Understanding Stress and Emotional Triggers of Disordered Eating Behaviors in College Students

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Abstract

Research has shown a relationship between stress and emotion in those with, or who are at-risk for, eating disorders. However, more research needs to be done on how levels of stress and emotion affect eating behaviors that could potentially lead to an eating disorder. This study is an effort to understand how stress and emotion affect disordered eating behavior. The study of 24 college students had participants report their levels of anxiety, stress, emotion, and eating behaviors over a five-week period. Results from this study showed that anxiety and negative affect were correlated with disordered eating behavior, but stress relationships were not significant. To further research, more understanding of the emotions associated with disordered eating is needed. Ultimately, this information could be used in a predictive, and defensive manner to prevent the onset of disordered eating behavior into a full-blown eating disorder.

**Introduction**

*Background*

A college girl is in sitting in her university’s dining hall on a Monday morning before breakfast. In front of her she has her planner with all of her commitments and assignments for the upcoming week. Glancing at it, she notices that she has no free time in the evenings to complete her homework and that some of her meetings are double booked for the same hour. The stress of completing all her homework and attending all of her extracurricular commitments settles as a sharp pain in her abdomen. In order to carve out more time to work, the girl strikes a line through her lunch breaks and dinner plans and writes in, “go to library,” instead. Having come to the dining hall for breakfast, the girl grabs a black coffee instead of her usual bagel, and heads to the library to work on her assignments.

Many people are familiar with the two well-known eating disorders, Anorexia Nervosa and Bulimia Nervosa, but very few are familiar with the sub-clinical behaviors of disordered eating. While eating disorders have specific criteria for diagnoses, disordered eating is defined by one’s thoughts, feelings, behaviors, or attitudes towards food that can be dysfunctional (Alvarenga, Periera, Scagliusi, Philippi, Estima, & Croll, 2010). The vignette of the girl skipping all of her meal times to work provides an example of how disordered eating can occur as a result of increased stress. Instead of grabbing a bagel and eating it on the way to the library, the girl chooses black coffee. She also chooses to work during her lunch hours instead of sitting down for a full meal. Though this behavior may not be normal for her, skipping most of her meals in a week is an example of disordered eating behavior. Not all examples are this extreme, and many people have time periods when their eating is considered “abnormal” for them. However, an increasing presence and pervasiveness of disordered eating attitudes in an individual can put them at risk for developing an eating disorder. This study examines the factors that lead to disordered eating, which can in turn potentially lead to eating disorders.

A variety of factors have been shown to affect development and onset of eating disorders. A longitudinal study of healthy adolescents found depression, body dissatisfaction and high dieting behavior to be predictors of eating disorder onset (Stice, Marti, & Durant, 2011). These factors have an even stronger influence on those considered “at risk” with negative eating attitudes (Bittinger & Smith, 2003). One measure used to determine risk for the onset of eating disorders is the Eating Attitudes Test (EAT; Bittinger & Smith, 2003). The Eating Attitudes Test is an objective measure of anorexia and bulimia symptoms used to identify disordered eating behavior in individuals. Those who score higher on the EAT are considered to be more at risk for developing an eating disorder. Of the predictors in Stice et al.’s (2011) study, the factors encompassed variables in emotional affect, cognition, and disordered eating. The EAT asks questions about these variables to identify behavior that is predicative of eating disorder onset. However, the wide variety of predictive factors contributing to disordered eating behavior makes it difficult to focus on researching preventative measures (Lavender, de Young, Anestis, Wonderlich, Crosby, Engel, Mitchell, Crow, Petson, & Le Grange, 2013).

*Stress and Disordered Eating*

There is a lack of research on how stress affects a change in eating behavior in those who only have disordered eating attitudes. Past studies have indicated that stress and emotion have an impact on eating habits of those with full-blown eating disorders, but more research needs to be done to understand the effects of stress and emotion on increased disordered eating behavior in a non-clinical sample.

Current research has shown that stress is related to the onset of disordered eating behavior in healthy adolescents and in those who are considered at-risk for eating disorders. In samples of those already at risk for developing an eating disorder, studies have shown that those individuals have a higher perception of stress than those who are not at risk. In simulated stress situations, individuals with a high risk for eating disorder development, as measured by high Eating Attitude Test (EAT) scores, showed higher reports of stress compared to the control with low EAT scores (Bittinger & Smith, 2003). The at-risk individuals found the same stress situations more stressful than those who are not at-risk for developing an eating disorder, especially in simulations pertaining to food/body issues. This indicates that those at-risk have higher stress perception. The difference in reported stress connects susceptibility for stress with vulnerability for developing an eating disorder.

In a large study of healthy adolescents in China, stress had an effect on eating behavior. The study of over 1000 adolescents found that higher levels of emotional symptoms and life stressors were associated with higher levels of restrained eating, emotional eating, and external eating (Hou, Xu, & Zhao, Lu, Zhang, Zu, Sun, Su, & Tao, 2012). This shows that disordered eating behaviors in normal samples of adolescents can be affected by increased stress.

Another study looked at a college student sample to find relationships between stress, emotion induction, and self-perceived emotional eating. This study found that when the negative emotional stressor was induced, the sample reported higher levels of self-perceived emotional eating compared to a neutral stressor (Bekker, van de Meerendonk, & Mollerus, 2004). This indicates that changes in eating behavior can occur in college students when stress and negative affect increase.

The results from these studies indicate that increases in stress are positively correlated with an increase in disordered eating pathology. Frequently, negative affect is a component of increased stress. Therefore, research on the effect of emotions on eating disorders will help to shed light on the relationship between emotion and change in eating behavior.

*Emotions and Eating Disorders*

When investigating the emotional triggers behind eating disorder symptoms, research revealed that emotion dysregulation, an emotional response that is not well controlled, can play a role in eating disorder symptomology. In a study of bulimia, emotional factors such as emotion dysregulation, negative affect, and lack of emotion identification were predicative of increased bulimic symptomology (Markey & Vander Wal, 2007). This finding can be demonstrated by the example of the college girl with disordered eating. Instead of coping with the overwhelming emotion of having too much work to do, the emotional state leads her to make a disordered eating decision. This study shows that there is a relationship between increased eating disorder symptomology and emotion that could potentially be seen in a non-clinical sample.

Another study has found negative affect, or a negative emotion state, to have an immediate effect on eating behavior in an anorexia nervosa sample. In the study, reports of negative affect predicted a greater likelihood of dietary restriction the following day (Engel, Wonderlich, Crosby, Crow, Peterson, Le Grange, Simonich, Coa, Lavender, & Gordon, 2013). The direct correlation of negative affect and increased dietary restriction strongly supports the prediction that negative emotions cause an increase in disordered eating behavior. Because this study focuses on an anorexia nervosa sample, further research is needed on negative affect’s effect on eating behavior in those without eating disorders.

Not only has negative affect been shown to increase dietary restriction, but it has also been found to have an effect on exercise behavior. A study investigating how negative affect impacts exercise behavior in college students found that there is an increase in exercise in response to increased negative emotions. (De Young & Anderson, 2010). Along with this find, other disordered eating behaviors, such as purging and restriction, were reported with increased negative affect. This study indicates that the disordered eating behaviors of exercise, purging, and restrictive eating can be impacted by an increase and negative emotions.

One study investigated the occurrence of affect lability, the fluctuation of emotional affect states, in anorexia nervosa inpatients and found that the frequent fluctuations in emotional affect were correlated with increased restrictive eating behavior (Lavender, Young, Anestis, et. al. 2013). This finding was only significant when the affect lability was measured with negative affect emotions such as anger, fear, sadness, and dissatisfaction, which are normally related to anorexia nervosa symptoms. Interestingly, the measure of emotional affect was significant over the measure of anxiety, indicating that emotion might have a stronger influence and be more predicative of restrictive eating behavior in anorexia nervosa patients. Moreover, the study had additional support that negative affect is associated with greater eating pathology. The strong relationships between specific negative emotions and increased eating disorder symptomology show that it is worth investigating the many negative emotions and disordered eating behavior in a non-clinical sample.

The role of shame has been studied as a more specific predictor of the emotional triggers of eating disorder symptoms. In a study of women with a history of anorexia and bulimia, disorder symptomology was predicted by varying levels of shame (Troop, Allan, Serpell, et. al., 2008). Interestingly, internal shame (shame of the self) was associated with bulimia nervosa. In contrast, levels of external shame (shame perceived by others) were associated with anorexia nervosa. These different conceptualizations of shame shed light on how different symptoms of eating disorders manifest as a result of emotion. The interpretation of shame and other negative emotions in those with eating disorders is relevant to understanding how specific disordered eating can develop.

The research on emotions, such as shame, on eating disorders has led to a viewpoint of eating disorders as an affect regulation strategy (Fox, Power, & Wiley, 2009). Fox et al. (2009) researched current literature on emotional factors in eating disorders in order to develop a new model of eating disorder understanding. The paper examined emotion and depression in attempt to create a multi-level model of emotions and how they affect eating disorders. From this model, it is reasonable to predict that increase in reported emotions is correlated with increased disordered eating behaviors.

Despite these findings, the exact relationship between emotions and eating behavior is still unknown. Investigation into how emotion changes eating behavior has been found to vary for different emotions and personal habits. Macht (2008) found that for stress and negative emotions there was increased and decreased motivation to consume food depending on whether the person was a restrictive eater or an emotional eater in times of stress. This change in eating behavior in restrictive and binge eaters shows that emotion has an overall impact on disordered eating that can be different for the various levels of disordered eating attitudes. The finding that change in eating can go in both directions (increased intake and decreased intake) supports that stress and negative emotion have a relationship with increased disordered eating behavior, especially in those who already display abnormal eating behaviors. Therefore, it is likely that those with high disordered eating attitudes would have a change in eating behavior when faced with increased emotions and stress.

*Research Question*

Previous research has shown a connection between stress, emotion, and increases in disordered eating behaviors (Bekker, van de Meerendonk, & Mollerus, 2004; Engel, Wonderlich, Crosby, Crow, Peterson, et al, 2013; De Young & Anderson, 2010)

Increased stress and emotions such as anxiety and shame are associated with changes in eating behavior in those who already suffer from an eating disorder as well as in the normal population (Engel et al., 2013; Bekker, van de Meerendonk, & Mollerus, 2004). My study was an effort to understand the relationships between stress, emotions, and changes in eating behavior in healthy college students. Most of the research on how emotion and stress affect eating behaviors was conducted using clinical samples of eating disorders. This leaves a hole in the literature about these factors in non-clinical samples. A few of the research studies described showed a relationship between stress and emotions and eating behavior in healthy samples (Hou, Xu, & Zhao, et. al., 2012; Bekker, van de Meerendonk, & Mollerus, 2004), indicating that this relationship is not unique to the clinical population of eating disorders.

My study of stress and emotions and the eating behavior of college students could shed light on this relationship in non-clinical samples. I predicted that negative affect, as well as specific emotions of anxiety and shame, would be associated with a change in eating and exercise behavior, and that an increase in stress would correlate with a change in eating and exercise behavior. I believed that these results would be especially supported in those with high disordered eating attitudes, based on the previous research of at-risk individuals mentioned above. By understanding how emotions and stress are correlated with disordered eating behavior, more conclusions can be drawn as to which emotions trigger specific disordered eating habits. Ultimately, this information could be used in a predictive and defensive manner to prevent the progression of disordered eating behavior into a full-blown eating disorder. Tracking stress and emotion levels in a college student sample could reveal how high stress environments can change eating and exercise behavior into disordered eating. This study attempted to find a correlation between increased stress and increased negative emotion and a change in eating and exercise behaviors.

**Method**

*Participants & Design*

In this longitudinal study, over the course of five weeks, participants completed an intake survey and then four weekly follow up surveys. The study began with 24 participants (20 females, 4 males) who completed a comprehensive intake survey for course credit. Participants pooled from a mid-sized, private, academically rigorous, southern university, and ranged in age from 18 to 22 years old. All participants who took the intake survey were prompted to take four follow up surveys for additional course credit, one survey each week for the following four weeks. Week 1 yielded 15 participants who completed the survey (4 males, 9 females), week 2 had 8 participants submit survey data (3 males, 3 females), week 3 had 15 participants (4 males, 8 females), and week 4 had 14 participants take the survey (4 males, 7 females).[[1]](#footnote-1)\* Overall, 4 participants completed all 5 surveys (3 male, 1 female), 4 participants completed 4 out of 5 surveys (1 male, 3 female), 4 (female) participants completed 3 out 5 of surveys, 6 (female) participants completed 2 out of the 5, and 6 participants only completed the intake.[[2]](#footnote-2)\*\*

*Measures*

The Disordered Eating Attitudes Scale (Alvarenga et al, 2010) measures thoughts and behaviors associated with disordered eating habits. The questions have a 1-5 point response scale, and participants were given a modified version with 24 questions (instead of 25). Spearman’s correlation coefficient between test-retest of DEAS was .69, indicating the scale’s high reliability. See measure 1 in Measures Index for a complete copy of Disordered Eating Attitudes Scale.

The Center for Epidemiologic Studies-Depression Scale (Radloff, 1977) measures depressive symptoms. The questions are on a 4-point scale, and the measure consists of 20 questions. The reliability for the CES-D is .85 for general populations. See measure 2 in Measures Index for a complete copy of the Center for Epidemiological Studies-Depression Scale.

PROMIS Level 2—Anxiety—Adult measure (anxiety measure) (Cella, Riley, & Stone, et. al. 2010) is a 7-item (modified to 8-item) anxiety questionnaire that focuses on fear, misery, hyperarousal, and somatic symptoms related to anxious arousal. The anxiety measure has a reliability of .89. See measure 3 in Measures Index for a complete copy of the Level 2-Anxiety-Adult measure.

The Perceived Stress Scale (Cohen & Janicki-Deverts, 2012) measures one’s reported ability to deal with current stress in his or her life. The scale consists of 14 questions rated on a 0-4-point scale, and participants were given a modified version of the PSS (time scale changed from month to week), asking them to rate their stress from the last seven days. Reliability for the PSS in a student sample was .85. See measure 4 in Measures Index for a complete copy of the Perceived Stress Scale.

The Discrete Emotion Adjectives List (DEAL; Kirby, Yih, & Smith, 2013) gives a cluster of emotion adjectives or feelings to rate on a 5-point scale. Each cluster of adjectives is meant to describe one basic emotion or feeling. See measure 5 in Measures Index for a complete copy of the Discrete Emotion Adjectives List.

Participants also received two original scales each week that asked the participants to rate their eating habits on a scale of 0 to 12, with a 6 representing that they “ate all meals usually eaten,” a zero representing “skipped or purged all meals usually eaten,” and 12 representing “ate 3x as many meals as usually eaten.” A similar scale asked them about their exercise habits, with a 6 representing “exercised as much as usual,” a zero representing “exercised 3x more than usual,” and a 12 signifying “exercised 3x less than usual.” On the scales, smaller numbers correlated with more restrictive/purging behaviors, and larger numbers correlated with binging behaviors. These scales were created to allow participants to quantify any disordered eating behaviors based on what is normal or out of the norm for them. For example, exercising 6 times in one week could be normal for someone who runs on the track team, or it could be a great change in behavior for someone who goes to the gym only twice a week. The original scales were ranged 0 to 12 to give room for a variety of responses for how behavior can change in a week, without being too broad, so that it would be easier to quantify change in behavior as a variable. See measure 6 in Measures Index for a complete copy of the original scales.

All surveys were administered online via Research Electronic Data Capture (REDcap; Harris, Taylor, Thielke, Payne, Gonzalez, & Condie, 2009) a secure online survey delivery system that allowed participants to complete the surveys completely anonymously, and from their own computers.

*Procedure*

Participants were given a Disordered Eating Attitudes Scale (DEAS) (Alvarenga et al, 2010), Center for Epidemic Studies-Depression Scale (CES-D) (Radloff, 1977), the Perceived Stress Scale (PSS) (Cohen & Janicki-Deverts, 2012), Level 2—Anxiety—Adult measure (anxiety measure) (Anthony, Bieling, Cox, et. al., 1998), and Discrete Emotions Adjective List (DEAL) (Kirby, Yih, & Smith, 2013) at intake. The surveys were administered online via REDcap as a survey called “Adjustment to College Life Survey.” Other questionnaires about health and relationships made up the “Adjustment to College Life Survey.” The purpose of the comprehensive survey was to deter biases against answering questions that focus on eating behavior. The intake measured the participants’ baseline eating attitudes, depressive states, anxiety scores, stress levels, and emotions. Additionally, each week the participants received survey questions via REDCap asking them only about their eating habits, stress, anxiety, and emotion. The measures asked about behaviors and feelings from the past week. All surveys and scales were administered anonymously over REDCap. Participants took the surveys from their own computers and at their own time preference over the Thursday, Friday, Saturday, Sunday period of each week. Participants were prompted with two reminders, an initial request to take the survey on Thursday, and a reminder on Sunday.

*Data Analysis*

Once all the data were collected, the weekly results were combined, and the results of each measure were averaged across the weeks. Due to the limited number of people who completed all the surveys, averages of their original eating behavior and exercise behavior scales were compared to the averages of their stress, anxiety, and emotion scores. Usually, correlations based on averages are higher than correlations based on individual scores. Combining the weekly scores into a total and then averaging them increased the power of the results because all the participants could be included in the analysis for each variable. This was necessary because not all participants completed surveys for each week, and the total overall *n* was small. The correlation function of SPSS was used to analyze the data.

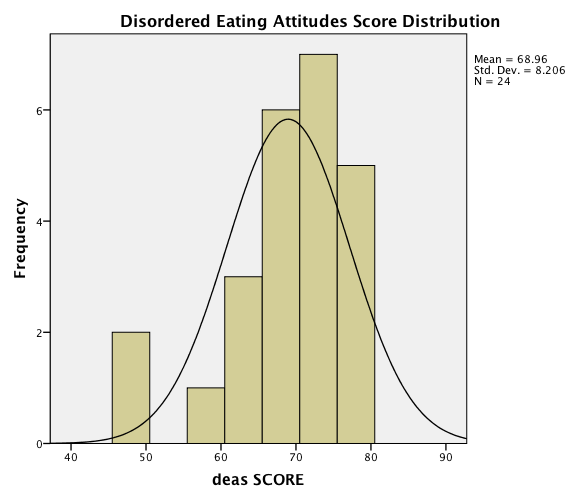
By comparing the averages of change in eating and exercise behavior to the averages of the anxiety measure, PSS, and DEAL, I expected to find relationships between change in behaviors and increased emotion and stress averages. Specifically, changes in eating and exercise would be correlated with increased anxiety, shame, and overall negative affect. Similarly, changes in eating and exercise would be correlated with increased reports of stress. Additionally, I expected these relationships to be found in those who scored higher on the DEAS.

**Results**

*Overall Results*

Correlational analyses were run on the full data set, and then on two levels of disordered eating attitude scores. A histogram of disordered eating scores separated the data into two levels: 73 and above was the “high level”, and scores below were the “low level.”Dividing the disordered eating scores into levels served the purpose of looking for specific relationships present between changes in disordered eating and emotions and stress for those with different eating attitudes. To find the scores for each group, DEAS scores for all participants were distributed in a histogram. *See figure 1.* Then the DEAS score corresponding to the top 33% was calculated from the mean, standard deviation and z-score for the corresponding area under the curve. From this, 73 was designated as the cut-off for the high scoring level. Scores below 73 fell in the lower level. Within these groups, the high disordered eating attitude level had a sample of 11 (9 females, 2 males), the low level had a sample of 13 (11 females, 2 males).

*Figure 1*



*Descriptive Statistics of Emotion and Stress Correlations with Change in Disordered Behavior*

The results from the analysis of all participants’ data supported the hypothesis that emotion is significantly correlated with changes in disordered eating behavior. For change in eating behavior, significant correlations of p=<.05 were found with anxiety from the DEAL measure and negative affect. Negative trends of p=<.10 were also found between change in eating behavior and the anxiety measure and the overwhelmed emotion. All of these relationships are negative, indicting that increased negative emotions are related to decreased eating behavior. For change in exercise, significant positive correlations of p=<.01 were found with the anxiety measure and overwhelmed emotion; and, with a significance of p=<.05, there was a positive correlation with negative affect. There were also positively correlated trends of p=<.10 between change in exercise and anger and the anxiety DEAL. All of these relationships are positive, indicating that a decrease in exercise is correlated with an increase in these emotions. See table 1 for statistics.

The results from the analysis only partially supported the hypothesis that there is a significant relationship between stress and disordered eating behavior. For change in eating there was no relationship with increased stress. However, for change in exercise behavior there was a positively correlated trend of p=<.10 with stress. This trend indicates that a decrease in exercise has a trend with increased stress. See table 1 for statistics.

*Table1*

Significant and trend correlations of change in eating and exercise behaviors compared to the anxiety measure, anxiety DEAL, stress, anger, overwhelmed, and negative affect.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Overall Data* | **Anxiety Measure** | **Anxiety DEAL** | **Stress** | **Anger** | **Overwhelmed** | **Negative Affect** |
| **Change in Eating** | -.363† | -.460\* |  |  | -.420† | -.426\* |
| **Change In Exercise** | .561\*\* | .420† | .378† | .386† | .592\*\* | .521\* |

\*p=<.05 \*\*p=<.01 †p=<.10

The data were then separated into levels of high and low disordered eating attitude scores to test the hypothesis that significant changes in eating behavior would be found in those with high disordered eating attitudes. Analysis was then run on the results from each level. Results from the analysis support the hypothesis that emotion will especially impact disordered eating in those who score high on the DEAS, however the predication that stress will also impact disordered eating behavior was not supported. For change in eating, significant negative correlations of \*p=<.05 were found between the anxiety measure, overwhelmed emotion, and negative affect. A negatively correlated trend of \*p=<.10 was also found with anxiety from the DEAL. These negative relationships suggest that negative emotions are related to a decrease in eating behavior in those who scored high on the Disordered Eating Attitudes Scale. For change in exercise, significantly positive correlations were found with the anxiety measure, frustration, overwhelmed, and negative affect. These positively correlated relationships suggest that increased negative emotion is related to a decrease in exercise behavior. See table 2 for statistics.

*Table 2*

Significant and trend correlations of change in eating and exercise behaviors compared to the anxiety measure, anxiety DEAL, frustration, overwhelmed, and negative affect in the high disordered eating level.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *High Eating Attitude Score Level* | **Anxiety Measure** | **Anxiety DEAL** | **Frustration** | **Overwhelmed** | **Negative Affect** |
| **Change in Eating** | -.742\* | -.624† |  | -.752\* | -.734\* |
| **Change In Exercise** | .771\* |  | .698\* | .722\* | .715\* |

\*p=<.05 \*\*p=<.01 †p=<.10

Within the low scoring level, there were also significant relationships between emotions and change in disordered eating behavior. For change in eating, there was a significant negative correlation of p=<.05 with negative affect, and a negatively correlated trend of p=<.10 with the overwhelmed emotion. The negative relationships indicate a decrease in eating with an increase in negative emotion. For exercise behavior, significant correlations of p=<.05 were found with the anxiety measure, overwhelmed, and negative affect. These relationships were positive, indicating decreased exercise with increased negative emotion. Unexpectedly, a significant negative correlation of p=<.01 was found between exercise and determination. This unpredicted relationship with the positive emotion indicates that exercise increased with the increase of determination. See table 2 for statistics.

*Table 3*

Significant and trend correlations of change in eating and exercise behaviors compared to the anxiety measure, determination, overwhelmed, and negative affect in the low disordered eating level.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *Low Eating Attitude Score Level* | **Anxiety Measure** | **Determination** | **Overwhelmed** | **Negative Affect** |
| **Change in Eating** |  |  | -.557† | -.734\* |
| **Change In Exercise** | .660\* | -.842\*\* | .701\* | .715\* |

\*p=<.05 \*\*p=<.01 †p=<.10

However, a one-way ANOVA test revealed that mean differences between the two groups were not significant. Table 4 shows the comparisons of the means between the high and low group.

*Table 4*

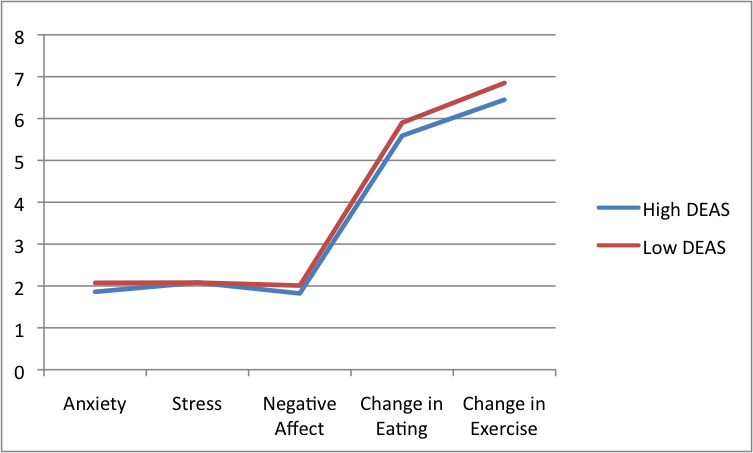
**ANOVA of High and Low Levels of Disordered Eating Scores Means**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | |
|  | | Sum of Squares | df | Mean Square | F | Sig. |
| DEAS SCORE | Between Groups | 857.000 | 1 | 857.000 | 27.247 | .000 |
| Within Groups | 691.958 | 22 | 31.453 |  |  |
| Total | 1548.958 | 23 |  |  |  |
| Eating Change | Between Groups | .448 | 1 | .448 | .415 | .528 |
| Within Groups | 18.351 | 17 | 1.079 |  |  |
| Total | 18.799 | 18 |  |  |  |
| Exercise Change | Between Groups | .776 | 1 | .776 | .381 | .545 |
| Within Groups | 34.632 | 17 | 2.037 |  |  |
| Total | 35.407 | 18 |  |  |  |
| Anxiety Average | Between Groups | .275 | 1 | .275 | .575 | .456 |
| Within Groups | 10.537 | 22 | .479 |  |  |
| Total | 10.813 | 23 |  |  |  |
| Stress Average | Between Groups | .000 | 1 | .000 | .003 | .954 |
| Within Groups | .904 | 21 | .043 |  |  |
| Total | .904 | 22 |  |  |  |
| Negative Affect Average | Between Groups | .211 | 1 | .211 | .884 | .357 |
| Within Groups | 5.241 | 22 | .238 |  |  |
| Total | 5.452 | 23 |  |  |  |

The line graph represents the trends of the means of the variables stress, anxiety, negative affect, change in eating, and change in exercise for levels. See figure 2.

Figure 2.

**Comparison of Means of Anxiety, Stress, Negative Affect, Eating Behavior, and Exercise Behavior for High and Low Disordered Eating Attitude Score Levels**



**Discussion**

This study was an effort to understand how stress and emotion affect non-clinical disordered eating behavior in college students. The study evaluated anxiety, stress, emotions, and change in eating and exercise behavior in order to find relationships between the emotion states and behaviors. As predicted, negative affect and anxiety were correlated with a change in eating and exercise behaviors. Additionally, the high disordered eating attitudes level had significant correlations between both eating and exercise behaviors with anxiety and negative affect, further supporting the predictions. However, there were no correlations between change in eating and exercise behaviors and shame as originally predicted. Similarly, reported stress was not shown to be significantly correlated with change in eating and exercise behavior. However, a trend relationship was found between stress and exercise behavior in the analysis of all data. This suggests that a study with more participants and stronger power of analysis could show support for a relationship between stress and changes in exercise behavior.

There were other significant findings that were not predicted, but are still of interest. Across the complete data set, the state of feeling overwhelmed was correlated with an increase change in exercise behavior. Interestingly, determination was significantly positively correlated with exercise behavior in the low disordered eating score level. The correlation with a positive emotion was not expected. This relationship could be due to an increased motivation to exercise that is separate from influence of stress and emotions.

The results of this study show support that there is a relationship between emotion and disordered eating behavior. The negative correlation between anxiety and eating behavior indicates a relationship between restrictive eating behavior and the increase of reported anxiety. Negative affect also had a negative correlation with eating behavior, indicating a relationship between restrictive behaviors and increased negative affect. This is consistent with previous research and my predictions. Conversely, exercise behaviors had a positive correlation with the anxiety measure, overwhelmed emotion, and negative affect. The positive correlation suggests that exercise decreased in the presence of these negative emotions. The positive correlation with the overwhelmed emotion could shed light on the two contradicting directions of correlation. On a college campus, feeling overwhelmed and anxious likely comes with increased course work and responsibilities. The decrease in exercise could be a consequence of lack of time to workout. Additionally, the decrease in exercise due to increased anxiety and overwhelmed emotion could be compensated for by eating less. In general, there was a pattern of eating behavior having negative correlations with emotions and exercise behavior having a positive correlation with emotions. This suggests that increases in anxiety and negative emotions are related to restrictive eating behaviors, and that an increase in these emotions is related to a decrease in exercise behaviors. More research needs to be conducted on negative emotions and how they change exercise behavior.

*Limitations*

This study was limited by the small sample size and inconsistent weekly participation. Increasing the sample size would increase the statistical power for discovering correlations of averages, and could potentially yield more significant results. The presence of trends in the data suggests that more power would have yield more significant results. Similarly, consistent participation across the weeks would allow for analysis to be done on the changes in emotion and stress reports each week and how they correlate with changing eating and exercise behaviors.

*Future Directions*

For future research, continuing the focus on emotions and stress of disordered eating behavior could help in creating eating disorder prevention protocols. By understanding which emotions are associated with disordered eating behavior, clinicians may be able to more effectively prevent disordered eating from progressing to a full-blown eating disorder by targeting those emotions before they result in harmful disordered eating.

*Conclusion*

According to the results of this study, there appears to be a relationship between emotion, specifically anxiety and negative affect, and changes in eating and exercise behavior. These findings are consistent across all levels of disordered eating attitude scores, and significant correlations are consistently found with anxiety and negative affect. Though no significant relationships were found between disordered eating and stress, the results from this study suggest that there is a relationship between negative emotions and change in eating behavior that demands further inquiry in order to gain a better understanding of emotions and disordered eating.

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**Measures Index**

*Measure 1*

Disordered Eating Attitude Scale

1) Do you feel pleasure when you eat?

Yes. No.

2) Does eating ever feel unnatural to you?

Yes. No.

3) Have you ever spent one or more days without eating or having only liquids because you believed you could lose weight?

Yes. No.

4) Do you count the calories of everything you eat?

Yes. No.

5) Do you enjoy the feeling of an empty stomach?

Yes. No.

6) Do you “skip” meals to avoid putting on weight?

Yes. No.

7) Does eating make you feel “dirty”?

Yes. No.

8) Do you have good memories related to food?

Yes. No.

9) Would you like to not need to eat?

Yes. No.

10) Do you believe that it is normal to eat sometimes just because you are sad, upset or bored?

Yes. No.

11) When you eat more than usual, what is your behavior afterwards?

Restart eating as usual.

Assume you have lost control and keep eating even more.

Decide to go on a diet to compensate.

Use some kind of compensation, such as physical activity, vomiting, laxatives and diuretics.

PART II

12) I feel guilty when I eat something that I thought I should not eat for some reason.

Always Usually Often Sometimes Rarely/Never

13) I quit eating a kind of food if I find out it has more calories than I thought.

Always Usually Often Sometimes Rarely/Never

14) I worry all the time about what I am going to eat, how much to eat, how to prepare food and whether I should eat or not.

Always Usually Often Sometimes Rarely/Never

15) I worry about how much a certain kind of food or meal will make me gain weight.

Always Usually Often Sometimes Rarely/Never

16) I am angry when I feel hungry.

Always Usually Often Sometimes Rarely/Never

17) It is hard to choose what to eat, because I always think I should eat less or choose the option with fewer calories.

Always Usually Often Sometimes Rarely/Never

18) When I desire a specific kind of food, I know I won’t stop eating until I have finished with it.

Always Usually Often Sometimes Rarely/Never

19) I would like to have my appetite and eating behavior under total control.

Always Usually Often Sometimes Rarely/Never

20) I try eating less in front of others in order to overeat when I am alone.

Always Usually Often Sometimes Rarely/Never

21) I am afraid to start eating and not be able to stop.

Always Usually Often Sometimes Rarely/Never

22) I dream of a pill that would replace food.

Always Usually Often Sometimes Rarely/Never

23) I get nervous and/or lose my self-control at parties and buffets, due to a great amount of foods available.

Always Usually Often Sometimes Rarely/Never

24) My relationship with food messes up my life as a whole.

Always Usually Often Sometimes Rarely/Never

*Measure 2*

Center for Epidemiologic Studies Depression Scale

Rate during the past week:

Rarely or none of the time (less than1 day)

Some or a little of the time (1-2 days)

Occasionally or a moderate amount of time (3-4 days)

Most or all of the time (5-7 days)

1. I was bothered by things that usually don’t bother me.

2. I did not feel like eating; my appetite was poor.

3. I felt that I could not shake off the blues even with help from my family or friends.

4. I felt I was just as good as other people.

5. I had trouble keeping my mind on what I was doing.

6. I felt depressed.

7. I felt that everything I did was an effort.

8. I felt hopeful about the future.

9. I thought my life had been a failure.

10. I felt fearful.

11. My sleep was restless.

12. I was happy.

13. I talked less than usual.

14. I felt lonely.

15. People were unfriendly.

16. I enjoyed life.

17. I had crying spells.

18. I felt sad.

19. I felt that people dislike me.

20. I could not get “going.”

*Measure 3*

*PROMIS* LEVEL 2—Anxiety—Adult (PROMIS Emotional Distress—Anxiety— Short Form)

In the past 7 days…

1. I felt fearful

Never (1) Once (2) 2 or 3 Times (3) Daily (4) More than once per day (5)

2. I felt anxious

Never (1) Once (2) 2 or 3 Times (3) Daily (4) More than once per day (5)

3. I felt my worries overwhelmed me

Never (1) Once (2) 2 or 3 Times (3) Daily (4) More than once per day (5)

4. I felt nervous

Never (1) Once (2) 2 or 3 Times (3) Daily (4) More than once per day (5)

5. I felt uneasy

Never (1) Once (2) 2 or 3 Times (3) Daily (4) More than once per day (5)

6. I felt tense

Never (1) Once (2) 2 or 3 Times (3) Daily (4) More than once per day (5)

7. I found it hard to focus on anything other than my anxiety. I found it hard to focus on anything other than my anxiety.

Never (1) Once (2) 2 or 3 Times (3) Daily (4) More than once per day (5)

8. I felt like I needed help for my anxiety

Never (1) Once (2) 2 or 3 Times (3) Daily (4) More than once per day (5)

*Measure 4*

Perceived Stress Scale

1. In the last week, how often have you been upset because of something that happened unexpectedly?

Never (0) Almost Never (1) Sometimes (2) Fairly Fften (3) Very Often (4)

1. In the last week, how often have you felt that you were unable to control the important things in your life?

Never (0) Almost Never (1) Sometimes (2) Fairly Fften (3) Very Often (4)

1. In the last week, how often have you felt nervous and “stressed”?

Never (0) Almost Never (1) Sometimes (2) Fairly Fften (3) Very Often (4)

1. In the last week, how often have you felt confident about your ability to handle your personal problems?

Never (0) Almost Never (1) Sometimes (2) Fairly Fften (3) Very Often (4)

1. In the last week, how often have you felt that things were going your way?

Never (0) Almost Never (1) Sometimes (2) Fairly Fften (3) Very Often (4)

1. In the last week, how often have you found that you could not cope with all the things that you had to do?

Never (0) Almost Never (1) Sometimes (2) Fairly Fften (3) Very Often (4)

1. In the last week, how often have you been able to control irritations in your life?

Never (0) Almost Never (1) Sometimes (2) Fairly Fften (3) Very Often (4)

1. In the last week, how often have you felt that you were on top of things?

Never (0) Almost Never (1) Sometimes (2) Fairly Fften (3) Very Often (4)

1. In the last week, how often have you been angered because of things that were outside your control?

Never (0) Almost Never (1) Sometimes (2) Fairly Fften (3) Very Often (4)

1. In the last week, how often have you felt difficulties were piling up so high that you could not overcome them?

Never (0) Almost Never (1) Sometimes (2) Fairly Fften (3) Very Often (4)

*Measure 5*

Discrete Emotions Adjective List

Below are a number of adjective clusters that describe different emotions or feelings.

Please indicate the extent to which you felt an emotion within the last WEEK.

1) surprised --- astonished

1 - Not at all 2 3 4 - Moderately 5 6 7- Extremely

2) defeated --- resigned --- beaten

1 - Not at all 2 3 4 - Moderately 5 6 7- Extremely

3) relieved --- unburdened

1 - Not at all 2 3 4 - Moderately 5 6 7- Extremely

4) tranquil --- calm --- serene

1 - Not at all 2 3 4 - Moderately 5 6 7- Extremely

5) frustrated --- thwarted --- exasperated

1 - Not at all 2 3 4 - Moderately 5 6 7- Extremely

6) determined --- motivated --- persistent

1 - Not at all 2 3 4 - Moderately 5 6 7- Extremely

7) grateful --- appreciative --- thankful

1 - Not at all 2 3 4 - Moderately 5 6 7- Extremely

8) interested --- engaged

1 - Not at all 2 3 4 - Moderately 5 6 7- Extremely

9) mad --- angry --- irate

1 - Not at all 2 3 4 - Moderately 5 6 7- Extremely

10) hopeful --- optimistic

1 - Not at all 2 3 4 - Moderately 5 6 7- Extremely

11) bored --- detached --- uninterested

1 - Not at all 2 3 4 - Moderately 5 6 7- Extremely

12) nervous --- anxious --- apprehensive

1 - Not at all 2 3 4 - Moderately 5 6 7- Extremely

13) overwhelmed --- overloaded --- rattled

1 - Not at all 2 3 4 - Moderately 5 6 7- Extremely

14) proud --- triumphant

1 - Not at all 2 3 4 - Moderately 5 6 7- Extremely

15) afraid --- frightened --- scared

1 - Not at all 2 3 4 - Moderately 5 6 7- Extremely

16) irritated --- annoyed

1 - Not at all 2 3 4 - Moderately 5 6 7- Extremely

17) amused

1 - Not at all 2 3 4 - Moderately 5 6 7- Extremely

18) curious --- inquisitive

1 - Not at all 2 3 4 - Moderately 5 6 7- Extremely

19) happy --- glad --- joyful

1 - Not at all 2 3 4 - Moderately 5 6 7- Extremely

20) eager --- enthused --- excited

1 - Not at all 2 3 4 - Moderately 5 6 7- Extremely

21) embarrassed --- humiliated

1 - Not at all 2 3 4 - Moderately 5 6 7- Extremely

22) disappointed --- let down

1 - Not at all 2 3 4 - Moderately 5 6 7- Extremely

23) satisfied --- content

1 - Not at all 2 3 4 - Moderately 5 6 7- Extremely

*Measure 6*

Original Eating Behavior Scales

On the scale, rate your eating habits from the last week:

Skipped or purged Ate all meals usually eaten Ate 3x as much as

all meals usually eaten usually eaten

0 1 2 3 4 5 6 7 8 9 10 11 12

On the scale, rate you exercise habits from the last week:

Exercises 3x Exercised as much as usual Exercised 3x less

As much as usual than usual

0 1 2 3 4 5 6 7 8 9 10 11 12

1. \* The discrepancy between total number of participants and numbers of males and females is due to three participants who used different identification codes from their intake to their weekly surveys, and therefore their sex was not recorded. [↑](#footnote-ref-1)
2. \*\* Of the 3 participants who used different identification codes on the weekly surveys than on the intake, 1 completed all 4 weekly surveys, and 2 completed 3 of the 4 surveys). [↑](#footnote-ref-2)