

CROSS-SECTIONAL ASSOCIATION BETWEEN
ANXIETY DISORDERS AND WORK
PERFORMANCE AMONG
U.S. ADULTS

A Thesis
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ABSTRACT

Background. Past research shows that anxiety disorders can impair work performance, but there are no national studies examining the relationship between anxiety disorder subtypes and low work performance. In a representative sample of employed US adults, we examined the association between low work performance and three types of anxiety disorders--generalized anxiety disorder (GAD), panic disorder (PD), and post-traumatic stress disorder (PTSD).

Methods. We analyzed data collected in 2001-2003 on 4,418 employed US adults participating in the National Comorbidity Survey Replication (NCS-R). DSM-IV diagnostic criteria were used to determine the 12-month prevalence of GAD, PD, and PTSD. Low work performance was classified as a score of ≤ 7 on a 10-point scale in response to a single question (i.e. "What number describes your overall job performance on the days you worked during the past 30 days?"). Logistic regression predicting low work performance adjusted for age, gender, education, financial stress, having children, weekly work hours, race/ethnicity, and geographic region.

Results. The prevalence of low work performances was 18.5%, while the prevalences of GAD, PD, and PTSD were 3.0%, 3.6%, and 4.2%, respectively. The prevalence of low work performance among those with GAD, PD, PTSD, or no anxiety disorder were 25.3%, 20.6%, 27.6%, and 18.0%, respectively. After adjustment for covariates, PTSD was the only anxiety disorder associated with a significantly higher risk of low performance (adjusted odds ratio = 1.44, 95 % confidence interval = 1.05, 1.98).

Conclusion. Not all types of anxiety disorders may be associated with low work performance. Future research should examine these associations prospectively and by subtype of anxiety disorder.

This work is dedicated to the
source of my inspiration and strength:
my daughter, Lyla.

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CHAPTER 1

INTRODUCTION

In a nationally representative cross-sectional sample of employed US adults, we will examine if GAD, PD, and PTSD are significantly associated with lower levels of work performance. Identifying differential effects of anxiety disorders on work performance will allow future research to focus on specific groups experiencing functional impairments in the workplace and the mechanisms involved. More detailed information on which people with anxiety disorders are most affected and why, will also allow employers to more effectively address the burden on the individual and the workplace that results from anxiety disorders.

CHAPTER 2

BACKGROUND

Approximately one in five US adults meets the diagnostic threshold for an anxiety disorder (Kessler, Chiu, Demler, & Walters, 2005). The three most common types of anxiety disorders are generalized anxiety disorder (GAD), panic disorder (PD), and post-traumatic stress disorder (PTSD), which have a 12-month prevalence among US adults of 3.1%, 2.7%, and 3.5%, respectively (Kessler et al., 2005). Because of the large number of veterans deployed in Operation Iraqi Freedom or Enduring Freedom and the high prevalence of PTSD among them, the population burden of anxiety disorders in the US could be increasing (Seal et al., 2009). In addition, many of these veterans are trying to re-integrate into the civilian workforce.

A major personal and economic burden of anxiety disorders is that they impair people's functioning at work. To understand the cost and scope of this burden, researchers have attempted to operationalize the construct of "presenteeism" to measure poor functioning while at work, rather than the separate problem of absenteeism. Presenteeism is defined as "decreased on-the-job performance due to the presence of health problems" (Schultz & Edington, 2007). The measurement of presenteeism has led to estimates of the dollar costs associated with lost productivity among those with mental health disorders, an amount estimated to be billions of dollars annually (Birnbaum et al., 2010; Goetzel et al., 2004; Kessler et al., 2008; Lerner & Henke, 2008; Stewart, Ricci, Chee, Hahn, & Morganstein, 2003).

Two national studies, one in Australia (Waghorn, Chant, White, & Whiteford, 2005) and one in Canada (Esposito, Wang, Williams, & Patten, 2007), have shown an increased risk of poor work performance among those with anxiety disorders. However, neither study separately examined the risks associated with specific types of anxiety disorders. The importance of examining anxiety disorders separately is suggested by one study conducted in the Netherlands of those seeking medical care, which found different effects on work performance between those with GAD and PD (Plaisier et al., 2010). Currently, we know of no national study among employed US adults examining the relationship between anxiety disorders and work performance.

CHAPTER 3

METHODS

Study Sample

The sample was obtained from the National Comorbidity Survey Replication (NCS-R), which is described in detail elsewhere (Kessler & Merikangas, 2004; Kessler et al., 2004). To conduct this study, we used a de-identified, publically available dataset from the NCS-R. It contained no data elements that would risk deductive disclosure of the NCS-R study participants. Our study was, therefore, deemed exempt from review by Temple University's Institutional Review Board.

In brief, the NCS-R was a cross-sectional survey, conducted between February 2001 and April 2003, with the purpose of estimating the prevalence and correlates of mental health disorders in a nationally representative sample of US adults. The design used a four-stage area probability sample based on data collected by the US Bureau of the 2000 Census. The sample was designed to be representative of English-speaking, civilian adults (aged 18 or older) living outside of institutions in the contiguous 48 states. Students were included if they had a permanent household address at the sampled household but were living in group housing at school.

A total of 9,282 US residents aged 18 and older were surveyed about their experiences over the previous 12 months. The survey was conducted with face-to-face interviews using computer-assisted personal interview (CAPI) methods that record responses and determine which participants receive subsequent sections of the survey. All respondents were administered Part 1 of the survey, which included the World Health

Organization's (WHO) Composite International Disease Interview (CIDI) version 3.0 for a general assessment of core mental health disorders (Kessler & Ustun, n.d.; Kessler et al., 2004).

Of the 9,282 Part 1 participants, a subsample of 5,692 were also administered Part 2 of the survey to assess additional mental health disorders and correlates of mental health disorders. The participants of Part 2 included all persons who were screened as having met the criteria for a core mental health disorder from Part 1, along with a probability sample of participants who did not meet that criteria. Therefore, Part 2 of the survey contained an oversampling of people with mental health disorders. The effective response rate for Part 1 was 75% and all participants eligible for Part 2 completed that part of the survey.

The sample used for the current study is a subset of the 5,692 Part 2 participants who were part of the workforce. Following the works of others (Birnbaum et al., 2010), we considered those in the workforce to be those currently employed for at least 20 hours per week (n=3,938) as well as self-employed individuals (n=480), yielding a sample size of 4,418 for the current study.

Primary Outcome

Participants were asked to rate their own work performance over the past 30 days based on the following question: "What number describes your overall job performance on the days you worked during the past 30 days?" Respondents were provided a 1 to 10 scale, anchored by 0 ("the worst job performance that anyone could have done") and 10 ("the best job performance anyone could have done"). This question is identical to a

question on the WHO Health Performance Questionnaire (HPQ) presenteeism scale (Kessler et al., 2003), with the exception that the latter asks about the past 28 days. Participant responses to the work performance item from the NCS-R ranged from 0 to 10 in our sample, and were highly skewed toward higher values, with 28.5% answering “9” and 21.3% answering “10”. We therefore created a binary outcome variable called low work performance, which was defined as those with a score of 7 or less. This cut-point was made *a priori*, before we conducted our analyses, and it was selected because it subsumed approximately the lowest quintile of responses. To our knowledge, data are not available to establish a cut point on this self-reported variable based on its relationship to another criterion measure of work performance. This binary outcome was chosen to allow for a nonparametric analyses appropriate for an outcome variable with a skewed distribution and to facilitate communication and interpretation of our results.

Exposure Measures

Anxiety disorders were assessed using the participants’ responses to the CIDI. This assessment tool was designed to diagnose mental disorders in accordance with the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) criteria (American Psychiatric Association, 2000). Using these criteria, participant responses were coded to establish whether individuals responding to the survey had an anxiety disorder within the previous 12 months. We included in our analysis the three most common anxiety disorders—generalized anxiety disorder (GAD), panic disorder (PD), and post-traumatic stress disorder (PTSD). We also created a fourth variable, labeled “any anxiety disorder,” that included those with either GAD, PD, or PTSD.

Covariates

We identified eight variables within NCS-R data that we considered possible confounders in that they were potentially related to both anxiety disorders (key exposures) and low work performance (outcome) but not on the causal pathway between the exposures and outcome. These variables included age, gender, geographic region (Midwest, Northeast, South, West), race/ethnicity, level of education, and the average weekly work hours during the previous month. Continuous variables were categorized in a manner similar to previous work examining presentism and depression using NCS-R data (Birbaum et al., 2010). These categories facilitated comparisons between studies and interpretation of our data. We also created a binary variable, labelled “has children,” which included those who reported having one or more biological children under the age of 18 in the household or being financially responsible for a non-related person under the age of 18 for at least the past five years. In response to the question “In general, would you say (you have/your family living here has) more money than you need, just enough for your needs, or not enough to meet your needs?”, we created a three-category financial stress variable of “more”, “enough”, or “not enough” income to cover current financial obligations.

Statistical Analyses

The goal of our analyses was to determine whether three anxiety disorders—GAD, PD, or PTSD—or having any of these three anxiety disorders was associated with low work performance after accounting for potential measured confounding variables.

Statistical analyses were conducted using Stata/SE (v. 13). All prevalence estimates applied the NCS-R sample weights appropriate for the analyses of Part 2 data. These weights reflected a subject's sampling probability based on the stratified sampling design and accounted for the oversampling of those with mental health diagnoses and survey non-response. We used the survey (svy) command in Stata to provide robust (Huber-White) standard error estimates that account for the sampling strata used in the complex survey design.

All 4,418 subjects had complete data on the anxiety disorders, but 745 were missing data on work performance and 94 were missing data on one or more covariates (Table 1). We imputed missing values for these variables to reduce bias and increase precision in our estimate of the association between anxiety disorders and low work performance (Cummings, 2013). Multiple imputation was implemented using sequential regression multivariate imputation (Raghunathan, Lepkowski, Hoewyk, & Solenberger, 2001). This procedure involves estimating plausible values when data are missing for a given variable by using a regression analysis, suitable to the nature of the missing variables (e.g. binary, ordered categories, or unordered categories), to predict the missing data from all other variables with available data. This iterative procedure then uses these predicted values to estimate the missing values of other variables. Our imputation models included the anxiety disorders and low work performance plus all eight covariates. We created 20 imputed datasets, each with 4,418 cases and the imputed values for missing data (Graham, Olchowski, & Gilreath, 2007). All analyses were conducted using logistic regression models on the imputed data sets, and the reported model parameters were

aggregated across the 20 datasets (Scafer & Graham, 2002). All statistical tests were two-tailed with significance set at .05.

In bivariate analyses using unadjusted logistic models, we first assessed how our eight potential confounding variables were related to our study outcome (low work performance) and our four exposure variables (GAD, PD, PTSD, and any anxiety disorder). We carried out separate sets of regression models to examine the relationships between each exposure variable (GAD, PD, PTSD, and any anxiety disorder) and low work performance. The first model contained no covariates and provided an estimate of the unadjusted odds of low work performance associated with each anxiety disorder. We then added all eight covariates to each model to estimate the adjusted odds.

Because prior studies show that the relationship between depression and presenteeism is modified by gender (Lerner et al., 2004; Merrill et al., 2012), we examined whether a similar type of effect modification might occur with anxiety disorders and low work performance. To test for this possible interaction between gender and anxiety disorder, we added to each model containing all covariates an interaction term for gender (female= 1 and male =0) X anxiety disorder. We evaluated the statistical significance of the regression parameter for that interaction term in the model.

CHAPTER 4

RESULTS

The prevalence of GAD, PD, PTSD, and any anxiety disorder were, 3.0%, 3.6%, 4.2%, and 9.2%, respectively (Table 1). The prevalence of low work performance was 18.5% (18.4% before imputing values for the 745 cases missing data on work performance). Approximately 60% of the sample was under 45 years of age, almost three-fourths was non-Hispanic white, over one-fourth had 16 or more years of education, and approximately one-third worked more than 40 hours per week.

Low work performance was reported more commonly among females and those without children, and it tended to be reported more commonly among those who were younger, had less money than they needed, and worked more hours per week (Table 2). Anxiety disorders were more common in females, which was the only subject characteristic significantly associated with each type of anxiety disorder (Tables 3&4). Anxiety disorders also tended to be more common in those who reported having less money than they needed, but tended to be less common in those who were older and non-Hispanic Black. In summary, gender, age, and money in relation to need were the subject characteristics most likely to confound the relationship between anxiety disorders and low work performance because these characteristics were associated significantly with both the exposure and outcome.

After adjustment for covariates, PTSD was the only anxiety disorder associated with a significantly higher risk of low performance (unadjusted odds ratio [OR] = 1.44, 95 % confidence interval [CI] = 1.05, 1.98) (Table 5). In an analysis of only those 3,579

cases with complete data on work performance and all covariates (no imputation) the adjusted risk of low work performance associated with PTSD was similarly elevated (OR [95% CI] = 1.46 [1.08, 1.96]). When we added an interaction term for gender (female = 1 and male = 0) X anxiety disorder to each model containing all covariates, none of the interaction terms were significant, suggesting that gender did not modify the risk of low work performance associated with GAD ($B = 0.19, p=.71$), PD ($B = 0.19, p=.67$), PTSD ($B = -0.22, p=.62$), or any anxiety disorder ($B = 0.003, p=.99$).

Table 1		
<i>Prevalence of Participant Characteristics</i>		
	Unweighted n	Weighted % ^a
Low Work Performance		
Yes	738	18.4
No	2935	81.6
Missing	745	-
GAD		
Yes	183	3.0
No	4235	97.0
Missing	0	-
PD		
Yes	209	3.6
No	4209	96.4
Missing	0	-
PTSD		
Yes	237	4.2
No	4181	95.8
Missing	0	-
Any anxiety disorder		
Yes	536	9.2
No	3882	90.8
Missing	0	-
Age, y		
18-29	1078	25.6
30-44	1733	35.9
45-59	1318	31.3
60+	289	7.4
Missing	0	-
Gender		
Male	2105	47.8
Female	2313	52.2
Missing	0	-
Race/ethnicity		
Non-Hispanic white	3278	73.0
Non-Hispanic black	506	11.6
Hispanic	417	11.4
Other	217	3.4
Missing	0	-
Education, y		
≥16	1310	27.6
13-15	1419	30.4
12	1262	31.1
0-11	409	10.9
Missing	18	-
Region		
South	1428	35.8
Midwest	1258	24.0
Northeast	798	17.8
West	944	22.4
Missing	0	-
Has children		
No	1242	70.8
Yes	3163	29.2
Missing	13	-

Table 1		
(Continued)		
	Weighted n	Weighted % ^a
Income to meet needs		
More than enough	842	18.6
Just enough	2364	56.9
Not enough	1132	24.6
Missing	80	-
Weekly work hours		
≤20	360	8.6
21-40	2517	57.3
41-60	1336	31.0
≥60	165	3.1
Missing	40	-
GAD = generalized anxiety disorder, PD = panic disorder, PTSD = post-traumatic stress disorder		
^a Weighted percentages are based on total survey respondents without missing data and may not add to 100.0% due to rounding		

Table 2		
<i>Association of Participant Characteristics with Low Work Performance</i>		
	Unweighted n (Weighted %)	Unadjusted OR (95% CI)
Age, y		
18-29	243 (24.6)	Ref
30-44	273 (17.7)	0.66 (0.50-0.88)
45-59	182 (14.6)	0.52 (0.38-0.73)
60+	40 (17.8)	0.66 (0.37-1.18)
Gender	0	-
Male	315 (15.9)	Ref
Female	423 (21.3)	1.43 (1.15-1.77)
Race/ethnicity	2313	52.2
Non-Hispanic white	565 (19.0)	Ref
Non-Hispanic black	77 (16.6)	0.85 (0.57-1.25)
Hispanic	62 (17.4)	0.90 (0.51-1.60)
Other	34 (18.3)	0.96 (0.53-1.71)
Education, y	417	11.4
≥16	210 (17.3)	Ref
13-15	226 (16.8)	0.97 (0.79-1.17)
12	221 (19.9)	1.18 (0.93-1.51)
0-11	78 (22.0)	1.35 (0.92-1.98)
Region	1419	30.4
South	227 (18.1)	Ref
Midwest	202 (18.9)	1.03 (0.73-1.47)
Northeast	147 (19.4)	1.09 (0.81-1.47)
West	162 (18.3)	1.01 (0.70-1.47)
Has children	227 (18.1)	Ref
No	266 (23.1)	Ref
Yes	470 (16.6)	0.66 (0.52-0.83)
West	162 (18.3)	1.01 (0.70-1.47)
Missing	0	-
Has children		
No	1242	70.8
Yes	3163	29.2
Missing	13	-
Money to meet needs		
More than enough	114 (14.7)	Ref
Just enough	379 (17.9)	1.27 (0.97-1.67)
Not enough	233 (22.6)	1.70 (1.27-2.30)
Weekly work hours		
≤20	76 (24.4)	Ref
21-40	466 (20.4)	0.79 (0.53-1.19)
40-60	166 (13.5)	0.48 (0.30-0.76)
≥60	24 (15.5)	0.57 (0.29-1.10)
GAD = generalized anxiety disorder, PD = panic disorder, PTSD = post-traumatic stress disorder, OR = odds ratio, CI = confidence interval, bolded results = statistically significant		

	GAD		PD	
	Unweighted n (Weighted %)	Unadjusted OR (95% CI)	Unweighted n (Weighted %)	Unadjusted OR (95% CI)
Age, y				
18-29	45 (2.9)	Ref	59 (4.3)	Ref
30-44	66 (3.0)	1.01 (0.66-1.55)	86 (4.2)	0.99 (0.72-1.36)
45-59	66 (3.4)	1.16 (0.71-1.91)	61 (3.2)	0.73 (0.49-1.10)
60+	6 (1.3)	0.44 (0.18-1.13)	3 (0.8)	0.18 (0.05-0.62)
Gender				
Male	63 (2.0)	Ref	63 (2.3)	Ref
Female	120 (4.1)	2.09 (1.6-2.72)	146 (5.2)	2.35 (1.70-3.25)
Race/ethnicity				
Non-Hispanic white	141 (3.2)	Ref	154 (3.9)	Ref
Non-Hispanic black	21 (2.2)	0.67 (0.44-1.02)	20 (2.3)	0.59 (0.33-1.04)
Hispanic	12 (2.2)	0.67 (0.31-1.48)	27 (4.1)	1.06 (0.70-1.61)
Other	9 (3.0)	0.94 (0.40-2.23)	8 (2.4)	0.61 (0.27-1.34)
Education, y				
≥16	43 (2.5)	Ref	54 (3.3)	Ref
13-15	57 (2.7)	1.11 (0.73-1.67)	70 (4.2)	1.28 (0.85-1.93)
12	57 (3.6)	1.47 (0.95-2.28)	59 (3.5)	1.05 (0.70-1.59)
0-11	24 (3.4)	1.39 (0.79-2.43)	26 (3.6)	1.11 (0.62-1.98)
Region				
South	62 (3.1)	Ref	70 (3.4)	Ref
Midwest	50 (3.0)	0.97 (0.61-1.54)	57 (3.8)	1.13 (0.87-2.07)
Northeast	37 (3.6)	1.18 (0.78-1.77)	39 (4.5)	1.34 (0.82-1.56)
West	34 (2.4)	0.79 (0.50-1.24)	43 (3.2)	0.94 (0.55-1.59)
Has children				
No	48 (2.8)	Ref	77 (4.7)	Ref
Yes	134 (3.0)	1.08 (0.79-1.47)	131 (3.2)	0.66 (0.50-0.88)
Money to meet needs				
More than enough	19 (1.9)	Ref	35 (3.6)	Ref
Just enough	77 (2.3)	1.28 (0.72-2.25)	90 (3.0)	0.82 (0.54-1.27)
Not enough	82 (5.3)	2.98 (1.72-5.17)	78 (5.2)	1.46 (0.88-2.41)
Weekly work hours				
≤20	17 (3.0)	Ref	22 (3.5)	Ref
21-40	114 (3.3)	1.13 (0.60-2.10)	127 (4.2)	1.21 (0.75-1.96)
40-60	44 (2.4)	0.79 (0.37-1.70)	52 (2.7)	0.76 (0.41-1.42)
≥60	7 (3.0)	1.03 (0.32-3.33)	8 (4.4)	1.28 (0.55-2.98)

GAD = generalized anxiety disorder, PD = panic disorder, OR = odds ratio, CI = confidence interval, **bolded** results = statistically significant

	PTSD		Any Anxiety Disorder	
	Unweighted n (Weighted %)	Unadjusted OR (95% CI)	Unweighted n (Weighted %)	Unadjusted OR (95% CI)
Age				
18-29	75 (5.4)	Ref	151 (10.4)	Ref
30-44	80 (3.5)	0.65 (0.43-0.97)	208 (9.8)	0.93 (0.72-1.22)
45-59	74 (4.5)	0.83 (0.56-1.22)	162 (9.1)	0.86 (0.67-1.11)
60+	8 (1.6)	0.29 (0.14-0.59)	15 (3.1)	0.28 (0.15-0.52)
Gender				
Male	53 (1.8)	Ref	154 (5.2)	Ref
Female	184 (6.7)	3.82 (2.77-5.26)	382 (13.6)	2.85 (2.36-3.44)
Race/ethnicity				
Non-Hispanic white	172 (4.2)	Ref	402 (9.7)	Ref
Non-Hispanic black	24 (3.5)	0.82 (0.47-1.45)	53 (6.7)	0.67 (0.45-0.99)
Hispanic	25 (3.9)	0.93 (0.51-1.69)	55 (9.0)	0.92 (0.64-1.31)
Other	16 (6.1)	1.50 (0.75-2.98)	26 (8.9)	0.92 (0.55-1.54)
Education, y				
≥16	63 (3.8)	Ref	142 (8.3)	Ref
13-15	79 (4.2)	1.11 (0.78-1.59)	176 (9.7)	1.89 (0.97-1.46)
12	66 (4.1)	1.08 (0.66-1.77)	153 (9.3)	1.14 (0.83-1.57)
0-11	29 (5.4)	1.45 (0.73-2.89)	63 (10.1)	1.25 (0.79-1.98)
Region				
South	65 (3.1)	Ref	163 (8.0)	Ref
Midwest	69 (4.1)	1.33 (0.89-1.99)	150 (9.4)	1.18 (0.89-1.58)
Northeast	47 (5.1)	1.64 (0.98-2.76)	104 (11.0)	1.42 (1.00-2.02)
West	56 (5.1)	1.64 (0.87-3.11)	119 (9.5)	1.21 (0.75-1.94)
Has children				
No	79 (4.7)	Ref	179 (10.4)	Ref
Yes	158 (3.9)	0.82 (0.59-1.15)	355 (8.7)	0.83 (0.65-1.05)
Money to meet needs				
More than enough	31 (2.7)	Ref	79 (7.6)	Ref
Just enough	119 (3.8)	1.44 (0.90-2.29)	249 (7.9)	1.04 (0.77-1.40)
Not enough	83 (6.0)	2.32 (1.53-3.52)	198 (13.6)	1.91 (1.34-2.74)
Weekly work hours				
≤20	19 (3.6)	Ref	50 (8.3)	Ref
21-40	144 (4.5)	1.25 (0.76-2.07)	330 (10.3)	1.28 (0.93-1.74)
40-60	61 (3.4)	0.93 (0.56-1.55)	134 (7.2)	0.87 (0.58-1.28)
≥60	13 (7.2)	2.07 (1.03-4.16)	21 (11.5)	1.45 (0.90-2.33)

PTSD = post-traumatic stress disorder, OR = odds ratio, CI = confidence interval, **bolded** results = statistically significant

Table 5				
<i>Prevalence and Odds of Low Work Performance Associated with Anxiety Disorders</i>				
	Prevalence of Low Work Performance		Odds of Low Work Performance	
	Unweighted n	Weighted %	Unadjusted OR (95% CI)	Adjusted OR (95% CI) ^a
Has GAD				
No	693	18.3	Ref	Ref
Yes	45	25.3	1.51 (1.00-2.29)	1.29 (0.86-1.93)
Has PD				
No	694	18.4	Ref	Ref
Yes	44	20.6	1.15 (0.72-1.86)	0.96 (0.60-1.55)
Has PTSD				
No	674	18.1	Ref	Ref
Yes	64	27.6	1.73 (1.25-2.40)	1.44 (1.05-1.98)
Has any anxiety disorder				
No	613	18.0	Ref	Ref
Yes	125	23.4	1.40 (1.05-1.86)	1.17 (0.90-1.54)
GAD = generalized anxiety disorder, PD = panic disorder, PTSD = post-traumatic stress disorder, OR = odds ratio, CI = confidence interval, bolded results = statistically significant				
^a Adjusted for the following variables: age, gender, education, money to meet needs, has children, weekly work hours, race/ethnicity, and region				

CHAPTER 5

CONCLUSION

In a nationally representative sample of US adults, we found that PTSD, but not GAD or PD, was significantly associated with self-reported low work performance. The risk was not modified by gender and persisted after accounting for potential confounders including age, gender, and perceived financial stress. To our knowledge this is the first study to examine, in a nationally representative sample of US adults, the association between specific types of anxiety disorders and work performance—a key component of presenteeism.

Strengths of this study include its generalizability to the US population and the validity of its diagnostic questionnaires for anxiety disorders (Hare et al., 2006; Komiti et al., 2001). However, there are limitations that bear mentioning. The cross-sectional nature of the data make it difficult to establish a causal relationship between the independent and dependent variables. Another limitation is that work performance was measured on a self-report scale of 1-10 and did not include any independent source of information on work performance. The significant increased risk of low work performance observed in persons with PTSD could be explained in part by a negative distortion in the perception of work performance among those with PTSD. It is possible, for example, that some persons with PTSD report lower work performance than those without the disorder who are, in fact, performing at the same level. Lastly, the categorization of anxiety disorders was based on DSM-IV criteria instead of the current DSM-V criteria (American Psychiatric Association, 2013).

Our study reported slightly fewer cases of employed participants (n=4418) than a previous NCS-R study (n=4,465) (Birnbaum et al., 2010). This is because, unlike the previous study, we chose to not include unemployed individuals who were actively looking for employment as part of the workforce. We also report differences in the prevalence of anxiety disorder from other analyses of the NCS-R data (a decrease of 0.1% in GAD and an increase of 0.9% and 0.7% for PD and PTSD, respectively), likely owing to the fact that our sub-sample only contained employed individuals.

There have been two national studies examining the prevalence of low work performance associated with anxiety disorders (Esposito et al., 2007; Waghorn et al., 2005). Waghorn and colleagues (2005) found an association between anxiety disorders and low work performance among 42,664 Australians. They found a much smaller prevalence of anxiety disorders in the working population (2.9%) of Australia than we found in the US (9.2%), and a much higher prevalence of low work performance in employed adults with anxiety disorder (43.4%) than we did (23.4%). These differences in prevalences are likely due to differences in measuring exposure and outcomes. In the Australian study, a single “Yes/No” question from the Short Form-12 Health Survey (SF-12) was used to measure low work performance (“During the past 4 weeks, have you accomplished less than you would like as a result of any emotional problems, such as feeling depressed or anxious?”). Although both studies used the CIDI to assess “any anxiety disorder” the Australian study used a 6-month rather than a 12-month prevalence.

A national study of 3,345 Canadians also showed a higher prevalence of low work performance in people with anxiety disorders than in people without (Esposito et al., 2007). Using the Stanford Presenteeism Scale-6, a validated presenteeism scale with

scores ranging from 5 (least amount of presenteeism possible) to 30 (highest amount of presenteeism possible) (Koopman et al., 2002), they found significantly higher scores among those with any anxiety disorder compared to those without one. Esposito and colleagues also reported an interaction effect of gender by anxiety, indicating that the effects of anxiety on presenteeism were higher among men.

We are only aware of a single study that looks at work performance and anxiety disorder subtypes (GAD, PD and social phobia) (Plaisier et al., 2010). In a sample of 1,876 participants recruited from health care settings (general practice and outpatient mental health organizations) in the Netherlands, 53.8% had a current anxiety disorder. Unlike our results, they found that anxiety disorders were significantly associated with impaired work performance (OR [95% CI] = 2.13 [1.61, 2.83]), and that GAD was only subtype to be significantly associated with impaired work performance (OR[95% CI] = 1.48 [1.03, 2.12]). These different findings can likely be attributed to different methods for measuring work performance. Their study used the Health and Labor Questionnaire Short Form (SF-HLQ), which produces a continuous measure of work performance (Roijen, Essink-bot, Koopmanschap, Bonsel, & Rutten, 1996). However, because their output did not meet the assumptions of normality, they defined impaired work performance as the scores in the highest quartile (>1.68).

CHAPTER 6

DISCUSSION

This study adds to the growing body of research that demonstrates the negative effects of anxiety disorders on work performance. Our results suggest, however, that work-related impairment among US adults is associated with anxiety disorders and may arise primarily from PTSD. This finding may be especially relevant for the country's many war veterans. Since 2001, over 2.7 million military service members have been deployed to active combat zones in Iraq and Afghanistan (Hautzinger, Howell, Scandlyn, & Wool, 2015). The prevalence of PTSD among these service members is nearly quadruple that of the general population (Kok, Herrell, Thomas, & Hoge, 2012), and has been linked to increased rates of suicide ideation and attempts (Bray et al., 2010; Guerra & Calhoun, 2011). The information from this study's results should be used in conjunction with existing literature to increase awareness about the deleterious physical, emotional, and occupational effects of PTSD.

Future studies should examine the impact of specific anxiety disorders, especially PTSD, on low work performance using a presenteeism scale which can capture more than one dimension of work impairment. To enhance causal inference, future studies should also employ a longitudinal design and consider the incorporation of cost associated with work impairment in addition to factors that might protect against impairment among those with anxiety disorders.

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APPENDIX A
IRB APPROVAL LETTER



**Application request for exempt human subjects research under 45CFR
46.101(b)(4)**

Ryan Bennett <tuf69701@temple.edu>
To: tuf32293@temple.edu

Wed, May 27, 2015 at 8:44 AM

Hi Mr. Samayoa,

Your research as you described it does not meet the regulatory definition of human subjects research, so IRB review will not be necessary. You are free to pursue the research, but keep in mind that changes to your study that affect the design and procedures may change the need for IRB review—you can always consult with someone in our office at [\(215\) 707-3390](tel:2157073390) if you think this may have an impact. Please also keep in mind that this is just a determination for IRB review, so check with your advisor and department to make sure that there aren't any other approvals you might require before starting your study.

Thanks,

Ryan Bennett, MS

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