption. The mean number of chocolate chips consumed was 23 (SD = 17) with a range of 1 to 91 chocolate chips consumed.

In summary, the analyses revealed that the experimental manipulations appeared function as intended.

A multivariate analysis of variance (MANOVA) was used to determine whether the three groups differed on any individual difference variables (i.e., impulsivity, anxiety symptoms, global self-esteem, depression symptoms, bulimic symptoms, perfectionism, drive for thinness, body dissatisfaction, dietary restraint, baseline state self-esteem, and baseline mood state) which could be relevant (and thus serve as a confound) in the prediction of number of chocolate chips consumed. The results revealed that there were no significant differences between groups on most variables (all ps>.05), with the exception of perfectionism being higher in the internal attribution group than the other two groups (F = 4.14 (df = 2, 92), p = .02). Because a statistically significant difference between the groups on perfectionism emerged, perfectionism was used as a covariate in the main analysis.

An ANCOVA was conducted to test the main study hypothesis that there would be significant differences in the amount of chocolate chips consumed between the three groups. Based upon escape theory’s assertion that binge eating is a method used to specifically escape aversive self-awareness (Heatherton & Baumeister, 1991), it was predicted that the internal attribution group would consume significantly more chocolate chips than the external attribution group and the control group. Based upon previous literature linking distress to increased food consumption (Polivy, Herman, & McFarlane, 1994; Strauss et al., 1994; Tice et al., 2001), it was predicted that the external attribution group would consume more chocolate chips than the control group, but less than the internal attribution group. Contrary to prediction, there were no significant differences between the three groups in terms of numbers of chocolate chips consumed (F = .54 (2, 128), p = .59).

In order to examine whether perfectionism interacted with group membership to predict number of chocolate chips consumed, a regression analysis was also conducted (using dummy coding for the group variable). The regression revealed that there was not a significant interaction between perfectionism and group membership in the prediction of chocolate chip consumption (F = .74 (df = 5, 127), p = .60).

The mediational analyses proposed in the prospectus were not performed because the required criteria were not met (Baron & Kenny, 1986).

One-way ANOVAs were also performed to examine whether the consumption of chocolate chips affected mood and state self-esteem differently depending upon group membership (internal attribution versus external attribution versus control). As depicted in Figure 2, group membership predicted change in SSES score following chocolate chip consumption (F = 18.98 (2, 122), p<.0001). Specifically, the internal attribution group experienced an increase in SSES that was significantly greater than the external attribution and the control group (t = -5.94 (1, 122), p<.0001). Meanwhile, the change in SSES among the external attribution and control groups did not significantly differ from each other (t = -1.70 (1, 22), p = .09; see Figure 3).

Similarly, group membership was a significant predictor of change in negative
affect following chocolate chip consumption (F = 5.94 (2, 122), p = .003). However, in this case, the internal attribution group and external attribution group both had significantly greater decreases in negative affect after eating the chocolate chips than the control group (t = -2.22 (df = 1, 122), p = .001), while the internal and external attribution groups’ decrease in negative affect were not significantly different from each other (t = .88 (1, 122), p = .38). These findings are also depicted in Figure 4.

Finally, change in positive affect following Stage 3 to after Stage 4 was entered in as the dependent variable. In contrast to previous analyses, group membership was not found to significantly predict change in positive affect after chocolate chip consumption (F = 1.61 (2, 122), p = .20).

After the planned analyses were conducted, all individual difference variables (i.e., ethnicity, psychological characteristics gathered from the questionnaires in Stage 1) were examined as potential moderators for the relationship between group membership and chocolate chip consumption. Specifically, regression analyses were conducted where the individual difference variable (e.g., restraint) and group variable (i.e., external attribution group, internal attribution group, or control group using dummy coding) were entered into the first step to test for main effects. Then, an interaction term for the individual difference variable and group variable (e.g., restraint X group) was entered into the second step. The analyses revealed that none of the individual difference variables included in the study significantly predicted chocolate chip consumption (all ps>.05). Furthermore, none of the individual difference variables interacted with group to predict chocolate chip consumption (all ps>.05). Therefore, no moderators for the relationship between group and chocolate chip consumption emerged.

In order to investigate the possibility that outliers in the chocolate chip consumption variable were masking group differences, all of the post hoc analyses outlined above were repeated with the chocolate chip consumption variable fenced into the range of two standard deviations above the mean (as the maximum) to two standard deviations below the mean (as a minimum). The analyses using chocolate chip consumption (fenced into two standard deviations) as the dependent variable did not reveal different results than the analyses utilizing the unmodified chocolate chip consumption variable (i.e., all ps >.05).

Next, additional tests of escape theory hypotheses were performed on the data. Though chocolate chip consumption did not vary significantly between groups, according to escape theory, individuals who experience the lowest state self-esteem and highest amount of negative affect following Stage 3 (after receiving the SCAT feedback) should consume the most chocolate chips. This hypothesis was tested using a regression equation where totals of state self-esteem and negative affect at Time 3 were entered as independent variables predicting chocolate chip consumption. Neither negative affect (t = -.82 (2, 125), p = .42) or state self-esteem (t = -1.13 (2, 125), p = .29) were significant predictors of chocolate chip consumption.

Finally, according to escape theory, the internal attribution group participants who were higher in perfectionism should be the most vulnerable to decreases in state self-esteem (cf. aversive self-awareness) following the receipt of failure feedback on the SCAT. This prediction was evaluated in a regression equation that utilized state self-
esteem following Stage 3 as the dependent variable. Group membership and
perfectionism were entered into the first step to test for main effects, and group X
perfectionism was entered into the second step to test for an interaction. Contrary to
escape theory predictions, perfectionism did not interact with group to significantly
predict state self-esteem (t = -9.59 (2, 125), p = .34).
CONCLUSION

Based on Heatherton and Baumeister’s (1991) theory of binge eating as an escape from aversive self-awareness, it was predicted that individuals who were distressed and blamed themselves (the internal attribution group) would consume more chocolate than individuals who were distressed but did not blame themselves (the external attribution group), and a control group. However, this prediction was not supported, as there were no differences in the amount of chocolate chips consumed between the three groups. Despite the lack of observed behavioral differences in the amount of chocolate consumed, an exploratory post-hoc analysis revealed that the consumption of chocolate chips may have led to a significant improvement in state self-esteem among the participants in the internal attribution group, but not for participants in the external attribution or control groups. In addition, consumption of chocolate chips appeared to have led to a significant decrease in negative affect in both the internal and external attribution groups, but not in the control group.

Though the main hypotheses about group differences were not supported, the finding that chocolate consumption reduced negative affect and improved state self-esteem for distressed individuals is worth noting. There are retrospective self-report data which suggest that people engage in binge eating because it improves their mood (Davis & Jamieson, 2005; Deaver et al., 2003) and experimental evidence that demonstrate that people tend to eat more when they believe it will improve their mood (Davis & Jamieson, 2005; Deaver et al., 2003; Polivy et al., 1994; Tice, Bratslavsky, & Baumeister, 2001). The current study contributes to this area by providing evidence that individuals actually viewed their mood as improved and experienced an increase in state self-esteem immediately after eating chocolate.

This result may be particularly interesting in light of findings from a study on a sample of undergraduate women who regularly engage in binge eating (Wegner et al., 2002). Wegner et al. used electronic diary technology (Palm Pilots) to assess mood and binge eating behavior throughout the day in the participants’ natural setting. In contrast to the authors’ predictions that binge eating would lead to an improved mood, the participants did not report significantly different mood states when prompted 30 to 60 minutes before the binge and 30 to 60 minutes after the binge. In a second measure in Wegner et al.’s study, participants were asked to fill out a self-report form on their mood before and after the binge episode as soon as possible after a binge occurred (in an effort to minimize retrospective bias). On this measure, participants tended to report an increase in negative mood (depression, guilt/self-blame, and anger) following a binge episode (Wegner et al., 2002).

The observed differences between the effects of eating on mood in Wegner et al.’s (2002) study and the current study raise interesting questions about the factors that determine when eating enhances, worsens, or has no effect on mood and feelings about the self. The differences between the samples suggest various possibilities. First, Wegner et al. recruited a sample who regularly engaged in binge eating (based on their report of clinically significant levels of binge eating), while the current study did not recruit for participants with any particular clinical characteristics. In connection with this, Wegner et
al.’s study assessed mood after binge episodes, while the participants in the current study had their mood assessed after eating smaller amounts of food, on average. Therefore, it may be that chocolate, when eaten in moderation, leads to improvement in mood and feelings about the self, while full blown binge eating episodes lead to a worsening of mood. Another possibility is that individuals who have clinical eating disorder symptoms are more prone to negative interpretations about their eating behavior (e.g., “I am bad because I ate fattening food,”) and that these negative interpretations hinder the mood elevation effects from food. A third possibility is that the current study allowed for assessment of mood and state self-esteem immediately following food consumption because it took place in a laboratory, whereas the participants’ moods in the Wegner et al. study were assessed up to 30 to 60 minutes following food consumption. Perhaps Wegner et al. missed the window of elevated mood following food consumption due to the delay in assessment in the participant’s naturalistic setting. Future studies which aim to clarify the contextual factors that impact the relationship between eating and mood may ultimately lead to more precise ways of intervening and reducing the suffering that so often accompanies binge eating (Hudson et al., 2007).

The results of the study should be interpreted in light of the design’s strengths and weaknesses. With regards to potential limitations, a non-clinical sample was used, and it is likely that people who do not have eating disorders are less likely to binge eat in response to the experience of failure and negative affect. Future studies may benefit from targeting a high risk group for the sample (e.g., people who regularly binge eat, perfectionists, or dieters; though it is worth noting that 51.6% of the sample said they were trying to lose weight at the time of the study). Another potential weakness is that chocolate chips were the only food offered to participants. Future studies offering a variety of foods (e.g., including salty snack foods) might increase the chance that some foods are appealing to all participants, allowing for a more sensitive measure of food consumption. Finally, the negative feedback in the current study was not related to weight or appearance. Though escape theory does not specify that the failure to meet one’s standards has to be weight or appearance-related, it is possible that negative feedback about appearance would be a more potent antecedent to binge eating.

With regards to the strengths of the study, the experimental manipulation appeared to work as it was intended, and may be a useful paradigm for future studies on escape theory. In addition, the current study is one of few experimental studies on escape theory, despite the fact that it is one of the most widely cited theories of binge eating since Heatherton and Baumeister’s article was originally published in 1991. Thus, null findings in the context of this adequately powered study may serve to advance knowledge on the escape theory of binge eating, and elucidate directions for future study.
APPENDIX A

INSTITUTIONAL REVIEW BOARD APPROVAL FORM

Florida State
Office of the Vice President For Research
Human Subjects Committee
Tallahassee, Florida 32306-2742
(850) 644-8633 - FAX (850) 644-4392

APPROVAL MEMORANDUM

Date: 2/15/2007

To: Kathryn Hope Gordon
MC 1270

Dept.: PSYCHOLOGY DEPARTMENT

From: Thomas L. Jacobson, Chair

Re: Use of Human Subjects in Research
Social Intelligence and Task Performance

The forms that you submitted to this office in regard to the use of human subjects in the proposal referenced above have been reviewed by the Human Subjects Committee at its meeting on 1/10/2007. Your project was approved by the Committee.

The Human Subjects Committee has not evaluated your proposal for scientific merit, except to weigh the risk to the human participants and the aspects of the proposal related to potential risk and benefit. This approval does not replace any departmental or other approvals which may be required.

If the project has not been completed by 1/9/2008 you must request renewed approval for continuation of the project.

You are advised that any change in protocol in this project must be approved by resubmission of the project to the Committee for approval. The principal investigator must promptly report, in writing, any unexpected problems causing risks to research subjects or others.

By copy of this memorandum, the chairman of your department and/or your major professor is reminded that he/she is responsible for being informed concerning research projects involving human subjects in the department, and should review protocols of such investigations as often as needed to insure that the project is being conducted in compliance with our institution and with DHHS regulations.

This institution has an Assurance on file with the Office for Protection from Research Risks. The Assurance Number is IRB00000446.

cc: Thomas Joiner
HSC No. 2007.009
APPENDIX B

INFORMED CONSENT FORM

Title of Research: Social Intelligence and Task Performance

Principal Investigators: Kathryn H. Gordon, M.S., and Thomas E. Joiner, Jr., Ph.D.

I, ____________________________, being 18 years of age or older, freely and voluntarily and without undue inducement or any element of force, fraud, deceit, duress, or other form of constraint or coercion, consent to be a participant in the above named research project, to be conducted at the Florida State University from February 1, 2007 – February 1, 2008. Listed below are the procedures to be followed in this research and their purposes, any risks, discomfort, and benefits associated with participation in this study, and the measures which will be taken to ensure confidentiality of the information obtained.

Purpose of the research: This project is being conducted by Kathryn Gordon, a graduate student in psychology who is being trained by Thomas Joiner, Ph.D., the Bright-Burton Professor of Psychology at Florida State University. I understand the purpose of this research project is to better understand how individuals’ social intelligence affects their performance on laboratory tasks.

Who can participate: You must be 18 to 55 years old and female to participate in this study.

Procedures for the research: I understand that if I participate in the project I will fill out questionnaires, all of which ask me about my feelings, thoughts, and mental health symptoms. I understand that participation in the project involves usual procedures as well as procedures specific to this project. Usual procedures involve signing this informed consent form, filling out questionnaires about my thoughts about myself, my behaviors, and mental health symptoms (if I consent). In addition, I understand that this study involves participating in a social intelligence assessment, for which I will receive feedback. Participation in this study also involve completion of a taste test for different brands of chocolate chips. The total time commitment for the session today in the laboratory will be approximately 1 hour. At the end of the study, I will be given information about the purpose and goals of the study.

Potential risks or discomforts: I understand there is a possibility of a minimal level of risk involved if I agree to participate in this study. I might experience emotional distress while answering questions about mental health symptoms or answering questions about my thoughts and feelings. I am able to stop my participation at any time I wish. I understand that after I complete the screening questionnaire packet, the experimenter will look at my responses to the questions about depression, suicide, and physical health. This will be done for my safety. If my responses indicate that I may experiencing depressive symptoms or other mental illness symptoms, I will be unable to participate (but I will still be given credit). If my responses indicate that I may be at risk for suicide, the experimenter will offer to walk with me to the Psychology Clinic where I may speak with
a therapist. If I am at imminent risk for suicide, the experimenter will contact a mental health professional and/or the campus police to ensure my safety.

**Potential benefits to you or others:** I understand there may be societal benefits for participating in this research project. Increasing the scientific community's knowledge of behaviors and feelings associated with mental health may inform the creation of mental health interventions.

**Confidentiality:** I understand my participation is totally voluntary and I may stop participation at any time. All my answers to the questions will be kept confidential to the full extent allowed by law. My name will not appear on any of the results. No individual responses will be reported. Only group findings will be reported. My confidentiality will be protected to the full extent allowed by law. Once data collection is complete any identifying information will be destroyed (i.e., we will not be able to connect your name with the data you supplied). All paper data will be permanently destroyed three years after it was collected, while electronic data (without identifying information) may be kept indefinitely.

I understand that this consent may be withdrawn at any time without prejudice, penalty or loss of benefits to which I am otherwise entitled. I have been given the right to ask any inquiry concerning the study. Questions, if any, have been answered to my satisfaction.

I understand that I may contact Kathryn Gordon, Florida State University, Department of Psychology, Mail Code 1270, (850) 644-9362, for answers to questions about this research or my rights. I may also contact her advisor, Thomas Joiner at (850) 644-1454 with any additional questions or concerns. Group results will be sent to me upon my request.

I understand that if I have any questions about my rights as a participant in this research, or if I feel I have been placed at risk, I can contact the Chair of the Human Subjects Committee, Institutional Review Board, through the Vice President for the Office of Research at (850) 644-8633.

I have read and understand this consent form.

<table>
<thead>
<tr>
<th>Participant</th>
<th>Date</th>
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22
REFERENCES


BIOGRAPHICAL SKETCH

Kathryn H. Gordon earned her Bachelor of Science in Psychology in 2001, her Master of Science in Clinical Psychology in 2004, and her Doctorate in Clinical Psychology in 2008. All degrees were completed at Florida State University under the mentorship of Dr. Thomas Joiner. She completed her Predoctoral Clinical Internship at the University of Chicago Medical Center.