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The Effect of Induced Anxiety on Eating Behavior

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Past research on anxiety and eating behavior focused primarily on females, eating disorders, and obesity. This experiment concentrated on both sexes as well as participants with healthy eating habits and normal weights. Participants filled out a self-report anxiety questionnaire and were then randomly assigned to a high or low induced anxiety situation. The high-induced anxiety situation consisted of a short clip from a horror movie; the low anxiety induced situation was a clip from a comedy. Participants were given an individual bag of chips to eat while watching the movie clip. The purpose of the study was to see if subjects would eat more or less during a horror movie or a comedy. This study also compared participant’s natural state anxiety level with their induced anxiety level. The hypothesis was that anxiety level would have an affect on eating behavior. The results did not support the hypothesis; eating behavior was not based on natural state anxiety or induced anxiety. There were no significant results, as participants did not eat differently depending on the movie they viewed. Future studies should include a larger sample size and could use other methods of anxiety induction.

Anxiety is often the central explanatory concept behind personality theories; it is regarded as a powerful influence in contemporary life and many facets of our culture. Spielberger (1966) defines anxiety as “a complex reaction or response – a transitory state or condition of the organism that varies in intensity and fluctuates over time” (pp.12). Anxiety can also be used to describe personality traits, as people are often characterized by prominent dispositions. While anxiety has always existed, it was not apparent until the twentieth century that anxiety could and should be viewed as a common persistent mental health problem. Since the 1950’s the volume of research on anxiety has
remarkably increased (Spielberger, 1966). More recently, clinical studies have confirmed that comorbidity between mental disorders, such as anxiety and eating disorders, is customary. Anxiety disorders are to a large extent more common among people with eating disorders than with control groups (McLean et al., 2007). The relationship between anxiety and eating behavior was discussed in detail by McLean et al. (2007). This study focused only on female participants. These women were required to complete self-report questionnaires for: social anxiety, disordered eating, expressive suppression, depression, and negative affect (McLean et al., 2007). The results of their research showed that there was a positive relationship between social anxiety and disordered eating. The research also suggested that participants suppress negative emotions associated with social anxiety and this resulted in disordered eating. McLean et al. (2007) stated, "the present study examined the relationships among social anxiety...and disordered eating...consistent with previous research, disordered eating was associated with greater depression, negative affectivity, social anxiety, and habitual expressive suppression" (pp.10). This experiment is interesting in that the participants were solely female. Reasons for excluding male participants can be better understood when looking at Beebe (1995).

Research done by Beebe (1995) looked at the tendency to eat in response to emotional or environmental pressures. This study included three experiments; the first included male and female participants. Participants were administered a nine-item appearance questionnaire. Beebe (1995) designed the ABS (attention to body shape scale) questionnaire as "adequate self-report measures of eating pathology, body dissatisfaction, body-size distortion, and even general-appearance orientation exist, but
no self-report measure has been specifically devoted to body focus” (pp.487). Beebe (1995) predicted that women would be more body focused than men. The results were internally consistent; therefore further testing was done among female participants only. The results of the second, female only experiment showed that there was a lack of correlation between the attention to body shape questionnaire and the “tendency to eat in response to strong emotions or environmental pressures” (Beebe, 1995, pp.493). The third study also included only female participants but involved two conditions: anxiety induction and no mood induction. Women in both conditions filled out an attention to body shape questionnaire. Women in the anxiety condition were told that they would have to give a 5-min speech during which her peers would be watching and rating her on content, persuasiveness, grammar, and fluency. These women were then administered a manipulation check which consisted of four questions asking participants how angry, nervous, sad or energetic they felt. Women in the no mood induction condition were administered the body-image measure and manipulation check without mention of a speech. The results of the third study showed that the women in the anxiety induced group reported being significantly more nervous than those in the no mood induction group. As predicted higher scores on the attention to body shape questionnaire were significantly associated with the induced anxiety condition. Women in the induced anxiety situation preferred body sizes that were thinner than the ideal body size. The results of this study showed that the attention to body shape questionnaire failed to correlate with the tendency to eat in response to emotional or environmental pressures. The results of this study suggest that women who are in an induced anxiety situation will rate their body more negatively which is consistent with body image disturbance. The
attention to body shape questionnaire was related to measures of eating pathology and
dietary restraint but there was no theoretical reason to believe that attention to body shape
was related to actual body size, general affective state, or whether one eats in response to
external or emotional cues.

Beebe (1995) went on to do more research in this field as he felt that the
previous studies used small and homogeneous participant sampling. Beebe (1999) states,
“it is well documented that women with eating disorders, when taken as a group, show
greater rates and severity of mood disturbances than do non-psychiatric controls” (pp. 8).
Beebe (1999) wanted determine if different results could be found using a larger sample
of participants across multiple ethnicities, age groups, education levels, and
socioeconomic groups. Beebe (1999) looked at induced anxiety and the attention to body
shape in more detail focusing on affective state and eating pathology. Despite larger
demographics and more intricate in depth testing, Beebe (1999) found similar results to
his prior research. His results failed to support the hypothesis. The level of eating
pathology or degree of body focus did not significantly relate to the relationship between
induced anxiety and body image. The mood manipulation had no significant direct effect
on body image in this study. The conclusion of this experiment showed that the data
failed to indicate that induced anxiety affected body image. Beebe (1999) failed to prove
that induced anxiety situations lead to a change in the participant’s eating behavior.

Gutiérrez-Maldonado et al. (2006) took a different approach to answer the
question about the correlation of eating behavior and anxiety situations. Gutiérrez-
Maldonado et al. (2006) measured the anxiety level of participants after being exposed to
virtual environments and emotionally significant situations. This experiment involved
thirty participants who were all female with eating disorders. These women were exposed
to six virtual environments: a living room, a kitchen with high-calorie food, a restaurant
with high-calorie food, a restaurant with low-calorie food, and a swimming pool. After
exposure participants were asked to complete the Spielberger ‘state’ inventory as a
measurement of anxiety, a measurement of depression was also administered. The results
showed that certain everyday situations provoke emotional reactions such as anxiety and
depression in women with eating disorders. Gutiérrez-Maldonado et al. (2006) also
found that participants exposed to environments with high-calorie foods provoked the
highest levels of state anxiety and depression. These results are quite interesting but
focus on females with eating disorders (Gutiérrez-Maldonado et al., 2006).

When looking at the correlation between anxiety level and eating behavior it is
common to focus primarily on females with eating disorders. Reznick, & Balch (1977)
decided to study a different sample. They assessed the effect of anxiety level and
response cost on 64 normal-weight and obese adults (Reznick, & Balch, 1977).
Participants were asked to complete the state section of the Spielberger state-trait anxiety
inventory as a pretest. Next participants were randomly divided into two conditions: high
and low anxiety. In the high anxiety condition participants were told that correct
responses were related to intelligence and electric shock would be dispensed for errors.
Participants in the low anxiety situation were given relaxation-induced instructions. In
addition to the high and low anxiety conditions, participants were divided into two
response cost conditions: high and low. Participants in the high-response cost condition
had access to tightly wrapped candies and participants in the low-response cost condition
had access to unwrapped candies. The results of this study indicated that anxiety and
response-cost manipulations did not affect the normal-weight participants. Interestingly, obese participants in the low-response cost and low-anxiety conditions tended to eat more than the obese participants in the high-response cost, high-anxiety conditions. Reznick, & Balch (1977) also discovered that the obese participants were more inaccurate when estimating the amount of candies eaten. These results contradict the research on females with eating disorders. The fact that obese participants ate more when they were in a relaxed environment differs from most hypotheses that people will eat more under high levels of anxiety (Reznick, & Balch,1977).

The present study was based on the previous research and examined eating behavior under low and high anxiety conditions. In the low anxiety condition participants watched a short clip from a horror movie; in the high anxiety condition participants watched a short clip from a comedy. This study compared participant’s eating behavior while they watch a short clip from a horror movie or a comedy. This study also compared participant’s natural state anxiety level with their induced anxiety level. The purpose of the study was to see if participants with low or high state anxiety levels would eat more or less under high or low anxiety induced situations. The hypothesis was that anxiety level would have an affect on eating behavior.

Method

Participants

Participants were randomly selected to partake in this experiment based on convenience. The majority of participants were family members or friends of the researcher. Some of the participants were University of Western Ontario students. All
participants were between 18 to 85 years of age. Participants were primarily Caucasian
descent, though all ethnicities were used. Both male and female participants were used.
In general, it was assumed that participants had relatively healthy eating habits and
normal weights. All of the participants signed a consent form prior to completing the
study. Participation was not mandatory and subjects were free to withdraw from the
study at any time. Participants were randomly divided into two groups: low and high
induced anxiety. There were 15 subjects in each group, creating a total of 30 participants
in this experiment.

Materials

Participants were also divided into two conditions based on their natural everyday
anxiety level. Natural anxiety level was measured using a questionnaire based on the
state component of the Spielberger State-Trait-Anxiety Inventory (STAI) commonly used
for measuring psychological characteristics of state anxiety. The questionnaire consisted
of 20 self-report questions, where subjects had to circle the degree to which they agreed
or disagreed with each of the following statements on a 4-point scale, from 1 being not at
all to 4 being very much so (Spielberger et al., 1970). The total questionnaire scores can
range from a minimum score of 20, which would be a person with little anxiety to a
maximum score of 80, which would be a person with extreme anxiety (Spielberger et al.,
1970). The Spielberger State-Trait-Anxiety Inventory (STAI) was based on 484
university undergraduates, the mean for 231 females was 38.25 with a standard deviation
of 9.14, and the mean for 253 males was 37.68 with a standard deviation of 9.69
(Spielberger et al., 1970). The alpha reliability of The Spielberger State-Trait-Anxiety
References


## Table 1

**Analysis of Variance Summary Table**

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Induced Anxiety</td>
<td>80.5</td>
<td>1</td>
<td>80.5</td>
<td>0.25</td>
<td>n.s.</td>
</tr>
<tr>
<td>State Anxiety</td>
<td>16</td>
<td>1</td>
<td>16</td>
<td>0.05</td>
<td>n.s.</td>
</tr>
<tr>
<td>Interaction</td>
<td>98.7</td>
<td>1</td>
<td>98.7</td>
<td>0.31</td>
<td>n.s</td>
</tr>
<tr>
<td>Error</td>
<td>8337.7</td>
<td>26</td>
<td>(320.68)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note.* The value enclosed in parentheses represents mean square error.
Inventory (STAI) was .90 and the test-retest reliability after 20 days was .86 for males and .76 for females, after 104 days the test-retest reliability was .73 for males and .77 for females (Spielberger et al., 1970). The Spielberger State-Trait-Anxiety Inventory (STAI) has high concurrent validity when compared to other similar tests and also has high construct validity when participants are given the test in different situations or conditions. After scoring the state anxiety levels of the participants in the present study, it was found that their anxiety levels ranged from a low score of 21 to a high score of 55. This suggested that the participants in the present study had a low to average anxiety level as a group. A median split of 33 was used to separate low and high anxiety participants. This resulted in 15 participants in the low state anxiety group and 15 in the high state anxiety group.

The participants viewed the movie clips after completing the anxiety questionnaire. The environment in which the test was conducted varied between participants. An effort was made to create similar environments that were quiet with no other people in the room besides the people being tested. The experiment was conducted in several living rooms. The furniture in each living room was arranged so that the T.V. was the focal point. The two movie clips that were shown were each 10 minutes in length. The movies used were Anchorman for the comedy, and The Descent for the scary movie. The scary movie was used to induce anxiety and the comedy was used to reduce anxiety. Subjects were given a consent form, which stated that they might disclose pertinent information but they would not be questioned directly. The consent form also informed subjects that the movie clips could offend participants and they were allowed to withdraw their participation at any time if they felt uncomfortable. This experiment also
included a debriefing form. This form summarized the purpose and hypothesis of the experiment. It also provided participants with background research on the correlation of anxiety and eating habits.

In order to evaluate eating behavior chips were given to each participant. The chips used were Lay’s, which came from Frito Lay Canada in Cambridge, Ontario. Small bags of chips were used; these bags are the 75g bags. Subjects had a choice of six flavors: Salt and Vinegar, Sour Cream and Onion, Barbeque, Ketchup, Dill Pickle, and Classic. These chips were weighed before and after subjects watched the movie clip. The scale used to measure the amount of chips eaten was NexXtech, which came from Orbyx Electronics in Concord, Canada.

Procedure

The participants entered the testing area, which was a living room. This experiment was designed so that the TV’s were placed in the center of the living rooms. This was done to ensure that the participant’s attention was focused on the T.V. at all times and there were no distractions. First, the subjects were given a consent form to read and sign. Next the participants were asked to fill out the state-anxiety questionnaire. While the participants were filling out the state anxiety questionnaire the researcher made sure the appropriate movie clip was ready to be played. After the participants completed the anxiety questionnaire they were given one bag of unopened chips each. These chips had previously been weighed before the experiment began in a different room. Subjects were randomly divided into two conditions: high or low induced anxiety situations. The subjects in the low anxiety induced condition were shown a clip from a comedy. The
subjects in the high anxiety induced condition were shown a clip from a horror movie. The scary movie clip was from the movie The Descent; the comedy clip was from the movie Anchorman. Before watching the movie clip, participants were told that they could open their bag of chips subjects and eat whatever amount of chips they desired. The participants were instructed to watch the movie clip and not talk to each other. Participants were usually tested in groups of three or less. The lights were turned off in the room while the movie was being shown. The researcher stayed in the room to watch the clip with the participants. After the movie clip was over subjects were given a debriefing form, and asked for their bags of chips back. The chips were weighed individually and the amount that each subject ate and the type of movie the subject watched was written at the top of the subject’s anxiety questionnaire. This was to ensure confidentiality of all participants, as the names of the participants were only written on the consent forms. The subjects were allowed to keep the remaining contents of the chip bag if they wished to. This study took around 20 minutes to complete.

Results

The results of this experiment show that the mean scores in each condition are quite similar. Mean scores were as follows: 26.8 for the low induced anxiety (comedy) and low state-anxiety conditions; 26.7 for the high-induced anxiety (horror) and low state-anxiety conditions; 29.4 for the low induced anxiety (comedy) and high state-anxiety conditions; 23.1 for the high induced anxiety (comedy) and high state-anxiety conditions. The results also showed high inter-subject variability in scores. The amount participants ate during the experiment ranged from 0g to 85g. An analysis of variance
showed that no significant differences were observed. F-scores are presented in Table 1 (see Appendix).

Discussion

The results of this study did not support the hypothesis that anxiety would affect eating behavior. There were no significant results, as participants did not eat differently depending on the movie they viewed. It was expected that subjects would eat different amounts of chips depending on the type of movie they watched. This study also compared participants state anxiety level with their induced anxiety level. Natural state anxiety and induced anxiety when compared did not significantly interact with each other.

Several issues might have contributed to the failing of this study to find significant differences. Perhaps the test measuring state anxiety was not as accurate as the 'trait' test used to measure anxiety over a longer period of time. State anxiety is said to be an emotional state or condition that is characterized by subjective, consciously experienced thoughts and feelings related to tension, apprehension, nervousness, and worry that vary in intensity and fluctuate over time (Spielberger, 2004). The state anxiety questionnaire asked participants how they feel right now and in this exact moment. It might have been better to ask participants how they usually feel in general all the time. Despite using the state instead of the trait anxiety questionnaire these tests usually result in similar scores when subjects take both tests at the same time.

Another issue that might have contributed to not having significant results could be that fact that there was high inter-subject variability in scores. This suggests that some
participants ate a lot of chips while others did not. This did not have to do with what kind of movie they were watching but with how hungry participants were at the time of being tested. The cell means are very similar indicating that people ate chips in both high and low induced anxiety conditions and high and low state anxiety conditions. Despite the fact that the experiment was conducted at relatively the same time each night, subjects had varied degrees of hunger. This study should be replicated involving a segment where participants are asked how hungry they are before conducting the movie-watching chip eating part of the experiment. This experiment demonstrates that it is extremely difficult to study eating behavior as every subject eats at different times of the day. Future experiments should consider using a larger sample size with hungry participants. Today, research on anxiety and eating behavior tends to focus on female subjects, eating disorders, and the difference between obese and normal weight subjects. Some of these studies have shown that anxiety and eating behavior are positively correlated. The results of the study could have been very different if a different subject pool was used including obese subjects or females with eating disorders.

In conclusion, the results of this experiment could vary dramatically depending on how one alters any of the factors of influence. For example the experiment might be quite different if the demographics of participants changed and did not included participants with healthy eating habits and relatively average anxiety levels. Significant results might have been obtained if anxiety was induced in a different manner. Participants could have been allowed to watch a whole movie or a different method could be used. It would also be interesting if future research could include participants who have anxiety disorders or have recently had a traumatic event happen to them.