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# The Effect of Eating Disorders on Work Performance

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The Effect of Eating Disorders on Work Performance

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APPROVAL PAGE

Master of Public Health

The Effect of Eating Disorders on Work Performance

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## ABSTRACT

Eating disorder rates have been on the rise over the past couple of decades, however little research has been conducted to examine their impact on work performance. A variety of tasks important to occupational functioning, such as memory, concentration, and ability to understand, were examined in this paper, and the data was compared to respondents who were free of eating disorders. It was expected that those who have symptoms of an eating disorder will report difficulty with key aspects of occupational functioning. It was also expected that those who have symptoms of Bulimia Nervosa will report a greater difficulty performing at work as compared to those with Anorexia Nervosa. This study utilized data from the Collaborative Psychiatric Epidemiology Studies (N = 20013).

Participants with symptoms of Anorexia Nervosa reported difficulty with understanding and learning new assignments, and health problems were related to difficulty with concentration, memory, or thinking over the past 30 days. Those with symptoms of Bulimia Nervosa reported difficulty with concentration, understanding, and learning new assignments, and health problems were reported to be related to difficulty with concentration, memory, or thinking over the past 30 days. In addition, this group of respondents also reported working less carefully and having a lower quality of work over the past 30 days. Anorexia Nervosa and Bulimia Nervosa appear to have a higher impact on concentration and understanding, but these difficulties may have a greater influence in Bulimia Nervosa by impacting the quality of work. Based on the results of this study, there is evidence to support further focused research on specific aspects of this relationship.

## The Effect of Eating Disorders on Work Performance

Eating disorders fall into two main categories, Anorexia Nervosa (AN) and Bulimia Nervosa (BN). There is also a third category, known as Eating Disorder Not Otherwise Specified (ED-NOS), for those individuals who have disordered eating behaviors, but do not meet the full criteria for AN or BN. A key characteristic that underlies eating disorders is a distorted view of body shape and weight. The majority of individuals who suffer from eating disorders are female (American Psychiatric Association, Diagnostic and Statistical Manual (4<sup>th</sup> ed.), 1994). The manner in which an individual attempts to resolve this distortion differs based on the type of eating disorder.

Despite the prevalence of eating disorders, and their known impact on an individual's ability to function, there has been little research examining the relationship between eating disorders and work performance. Krauth conducted a study in 2002, and found that the impact of lost work time far outweighed the cost of health services. Clearly additional research into this area is necessary (Simon et al., 2005).

### *Criteria for Anorexia Nervosa*

Anorexia Nervosa (AN) typically begins during the teenage years, and usually occurs following a trauma. In order to be clinically diagnosed with AN, there are four main criteria that an individual must meet. The first criterion is related to an individual's weight. Those with AN are considered to be at a low weight (less than 85%) of their recommended weight. In order to reach this low weight, anorexics can either restrict their caloric intake or engage in purging behaviors. The second and third criteria are related to an individual's extreme anxiety over the thought of an increase in weight or becoming obese. Despite their low weight, these patients may believe that they are fat,

causing them to feel that they need lose additional weight. The last criterion is a loss of menstrual cycle for at least three months. Anorexia Nervosa is associated with co-morbid disorders such as depression and obsessive-compulsive disorder (DSM-IV, 1994).

#### *Criteria for Bulimia Nervosa*

Bulimia Nervosa typically begins around the start of adulthood. In order to be clinically diagnosed with BN, there are five main criteria that an individual must meet. The first two criteria are related to bingeing and purging behaviors. The term binge is defined as a person eating an objectively large amount of food in a short period of time, accompanied by a feeling that she cannot stop eating. In order to meet the criterion for purging, a bulimic can force herself to throw up, or use medications in order to aid in weight loss, such as laxatives or diuretics. It is important to note, however, that other types of behaviors, such as fasting or excessively exercising, are also considered to meet the criteria for BN. The third criterion is related to the frequency of the disordered behaviors, where the bingeing and purging must occur at a minimum of two times per week for three months. Like anorexics, bulimics also have a distorted perception of their body, as the fourth criterion. Finally, episodes of BN occur when an individual is at a normal weight. BN is typically associated with co-morbid disorders like depression, anxiety, and substance use disorders (DSM-IV, 1994).

#### *Background*

Eating disorder rates have been on the rise over the past couple decades. As the prevalence of eating disorders has increased, research has shown that the proportion of women who have a negative body image perception has also increased in parallel. As noted previously, both Anorexia Nervosa and Bulimia Nervosa most commonly occur in

the female population, and usually affect women who are in their teenage years ranging to early adulthood (Foreyt, Poston, & Goodrick, 1996). Both these eating disorders typically occur with a host of other psychiatric conditions including difficulties with depression, anxiety, obsessive-compulsive tendencies, and substance use. In addition, medical issues such as cardiac abnormalities, metabolic imbalances, and gynecologic conditions may arise as a result of these disorders (Simon, Schmidt, & Pilling, 2005).

In the female population, the prevalence rate of Anorexia Nervosa and Bulimia Nervosa are estimated to be approximately 1%, but, Bulimia Nervosa may range up to a rate of 4%. It is important to note that these prevalence rates typically vary according to study (Foreyt et al., 1996). For example, Simon et al (2005) reviewed prevalence rates of eating disorders based on research conducted both in Europe and in the United States. In this research, the rate for AN is slightly lower, at 0.3%, but the rate for BN remains somewhat consistent at 1%. While Bulimia Nervosa is not thought to be related to an increased risk of mortality, patients with Anorexia Nervosa are more likely to die (Simon et al., 2005).

Of note, Bulimia Nervosa was not recognized as its own disorder until 1979. Once physicians were made aware that symptoms of BN were symptoms of their own condition, and they were not related to AN, the number of cases rose quickly. By the 1980s, the rate of diagnosis of BN decreased and has continued since. However, researchers may never be certain of the true prevalence of Bulimia Nervosa, as bulimics typically binge and purge in secret. Due to shame, bulimics may not seek treatment for their disorder (Bravender, Robertson, Woods, Gordon, & Forman, 1999).

*Health Services for Eating Disorders*

Managed care is on the rise as one of the primary means of health care in the United States, and the specific treatments that are covered under this type of care are in a constant state of flux. Given the frequent changes in coverage, and the dominant use of managed care, it is no surprise that health care providers have changed their methods of treating patients. Patients with eating disorders normally require both medical and psychological treatments, administered in combination, of course, with nutritional counseling. However, when patients are being treated according to the guidelines of managed care, they may not be able to receive the treatments and participate in programs that are essential to their recovery (Bravender et al, 1999).

It is important to understand the amount of health services eating disordered patients use. Previous research has provided evidence that those with Anorexia Nervosa and Bulimia Nervosa may utilize a greater amount of health services than the non-eating disordered population. Such an increase in health service usage is indicative not only of the severity of the eating disorder, but it also may serve as indicative of struggles with social relationships and financial responsibilities (Striegel-Moore et al., 2005). It can be inferred that the treatment options available, as well as the amount of health services utilized, will clearly impact both the amount of time eating disordered patients spend at work, as well as quality of their work.

Striegel-Moore et al. (2005) studied patients who had Bulimia Nervosa or binge-eating disorder during their teenage years, but had recovered by the time they reached early adulthood. In this study, the investigators reviewed health services use by the patients over the past year. There were 3 different patient populations; those patients who had recovered from BN or binge-eating disorder, women who were diagnosed with a

psychiatric disorder but had not suffered from an eating disorder, and healthy women to be used as a control. The investigators found that patients who recovered from BN or binge-eating disorder and those with a psychiatric condition used more health care services than the healthy controls. This study also examined ethnicity of the participants, and found that African American patients were less likely to have had outpatient counseling sessions over the past year than Caucasian women, but had a greater chance of having a hospital visit over the past year (Striegel-Moore et al., 2005).

#### *Costs of Treatment*

Simon et al. (2005) performed a comprehensive analysis of information published on eating disorders, specifically related to health service use and economic impact. Only a small percentage of cases of eating disorders are diagnosed and treated by the patient's primary care provider. It was noted that those with eating disorders tend to visit their primary care physician more frequently due to mental, abdominal/ stomach, and gynecologic issues they might be experiencing. This research also confirms that anorexics and bulimics contact their primary health care provider significantly more than the non eating disordered population (Simon et al., 2005). Additional research found evidence that for eating disordered patients who want to receive treatment, anorexics have a greater chance of their disorder being identified accurately than bulimics (Striegel-Moore, Leslie, Petrill, Garvin, & Rosenheck, 2000).

Research has also been conducted by Striegel-Moore et al. (2000) to examine the cost of eating disorder treatments in the United States. The investigators found that the cost for Anorexia Nervosa is greater than that of Bulimia Nervosa (Simon et al., 2005). Due to the severity of AN, treatment is often lengthy, costly and complex. As a result,

health insurance providers typically place restrictions on the treatments for this disorder. However, it is important to note that when the costs of treatment are calculated, current treatment methods for AN are cost-effective, simply because if these patients die, they are young, and therefore did not receive lengthy treatments (Crow & Nyman, 2004). Of those women who were diagnosed with AN, Striegel-Moore et al. (2000) found that approximately 22% received in-patient treatment at a duration of 26 days; the duration of outpatient treatment is 17 days. The treatment cost per year for Anorexia Nervosa is approximately \$6000. The duration of outpatient treatment for those with BN is roughly 16 days, with the treatment cost per year around \$3000 (Simon et al., 2005). In addition, those with BN are more likely to be treated in an outpatient setting (Striegel-Moore et al., 2000).

#### *Treatment*

The most effective course of treatment for eating disordered patients is recommended to occur as an intensive outpatient program, as the plan for treatment for each patient can be easily adapted as progress is made. In addition, patients are able to maintain their social relationships, as well as important aspects of their daily lives, for example, going to work or school. When treatment is administered in this setting, it is thought that patients are better able to adapt to new skills and methods of coping as they learn them. This type of treatment also reduces the financial burden on both the individual and society. However, these treatment programs are not typically available as a part of standard community services (Golan & Heyman, 2005).

#### *Treatment for Anorexia Nervosa*

Treatment for patients with Anorexia Nervosa is typically a combination of therapeutic modalities. Patients who are severely underweight are hospitalized until they are able to reach a weight that is considered to be adequate by their physician. They must maintain this weight for at least 2 days before they are able to be discharged from the hospital. Representatives from managed care companies examine these types of patient charts on a daily basis. Physicians have to fully document the condition of their patients in order to have the hospitalization approved, as well as to ensure underweight patients stay in the hospital for the appropriate amount of time to gain enough weight so that they will not be at risk for relapse. There is evidence to show that if a patient is discharged from the hospital too soon, there is a greater chance of additional hospitalizations, which in turn, cost more money for the managed care companies, as well as the patient (Hill & Maloney, 1997). This can be interpreted to have a direct impact on the patient's employer (or the parents' employers, if the patient is at a young age), as well as the economy, through increased work absences and lost productivity.

Once discharged from the hospital, anorexic patients work with their counselors to set a goal weight. If the patient is able to reach this weight, the hope is that her menstrual cycle will re-start and occur regularly, and the risk of osteoporosis will be reduced. The patient will also be enrolled in individual therapy, and may be prescribed an antidepressant medication. One benefit of this type of medication is that it may help patients to speak freely about eating disorder symptoms during counseling sessions. These outpatient sessions, in combination with an antidepressant regimen, typically continue on an ongoing basis for a lengthy period of time. This treatment regimen has a favorable outcome for anorexic patients to achieve remission (Hill & Maloney, 1997).

### *Treatment for Bulimia Nervosa*

Given that Bulimia Nervosa was not classified as its own disorder until the late 1970s, treatment methods are still relatively new. Initially, the preferred treatment was antidepressant medication; bulimic symptoms decreased as a result of this treatment in patients both with depression and without depression. However, patients rarely recover from BN as a result of this type of therapy. Treatment methods progressed to administration of outpatient therapy, which may be administered in conjunction with antidepressant medication. Therapy methods have evolved, and include different courses of treatment, such as interpersonal therapy and cognitive behavioral therapy. Cognitive behavioral therapy is currently the standard treatment for Bulimia Nervosa (Mitchell, Agras, & Wonderlich, 2007).

### *Research on Community Based Programs*

Golan and Heyman (2005) describe a community based program that was developed in Israel for patients with Anorexia Nervosa and Bulimia Nervosa. In this program, patients were allowed to live in their personal residence, continue to work or go to school, while receiving treatment. Each patient's course of treatment was developed based on personal experiences, and therapeutic sessions were administered at times that were convenient for each patient to minimize any impact on daily routines. Patients participate in a dynamic treatment program, including weekly individual and family counseling, and sessions with a nutritionist. In addition, patients are required to spend a certain number of hours each week with an assigned mentor, which encourages patients to have a good relationship with the counselors who are treating them (Golan & Heyman, 2005).

The investigators then conducted their own study to compare clinical outcomes for eating disordered patients who were assigned to a limited treatment regimen (individual and nutritional therapy), or an extensive treatment regimen (a range of outpatient therapy, combined with a mentor). The investigators found that incorporating outpatient treatment into the patients daily lives was successful, with 66% of those with AN and 72% of those with BN in partial or full remission at the end of the study. Within 6 years of completion of the study, anorexic and bulimic patients experienced a 25%-50% relapse rate, however, this rate continues to decrease the greater the duration from the end of treatment (Golan & Heyman, 2005).

#### *Research on Cost and Effectiveness of Treatment*

Little research has been done to compare the cost versus the effectiveness of eating disorder treatments. With the continuous increases in health care costs, as well as an increase in providers who are utilizing managed care, it is important to understand if the money spent in treatment is really helping to improve a patient's condition. Research was conducted to compare the effectiveness of five different treatments in Bulimia Nervosa: (Treatment 1) cognitive behavioral therapy for 15 weeks, (Treatment 2) medication (desipramine) for 16 weeks, (Treatment 3) medication (desipramine) alone for 24 weeks, (Treatment 4) a combination of cognitive behavioral therapy and medication (desipramine) for 15 weeks, and (Treatment 5) a combination of cognitive behavioral therapy and medication (desipramine) for 16 weeks, plus an additional 8 weeks of medication (desipramine) therapy alone. Patients enrolled in this study had no current comorbid conditions, such as depression, and participants with a current diagnosis

of Anorexia Nervosa were excluded. Each week an independent interviewer asked patients to recall their binge/ purge episodes over the past week (Koran et al., 1995).

The investigators found that the most cost effective treatment was medication (desipramine) administered by itself for a period of 16 weeks. One year after completion of the study, the researchers followed up with study participants. At this time point, the most cost effective treatment remained medication (desipramine) administered alone, but this time for a period of 24 weeks. The cost for 24 weeks of desipramine was approximately \$1000 per patient. The health care costs used in this study are estimates only, but it is important to note that there may be more effective, cost-efficient options that need to be explored in future research (Koran et al., 1995). Research into reducing health care costs, as well as increasing the effectiveness of treatments provided, will indirectly decrease the impact an eating disorder has on an individual's work performance and attendance.

#### *Additional Costs Related to Bulimia Nervosa*

In addition to the health care costs associated with treating Bulimia Nervosa, this disorder is associated with a high financial cost to the individual suffering from this disorder. Research was conducted to learn more about the costs related to food purchases for binges, as well as any medications to aid with purging behaviors. Since little research has been done in this area, the investigators examined the bulimic behaviors of 10 women who had been diagnosed with Bulimia Nervosa but had not yet been treated for their disorder. The 10 study participants were approximately 27 years old, and had been experiencing bulimic symptoms, such as bingeing or purging for an estimated mean of 13 years. Subjects were asked to keep a food journal for one week in order to track the type

and amount of food consumed, as well as any medications they took. In addition, subjects noted when their binges and purges occurred. Based on this information, the investigators were able to calculate the approximate costs of food and medication to determine the financial impact of BN (Crow et al., 2008).

On average, the women in this study binged 4-5 times and purged 3-4 times over the course of the week. Based on the food consumed, the investigators calculated that the weekly cost of food for these subjects was about \$100 per week, with the bulimic symptoms accounting for approximately \$30. Only three women participating in this study used medication to assist with their purging behaviors, with the cost being a little less than \$5 each week. This translates into an average of approximately \$230 per year (Crow et al., 2008).

Crow et al. (2008) then looked at the female population as a whole in the United States and determined that on average, women earned a little less than \$600 each week, or approximately \$30,000 per year. Based on the bulimic behaviors of the participants in this study, they are spending approximately 5% of their yearly income on food and/or medication as a result of their bulimic tendencies when compared to the financial profile of women aged 25-34 years in the overall population (Crow et al., 2008). There is clearly a need for future research into this area.

### *Eating Disorder Impairments*

The degree of impairment caused by an eating disorder can affect many aspects of a patient's life. Anxiety over eating in public or perceived body image can impact personal relationships, affect, and cognition. Unfortunately, while these types of impairments can be detrimental to the patient, they are rarely captured during routine

questions related to quality of life. A new questionnaire was designed to examine the impact of impairment that is specifically related to eating disorders, called the Clinical Impairment Assessment (CIA). The CIA is intended to examine any impairment that the patient may have subjectively experienced over the past 28 days related to affect, social relationships, cognition, and ability to function in an occupational setting (Bohn et al., 2008).

Among the key inclusion criteria in the Bohn et al. (2008) study were body mass index (acceptable range was 16.0- 39.9) and no evidence of co-morbid conditions related to affect, such as depression, as these types of disorders may influence impairment ratings on the CIA. Study participants also needed to meet criteria for a clinically significant eating disorder, per the DSM-IV. In this study, 8 patients were diagnosed with Anorexia Nervosa, 48 were diagnosed with Bulimia Nervosa, and 67 were diagnosed with an eating disorder not otherwise specified. The results of this study showed that the more significant the symptoms of the eating disorder, the greater the rating of subjective impairment on the CIA. In addition, the researchers found that if a patient was treated with cognitive behavioral therapy, there was a decrease in the subjective impairment ratings on the CIA (Bohn et al., 2008). It can be inferred that the greater the degree of impairment, the greater the impact an eating disorder has in an occupational setting.

### *Cognitive Deficits*

There are a myriad of cognitive deficits that are associated with eating disorders. Overall, these deficits may disappear when the eating disorder is in remission. However, in patients with an active eating disorder, these impairments can be detrimental to

educational and occupational functioning. Past studies have shown that those with Anorexia Nervosa have difficulty paying attention and remembering information. There is evidence that those with Bulimia Nervosa also have difficulty paying attention and focusing on assigned tasks. It is important to note that as anorexic and bulimic patients recovered from their illnesses, their impairments in these areas improved (Bosanac et al., 2007).

Bosanac and his co-investigators conducted a study where their patient population was categorized into four main groups: active Anorexia Nervosa, active Bulimia Nervosa, those who have recovered from Anorexia Nervosa, and a group of normal controls. All patients were administered a series of neuropsychological tests to determine the impact that cognitive deficits may have on these patient groups. The investigators of this study confirmed that patients with active Anorexia Nervosa and active Bulimia Nervosa had difficulty paying attention to assigned tasks. In a word recall task, those who recovered from AN had difficulty remembering words they had just heard, and those who were actively suffering from BN had difficulty remembering not only words they had just heard, but also words they had heard previously. Both groups with active BN and AN, as well as those who had recovered from AN had difficulty completing a finger tapping task (Bosanac et al., 2007).

The investigators also note that there were a small number of participants in this study were taking medication to reduce symptoms of concurrent conditions, such as depression or anxiety. At this time the impact these medications have on cognitive functioning is not clear. It is apparent in this study, that cognitive deficits had the greatest impact on those with active AN and active BN. If researchers are able to

determine the specific impact of these deficits, health care providers can proactively treat these impairments in eating disordered patients to minimize any negative effects to daily functioning (Bosanac et al., 2007).

Research has shown that those who have Anorexia Nervosa may have difficulty with neurocognitive functioning, however, the reason for this has yet to be determined. Some researchers believe that these deficits are due to the psychological components of AN while others believe that changes in brain functioning related to metabolism are the cause. Due to this impairment, those with AN may have difficulty focusing on tasks or remembering information, and may be slower to process information and in reaction time. A study was conducted to further examine these neurocognitive impairments through administration of a number of tasks to test abilities such as motor and memory skills (Fowler et al., 2006).

For this study, Fowler et al. (2006) recruited women who were actively suffering from AN, at low weight, and currently hospitalized. If the participants were taking medication for their AN on a regular basis, the investigators asked that their dose was administered after neurocognitive tests were completed. The patient group was compared to a group of healthy controls who completed the same battery of tests in the same order. The investigators found that the patients in the AN group did show evidence of neurocognitive impairment when compared to the healthy control group. The deficits the investigators noted in this study were related to spatial memory, planning, and processing information that was presented quickly (Fowler et al., 2006). These types of skills are necessary to perform well at work and school.

### *Decision-Making*

The Iowa Gambling Task (IGT) is used to test decision making skills. The purpose of this task is to determine if participants are able to forgo immediate gratification for future rewards. Previous research has shown when the IGT was used to study eating disorders, anorexics and bulimics do not do well on this task. Liao et al. (2008) designed a study to investigate anticipatory skin conductance responses (SCR) during the IGT, in patients with Anorexia Nervosa, Bulimia Nervosa, and healthy controls. Participants were given a certain amount of money at the beginning of the task as a loan. Playing cards were divided into four decks, with two of the decks paying out a greater reward, but with a greater risk of monetary loss. Two additional card decks paid less money, but also had a small risk of monetary loss (Liao et al., 2008).

The results of the Liao et al. (2008) study showed that the control group performed better in this task, as they avoided the two riskier card decks, when compared to both the BN and AN groups. However, the BN group and the control group had similar levels for SCR during this task, with the AN group having the lowest level of SCR. In all three groups, the bigger the monetary loss was, the greater the SCR response. This may imply that individuals who suffer from Anorexia Nervosa and Bulimia Nervosa do respond to negative results, however, they may not draw upon these experiences to improve their future performances (Liao et al., 2008).

Anorexia Nervosa and Bulimia Nervosa are clearly two different conditions that have their own unique effects. With frequent changes in health care and insurance coverage, eating disorder treatment varies widely by individual. These differences will likely have an impact on employers due to increased absenteeism as well as a decreased

quality of work. This literature review has provided evidence that there is a link between the impairments caused by eating disorders and work performance.

### *The Current Study*

The purpose of this study is to utilize data from a compilation of several national surveys to analyze the impact eating disorders have on work performance. A variety of tasks important to occupational functioning, such as memory, concentration, and ability to understand, will be examined. This data will be compared to those respondents who are free of eating disorders. The analyses conducted will examine all responses provided to eating disorder questions due to the limited amount of data available. In addition, the number of days an eating disordered participant has missed from work over the past 30 days will also be examined and compared to the non-eating disordered participants. It is expected that those who have symptoms of an eating disorder will report difficulty with key aspects of occupational functioning. It is also expected that those who have symptoms of Bulimia Nervosa will report a greater difficulty performing at work as compared to those with Anorexia Nervosa.

### Methods

This study uses data from the Collaborative Psychiatric Epidemiology Surveys (CPES) (Alegria, M., Jackson, J.S., Kessler, R.C., & Takeuchi, D., 2008). The CPES is a compilation of data collected during administration of three surveys which are considered to be a representative sample of the population in the United States of America. The three surveys included in the Collaborative Psychiatric Epidemiology Surveys are the National Comorbidity Survey Replication (<http://www.hcp.med.harvard.edu/ncs/>), the

National Survey of American Life (<http://www.rcgd.isr.umich.edu/prba/nsal>), and the National Latino and Asian American Study (<http://www.multiculturalmentalhealth.org/nlaas.asp>). This research was funded through the National Institute of Mental Health and was intended to focus specifically on mental disorders and risk factors that are present in the United States population (Heeringa et al., 2004).

The National Comorbidity Survey Replication sampled households in the United States, with the population included in the survey aged 18 to 74 years old between 2001-2002. The National Comorbidity Survey Replication was intended to build upon an earlier survey, the 1992 National Comorbidity Survey, and offered an opportunity to compare results between populations. Individuals were excluded from participating in this survey if they lived in institutionalized settings or if they were living in military housing. In addition, those who did not fluently speak English were not able to participate in this survey. Approximately 11,000 households were screened for this survey, with slightly more than 10,000 primary participants completing the questionnaire (Heeringa et al., 2004).

The National Survey of American Life survey sampled households in the United States, with the population included in the survey aged 18 and over. This survey interviewed approximately 6000 participants, but specifically focused on African Americans, Non-Hispanic Whites, and individuals from the Caribbean. Like the National Comorbidity Survey Replication, those who were living in an institutionalized setting, in military housing, and those who did not fluently speak English were not included. This survey was developed based on the 1990 census, and specifically focused on the

responses of African Americans in this 1990 census. The National Survey of American Life was conducted between 2001 and 2003 (Heeringa et al., 2004).

The National Latino and Asian American Study of Mental Health survey also sampled households in the United States, with the population included aged 18 and over. The Latino population consisted of four main groups (Mexicans, Puerto Ricans, Cubans, and Other). The Asian American population also consisted of four main groups (Chinese, Filipino, Vietnamese, and Other). Like both previous surveys, those living in institutionalized settings and military house were excluded from participation. Focusing specifically on this population was costly due to the lower prevalence of these groups. In an effort to make the results of this survey nationally representative, the 2000 Census was examined to determine where the greatest number of individuals in these groups live. Over-sampling was conducted in these regions, and individuals in the Latino and Asian groups were matched with white controls. Approximately 2000 Latinos and 1,600 Asians completed this study, which was conducted between 2002 and 2003. Table 1 provides an overview of the demographics of the National Comorbidity Survey Replication, the National Survey of American Life, and National Latino and Asian American Study of Mental Health surveys (Heeringa et al., 2004).

Specific questions from this survey were used for the purposes of this analysis. All data was filtered to allow a comparison of respondents who reported having characteristics of an eating disorder versus participants who reported not having those characteristics. Three primary predictors were utilized in this analysis to represent key characteristics of eating disorders. The first was related to having a strong fear of becoming overweight, which was thought to be a characteristic of eating disorders as a

whole. The second was related to having a strong fear of being overweight despite being at a low weight, which is characteristic of anorexia nervosa. The third was related to having binge episodes at least twice a week for several months, which is characteristic of bulimia nervosa.

These three primary predictor variables were examined in relationship to several variables thought to impact work performance. Among the secondary variables were the amount that reported health problems affected ability to concentrate and remember information, if a work failure was reported in the past month, as well as quality of work, and an assessment of how carefully work was completed. Variables related to ability to concentrate, understand tasks, remembering important things to do, and difficulty learning new tasks were also assessed. Finally, the number of days these respondents have missed work over the past 30 days were analyzed. All factors were also examined in relationship to race. Table 2 provides a brief description of the variables as well as measurement scales used. Data was analyzed using SPSS Version 12.0 and Microsoft Excel. Table 3 provides an overview of the demographics of the population sampled in these studies.

## Results

A distribution by race for those who answered yes to the three key variables is presented in Table 4. A 2 x 2 contingency table was created to investigate the relationship between each of these three variables and variables related to work performance, such as concentration and memory. In order to test for a significant difference, a Yates Chi Square test was conducted to examine the proportion of

participants who responded yes and no to each of the key variables as compared to the work performance variables. This test is similar to a Pearson Chi Square test, however, there is a correction for continuity for the Chi Square distribution approximation. The Yates Chi Square test was chosen due to the low prevalence of eating disorders in the population in an attempt to prevent overestimation of significance. Since this is a 2 x 2 contingency table, the Chi Squared test statistic will have one degree of freedom. An alpha of 0.05 was used to determine significance in this analysis.

#### *Strong Fear of Becoming Overweight*

A strong fear of becoming overweight was compared to the work performance variables. There was a strong association between those who reported having a health problem that caused difficulty with concentration, memory, and thought over the past month and having a strong fear of becoming overweight when compared to those who did not have fear of becoming overweight ( $\chi^2_{(df=1)} = 150.7, p < 0.001$ ). In addition, there was a strong association between those who reported having a failure at work over the past month and having a strong fear of becoming overweight when compared to those who did not have this fear of becoming overweight ( $\chi^2_{(df=1)} = 6.4, p = 0.011$ ). The results showed there was a strong association between those respondents who had a strong fear of becoming overweight and working less carefully ( $\chi^2_{(df=1)} = 12.0, p < 0.001$ ), having a lower quality of work over the past month ( $\chi^2_{(df=1)} = 10.4, p = 0.001$ ), having difficulty concentrating for 10 minutes ( $\chi^2_{(df=1)} = 5.9, p = 0.015$ ), having difficulty understanding ( $\chi^2_{(df=1)} = 6.2, p = 0.013$ ), and having difficulty remembering important tasks ( $\chi^2_{(df=1)} = 4.0, p = 0.045$ ) when compared to those who did not have a strong fear of becoming overweight. The fear of becoming overweight did not have an impact on the ability to

learn a new task ( $\chi^2_{(df=1)} = 0.9, p = 0.319$ ). The p value for this factor is higher than the assigned alpha of 0.05 and was not determined to be significant for this variable. Table 5 provides a summary of these findings.

#### *Strong Fear of Being Overweight When at a Low Weight*

A strong fear of being overweight despite being at a low weight was compared to the work performance variables. There was a strong association between those who reported having a health problem that caused difficulty with concentration, memory, and thought over the past month and having a fear of being overweight when at a low weight compared to those who did not have a fear of being overweight when at a low weight ( $\chi^2_{(df=1)} = 26.4, p < 0.001$ ). A strong association was also found between having fear of being overweight when at a low weight if they reported having difficulty understanding ( $\chi^2_{(df=1)} = 4.7, p = 0.030$ ) and having difficulty learning a new assignment ( $\chi^2_{(df=1)} = 21.0, p < 0.001$ ) when compared to those who did not have a fear of being overweight when at a low weight. The fear of being overweight when at a low weight did not impact having a failure at work in the past 30 days ( $\chi^2_{(df=1)} = 2.4, p = 0.118$ ), working less carefully ( $\chi^2_{(df=1)} < 0.1, p = 0.805$ ), having a lower quality of work over the past month ( $\chi^2_{(df=1)} = 2.5, p = 0.113$ ), having difficulty concentrating for 10 minutes ( $\chi^2_{(df=1)} < 0.1, p = 0.885$ ), and having difficulty remembering important tasks ( $\chi^2_{(df=1)} = 0.9, p = 0.334$ ). Given that the p values for these factors were higher than the assigned alpha of 0.05, they were determined to not be significant for these variables. Table 6 provides a summary of these findings.

#### *Binge Episodes*

The variable for bingeing at a minimum of two times per week for several months was also compared to the work performance factors. There was a strong association between those who reported having a health problem that caused difficulty with concentration, memory, and thought over the past month and having binge episodes when compared to those who did not report bingeing ( $\chi^2_{(df=1)} = 173.5, p < 0.001$ ). There was also a strong association between experiencing binge episodes and working less carefully ( $\chi^2_{(df=1)} = 6.5, p = 0.011$ ), and having a lower quality of work over the past month ( $\chi^2_{(df=1)} = 11.6, p < 0.001$ ) when compared to those who did not report bingeing. In addition, a strong association was also found between those who reported binge episodes and difficulty concentrating for 10 minutes ( $\chi^2_{(df=1)} = 5.9, p = 0.015$ ), difficulty understanding ( $\chi^2_{(df=1)} = 23.2, p < 0.001$ ), and difficulty learning new assignments ( $\chi^2_{(df=1)} = 19.1, p < 0.001$ ) when compared to those who did not report bingeing. However, having binge episodes did not have an impact on having a failure at work over the past 30 days ( $\chi^2_{(df=1)} = 2.5, p = 0.117$ ), or having difficulty remembering important tasks ( $\chi^2_{(df=1)} = 2.9, p = 0.089$ ). Since the p values for these variables were greater than the assigned alpha of 0.05, these factors were determined not to be significant. Table 7 provides a summary of these findings.

## Discussion

Based on Table 4, it is important to note that the highest percentage of reported symptoms for all three key characteristics fall into the African American group. Based on the literature reviewed, it would be expected that the highest percentage would occur in the Non-Latino Whites group. Given that one of the surveys included in this

compilation focused specifically on minority groups, this percentage may be inflated due to an increased number of African Americans who completed this survey.

Anorexia Nervosa and Bulimia Nervosa commonly occur with depression and anxiety disorders, but this study does not control for these co-morbid conditions. However, it is recognized that these types of co-morbid disorders will likely impact work performance. This study is a secondary data analysis on existing data that was not designed to specifically investigate eating disorders. Since only a small percentage of respondents reporting having symptoms of eating disorders, this data allowed for examination of those with Anorexia Nervosa and Bulimia Nervosa, however the data available was not sufficient to analyze subsets within the eating disorder groups. This is clearly an important area for future research.

The first key characteristic, a concern of being overweight, was considered to be a general symptom of eating disorders, but was not equated with a specific disorder for the purposes of this analysis. Based on the results, this variable appears to have the greatest impact on work performance. Respondents reported having difficulty with all work performance variables, with the exception of difficulty learning a new assignment. Given that a fear of being overweight is a key symptom of both AN and BN, more respondents may have answered yes to this variable. Since a greater number of respondents answered this question, the number of significant work performance items is higher than those work performance variables associated with Anorexia Nervosa and Bulimia Nervosa. It is important to emphasize that additional respondents who have this fear, but do not suffer from a specific eating disorder, have also answered yes to this variable. It can be assumed that the range of severity of this fear of being overweight has a greater

variability among this group of respondents. As a result, it may be difficult to gain a true understanding of the impact of this fear on work performance.

The second key characteristic, a concern of being overweight when weighing below average, was considered to be a symptom of Anorexia Nervosa. Respondents reported a significant difficulty with understanding and learning new assignments. In addition, health problems were significantly related to difficulty with concentration, memory, or thinking over the past 30 days. These findings are consistent with those reported during the literature review.

When examining this symptom, considered to be indicative of Anorexia Nervosa, the variables related to having a work failure, working less carefully, and having a lower quality of work were all found to be non-significant. One possible explanation for this is that those individuals who suffer from Anorexia Nervosa tend to strive for perfection. Answering yes to any of these variables would be indicative of work performance that does not meet such high standards. A second possible explanation for this is due to the small number of respondents who responded yes to this variable. A more focused study, with a larger number of respondents should be considered to further examine this relationship.

The third key characteristic, bingeing at least two times per week for several months, was considered to be a symptom of Bulimia Nervosa. All individuals who reported episodes of purging, such as self-induced vomiting, use of laxatives, and use of diuretics, also reported bingeing. Respondents reported a significant difficulty with concentration, understanding, and learning new assignments. Health problems were reported to be significantly related to difficulty with concentration, memory, or thinking

over the past 30 days. These findings are consistent with those reported during the literature review.

This group of respondents also significantly reported working less carefully and having a lower quality of work over the past 30 days. A key symptom of Bulimia Nervosa is impulsivity, a characteristic that would likely have a great influence on both of these work performance variables. Missed work days due to health reasons was an item of interest for this analysis, however, only 208 respondents answered this question, with 43 of those respondents answering yes. It is important to emphasize that all 43 of these respondents reported bingeing at least twice a week for several months, thus indicating that Bulimia Nervosa may play an important role in work attendance. The median number of missed work days was 7. Due to the small number of participants responding to this question, this item will not be analyzed further for this study, however, it is clear that work performance in relationship to Bulimia Nervosa needs to be studied further.

## Conclusion

Eating disorders are costly and difficult to treat. Given the constant changes in insurance policies, providers may not be able to treat eating disordered individuals appropriately. When these patients are discharged from treatment before they have recovered, the rate of relapse is high, leading to additional cycles of treatment. While this is not cost efficient for insurance companies or health care providers, spending additional time in treatment also directly impacts employers and indirectly impacts the economy thorough absenteeism.

There is little literature examining the relationship between eating disorders and work performance. Anorexia Nervosa and Bulimia Nervosa are different disorders, each having a different impact on aspects of work performance. As noted in the discussion section of this paper, both types of eating disorders may have a higher impact on concentration and understanding, but these difficulties may have a greater influence in Bulimia Nervosa by impacting the quality of work. Based on the results of this study, there is evidence to support further focused research on specific aspects of this relationship.

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Table 1.

Overview of the Demographics of the Surveys included in the CPES

	<b>National Comorbidity Survey Replication</b>	<b>National Survey of American Life</b>	<b>National Latino and Asian-American Study of Mental Health</b>
<b>Years Conducted</b>	2001 – 2002	2001 – 2002	2002 - 2003
<b>Age of Participants</b>	Age 18 and older	Age 18 and older	Age 18 and older
<b>Survey Population</b>	All adults	African American, Afro-Caribbean, Non-Hispanic Whites	Latino and Asian-American Adults
<b>Region Sampled</b>	Continental United States	Continental United States	Continental United States, Alaska, and Hawaii

Source: Alegria et. al., 2008

Table 2.

## Description of Variables of Interest and Measurement Scales

<b>Variable</b>	<b>Response Options</b>
Strong fear of being overweight	Refused, Don't Know, Yes, No
Strong fear of being overweight despite being at a low weight	Refused, Don't Know, Yes, No
Binge episodes of a minimum of two times per week for several months	Refused, Don't Know, Yes, No
Trouble with concentration, memory, and thinking in past month due to health problems	# of Days
Work failure at any time in past month	Refused, Don't Know, Yes, No
Not working as carefully as should be working	Refused, Don't Know, All, Most, Some, A Little, None
Quality of work lower than expected	Refused, Don't Know, All, Most, Some, A Little, None
Difficulty concentrating for 10 minutes	Refused, Don't Know, None, Mild, Moderate, Severe, Cannot
Amount of difficulty understanding	Refused, Don't Know, None, Mild, Moderate, Severe, Cannot
Amount of difficulty remembering important tasks	Refused, Don't Know, None, Mild, Moderate, Severe, Cannot
Amount of difficulty learning a new assignment	Refused, Don't Know, None, Mild, Moderate, Severe, Cannot

Source: Alegria et. al., 2008

Table 3.

## Overview of CPES Demographics

<b>Variable</b>	<b>Number of Observations</b>	<b>Mean</b>	<b>Standard Deviation</b>
Sex (1 = Male, 2 = Female)	20013	1.57	0.49
Age	20013	43.38	16.72
Region of Country (1= Northeast, 2= Midwest, 3= South, 4= West)	20013	2.65	1.05
Marital Status (1= Married/ Cohabiting, 2=Divorced/ Separated/ Widowed, 3= Never Married)	20013	1.70	0.83
Years of Education (1= 0-11 years, 2=12 years, 3=13-15 years, 4= greater than or equal to 16 years)	20013	2.53	1.06

Source: Alegria et. al., 2008

Table 4.

Distribution of Race for Positive Responses to Primary Variables

<b>Race</b>	<b>Reported Having a Strong Fear/ Concern of Being Overweight</b>	<b>Reported Having a Strong Worry/ Fear of Being Overweight When Weighed Below Average</b>	<b>Reported Having Binge Episodes at Least Twice a Week for Several Months</b>
Vietnamese	3.2%	3.1%	1.5%
Filipino	4.3%	5.0%	4.6%
Chinese	4.7%	6.8%	2.9%
All Other Asian	3.5%	3.6%	3.3%
Cuban	4.1%	3.8%	6.8%
Puerto Rican	4.7%	5.7%	5.1%
Mexican	8.1%	7.1%	8.3%
All Other Hispanic	7.0%	5.3%	9.0%
Afro-Caribbean	9.2%	6.7%	8.6%
African American	27.1%	27.0%	29.5%
Non-Latino Whites	23.0%	24.5%	19.3%
All Other	1.1%	1.4%	1.1%

Source: Alegria et. al., 2008

Table 5.

Summary of Findings Related to those Reporting Having a Strong Fear or Concern of Being Overweight

Indicators of Work Performance	Reported Having a Strong Fear/ Concern of Being Overweight	
	Chi Square (df = 1)	P-Value ( $\alpha = 0.05$ )
Health problems are related to difficulty with concentration, memory, or thinking in past month	150.7	0.000
Work failure any time in past 30 days	6.4	0.011
Not working as carefully as should over past month	12.0	0.000
Quality of work lower than expected over past month	10.4	0.001
Difficulty concentrating for 10 minutes	5.9	0.015
Difficulty understanding	6.2	0.013
Difficulty remembering important tasks	4.0	0.045
Difficulty learning a new assignment	0.9	0.319

Source: Alegria et. al., 2008

Table 6.

Summary of Findings Related to those Reporting Having a Strong Fear of Being Overweight When at a Low Weight

Indicators of Work Performance	Having a Strong Worry/ Fear of Being Overweight When Weighed Below Average	
	Chi Square (df = 1)	P-Value ( $\alpha = 0.05$ )
Health problems are related to difficulty with concentration, memory, or thinking in past month	26.4	0.000
Work failure any time in past 30 days	2.4	0.118
Not working as carefully as should over past month	0.06	0.805
Quality of work lower than expected over past month	2.5	0.113
Difficulty concentrating for 10 minutes	0.02	0.885
Difficulty understanding	4.7	0.030
Difficulty remembering important tasks	0.9	0.334
Difficulty learning a new assignment	21.0	0.000

Source: Alegria et. al., 2008

Table 7.

Summary of Findings Related to those Reporting Binge Episodes

Indicators of Work Performance	Having Binge Episodes at Least Twice a Week for Several Months	
	Chi Square (df = 1)	P-Value ( $\alpha = 0.05$ )
Health problems are related to difficulty with concentration, memory, or thinking in past month	173.5	0.000
Work failure any time in past 30 days	2.5	0.117
Not working as carefully as should over past month	6.5	0.011
Quality of work lower than expected over past month	11.6	0.000
Difficulty concentrating for 10 minutes	5.9	0.015
Difficulty understanding	23.2	0.000
Difficulty remembering important tasks	2.9	0.089
Difficulty learning a new assignment	19.1	0.000

Source: Alegria et. al., 2008