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Are Women Higher in Anxiety than Men? United States Surveys, 2003-2013

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Rabale Hasan

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Abstract

A large proportion of the U.S. population suffers from anxiety and related mental illnesses. An in-depth analysis needs to examine all possible factors that may explain why anxiety is on an upward trend and why women are more likely than men to present with anxiety. This study examined the anxiety in five cross-sectional United States surveys (Total N=19,630) taken in 2003, 2006, 2009, 2011, and 2013. Predictors such as demographics (e.g., race, age, gender), medical conditions, behavioral choices (e.g., BMI, exercise, sleep), and psychosocial stressors were investigated. Linear regression and logistic regression analyses were used to examine trends. Anxiety is more likely to be reported in females (vs. males), whites (vs. other races or ethnicities), younger generations, those with lower education levels, lower household income, being married (or formerly married or single; vs. cohabitating), living with stress and depression, managing or coping with stress, having a lack of concentration, a lack of memory, deficits in sleep, having acid reflux/heartburn, cancer, irritable bowel syndrome and/or vision problems. Although there are important limitations to the current study, these trends may provide some insights to help society control the drastic increase of anxiety in both men and women.

Introduction

Anxiety refers to the fear and inner restlessness one feels in anticipation of a future threat (American Psychiatric Association, 2013). While there are various forms of anxiety, studies have shown that in recent decades, there has been a gradual increase in an overall occurrence. Twenge (2000) found that young people's anxiety steadily increased between the 1950s and the mid-1990s in the United States. Not only is there an increase in anxiety levels but also substantial evidence also indicates significant gender differences: Women are about twice as likely to experience anxiety as men (Baxter et al., 2013). Anxiety disorders differ from one another in terms of the types of situations or objects that induce these avoidant or nervous behaviors. To decrease these rising levels of anxiety and other related mental illnesses, an in-depth analysis needs to examine possible factors that are leading to this upward trend and gender gap. This study is considering the following aspects in relation to anxiety: demographic information, psychosocial factors, medical conditions, and behavioral choices. These factors will be examined using United States surveys of adults within the ten-year period of 2003 and 2013.

Demographic Factors in Anxiety

In order to understand the factors that induce anxiety, demographic information should be examined. Gender is markedly associated with developing anxiety. As children, girls are more likely to develop an anxiety disorder than boys (Lewinsohn et al., 1998), possibly because adolescent girls have higher vulnerability or internalized emotional problems in society. The National Comorbidity Survey showed how this trend continues in adults. The survey's lifetime prevalence data

demonstrated how women are more prone to being diagnosed with panic disorder, generalized anxiety disorder, agoraphobia, and post-traumatic stress disorder (Kessler et al., 1995).

According to Baxter et al. (2013), older adults (55 years plus) were 20% less likely to have anxiety compared to younger adults (35-54 years). This finding has been replicated in 22 different countries (World Mental Health Survey Consortium, 2008). There are four interlinked themes that are emphasized in young people's lives: poverty, education, social class and school-to-work transition (Jeffrey, 2008). Logically, these factors have been playing even more of a role with younger generation. For instance, an interaction between all of these variables could create an endless cycle where poverty could lead to low education opportunities, poor access to health services, a higher risk of violence, and more (Patel & Kleinman, 2001). There has been little or no published literature focused on higher education and anxiety levels. It is assumed that education levels would not change the reported increase in anxiety.

A study conducted by Salas-Wright et al. (2014) aimed to investigate how mental illnesses and immigrants from Asia, Africa, Europe and Latin America. First and second-generation immigrants from all of these regions were significantly less likely to have anxiety disorder compared to native-born Americans. The lowest prevalence of mood/anxiety disorders was among African American immigrants whereas the highest prevalence was among native-born Americans. This is noteworthy because immigrants are found to report lower income and education levels that would most probably lead to anxiety. Baxter et al. (2013) examined the

global prevalence of anxiety among six different cultures: Euro/Anglo, Indo/Asia, Central and Eastern Europe, North Africa and the Middle East, and Ibero/Latin. When compared with Euro/Anglo, the risk for anxiety in the remaining cultures was 20-50% lower.

To determine that the demographic factors discussed above explain the increasing levels of anxiety, this study hypothesizes that:

Hypothesis 1.1. Following the temporal trend, as time passes the prevalence of anxiety will increase.

Hypothesis 1.2. Women will have higher rates of self-anxiety compared to men.

Hypothesis 1.3. There will be a higher prevalence of anxiety in younger people compared to older people.

Hypothesis 1.4. Whites will have higher rates of anxiety compared to the other races (African American/Black, Asian, and Hispanic).

Research Question 1. To what extent is education associated with anxiety?

Psychosocial Causes of Anxiety

The higher rates of mental illnesses can also be explained by an increase in exposure to psychosocial stressors. Chaby et al. (2014) tested to see if chronic stress in adolescents would lead to long-term anxiety. Rats were tested on feeding paradigms after being exposed to unpredictable stress throughout childhood. Six-and-a-half months later, the rats exhibited altered anxiety-like behavior. Correlations with social factors (divorce rates, crime rates, etc.) suggest that the decrease in social connectedness and the increase in environmental dangers may be

responsible for this rise in anxiety (Twenge, 2000). Women's anxiety can rise when given greater opportunities because there is a greater expectation to do well, thus increasing stress and anxiety levels.

Brady and Kendall (1992) discovered that measures of anxiety and depression are highly correlated, with anxiety generally preceding depression. Among youth, 15.9% to 61.9% who identified as depressed also had comorbid anxiety. Being the most commonly co-occurring mental health illnesses, this trend continues on with adults (Mineka & Clements, 1990). Identifying predictors or precursors to these illnesses can help to prevent this comorbidity from occurring in the future. Hankin et al. (2007) focused more on why depression occurs two or three times more often in girls than it does boys. This sex difference can possibly be explained by risk mechanisms and exposure to stressors such as peer events (Hankin et al., 2007). Thus, women react more severely to stressors that lead to depression and in turn lead to higher anxiety levels.

Present literature demonstrates a relationship between religiosity and mental health. Agorastos et al. (2014) identify two prominent theories relating anxiety and spirituality. The first promotes the Freudian hypothesis that anxiety can arise from negative religious conflicts thus exacerbating the affect. The second theory suggests that religiosity buffers the effects of stress, thus leading to lower distress and anxiety. In a case study focused on Christians, Ramos et al. (2011) discovered positive benefits of incorporating spirituality into cognitive-behavioral therapy for generalized anxiety disorder. Other studies have confirmed this finding,

where a more religious sample of healthy and mentally ill subjects had lower anxiety levels (Kaczorowski, 1989).

Even though losing weight has become more prevalent in society, limited research has examined its relationship with anxiety. One exception is White and Warren's (2014) investigation of the influence of social anxiety on body checking behaviors of female college students: Women with anxiety over their social physique were more likely to have body-checking behaviors that in turn impaired psychosocial functioning. To further understand this relationship, the current study examines anxiety in females (vs. males) based on a multitude of factors including losing weight for appearance purposes.

In summary, the current student examines psychosocial stressors predictors of anxiety; specially, this study hypothesizes that:

Hypothesis 2.1. There will be a higher prevalence of anxiety with those experiencing chronic stress, including, as well as a lack of mental focus, lack of sleep, and lack of energy.

Hypothesis 2.2. Anxiety is more likely in those who also have depression.

Hypothesis 2.3. Those who believe in spirituality will experience less anxiety.

Hypothesis 2.4. Anxiety should increase in those who are losing weight for appearance purposes.

Medical Conditions

Individuals with higher rates of distress and anxiety are more likely to be diagnosed with medical conditions. For instance, irritable bowel syndrome (IBS) is a common gastrointestinal disorder that affects the large intestine. It is characterized

with frequent abdominal pain and alteration of bowel habits (Longstreth et al, 2006). Recent studies of IBS suggest that it is associated with psychological disorders like depression, anxiety, and somatization. Fond et al. (2014)'s systematic review found that patients with IBS have significantly higher anxiety and depression levels than healthy controls. These results could lead to psychological interventions that may improve the quality of life for those who live with IBS.

Diabetes Mellitus, commonly known as diabetes, consists of a group of metabolic diseases with high blood sugar levels over a period of time. Much research has been conducted on the co-morbidity of diabetes and depression but not as much on anxiety. Grigsby et al. (2002) discovered that generalized anxiety disorder is present in 14% of those diagnosed with diabetes and 40% present with elevated anxiety symptoms. Taking the results a step further, Smith et al. (2013) determined whether adults with diabetes have an increased likelihood of anxiety or elevated anxiety symptoms compared to the general population without diabetes. There was a significant, positive association between diabetes and anxiety and elevated anxiety symptoms. While the relationship between diabetes and anxiety has been consistent, it is also possible that having anxiety could lead to an increase risk of developing diabetes.

Associations between anxiety and disease are understudied and need to be emphasized more throughout literature. A recent study by Niles et al. (2015) assessed the presence of medical conditions in adults that were diagnosed with anxiety disorders. More severe anxiety and depressive symptoms were related to higher rates of asthma, back problems, heart attacks, ulcers and eyesight difficulties.

Although these analyses do not infer causality or directionality, they are consistent with the studies completed by O'Donovan et al. (2013), who linked anxiety to diseases of aging such as cardiovascular, autoimmune and neurodegenerative illnesses. Early stress in life promotes chronic inflammation through structural and functional brain changes. Similarly, adolescents living with food allergies are at an increased risk of psychopathology (Shanahan et al., 2014): Children with food allergies experience increased symptoms of generalized anxiety disorder and depression. All of these findings are consistent with previous research showing that patients with both anxiety and depression have poorer health conditions that patients diagnosed with anxiety or depression alone.

To understand how medical conditions influence levels of anxiety in females, this study hypothesizes:

Hypothesis 3.1. Being diagnosed with an important medical illness is

associated with increased chance of experiencing anxiety.

Behavioral Choices and Anxiety

Present-day society has emphasized the need to lose weight and increase the amount of exercise. These behavioral choices are to improve the overall quality of life. Norwegian researchers Brumpton et al. (2013) investigated how closely anxiety relates to weight change and incident obesity in men and women. Over an 11-year time period, women with anxiety or depression gained more weight compared with anxious or depressed men. Subjects with anxiety or depression had a significantly elevated incidence of obesity in both men and women. To counter the high levels of obesity and anxiety, Stonerock et al. (2015) conducted research promoting the use

of exercise, concluding that exercise as a treatment for anxiety *could* be useful, but definitive conclusions about its effectiveness were not made.

Whereas there are a multitude of studies on the topic of anxiety, not one of them focused on the possible precursors of this mental illness in one setting. The aim of this study was to identify predictors that may predispose women to experiencing higher levels of anxiety as a whole. These predictors can range from basic demographic information, psychosocial variables, to medical conditions and various behavioral choices. Specifically, investigating medical and behavioral factors that are related to levels of anxiety in females, this study hypothesizes:

Hypothesis 4.1. Having a higher body mass index (BMI) or a greater need to

lose weight for health reasons is linked to more anxiety.

Hypothesis 4.2. Choosing healthy options such as maintaining weight, diet and

exercise is associated with lower levels of anxiety.

Methods
Participants

Since 1999, the Natural Marketing Institute (NMI; Harleysville, PA) has collected data about the health and wellness (such as natural/organic foods/beverages, personal care products, weight supplements, etc.). Participants partook in an incentive program in return for completing the surveys. Available were databases collected in the following years: 1999, 2003, 2006, 2009, 2011 and 2013. Originally, the survey was taken on paper questionnaires; it became an online survey in 2005. For this study, only the years 2003-2013 were analyzed because no

questions about anxiety appeared in the 1999 survey. The most current database (2013) consisted of 111 questions.

Variables Available

      Demographics. Specific demographic information evaluated in this study included age, gender, household income, race, and education level. Year of birth was asked as fill-in the blank question, except for the 2003 sample, when ranges of ages were checked; because age was highly correlated with age category ($r>.97$) for each range, the mean available for the same age ranges in the 2006 sample was used to estimate age for the 2003 sample. Regarding income, participants answered, "*which of the following income categories best describes your total 2012* <u>*household*</u> *income before taxes?*" The options for this question included "*less than $15,000*," "*$15,000-24,999*," "*$25,000-29,999*," "*$30,000-34,999*," "*$35,000-49,999*," "*$50,000-74,999*," "*$75,000-99,999*," "*$100,000-124,999*," "*$125,000-149,999*," "*$150,000-$199,999*," "*$200,000-249,999*," "*$250,000 or more*," and "*decline to answer*." To measure race, participants answered "*do you consider yourself…?*" with the options of *White, African-American, Black, Asian, Pacific Islander, American Indian or Alaska Native, Other,* or *decline to answer*. A separate question addressed if the participants considered themselves of Hispanic origin. In regards to academia, the question asked what their education level was and ranged from "*less than high school*," "*some high school*," "*high school graduate or equivalent (e.g., GED school)*," "*some college, but no degree*," "*associate's degree*," "*college graduate (e.g., B.S., B.A.)*," "*some graduate school, but no degree*," to "*graduate school (e.g., M.S., M.D., Ph.D.)*."

Psychosocial Factors. Participants were asked to answer if they or anyone in their household was actively managing or treating the following issues: *stress, depression, anxiety, lack of mental focus, lack of energy, sleeplessness,* and *a need to lose weight (for appearance).* In a separate measure, participants were asked to indicate their importance to: "*spiritual factors*," "*usage of conventional healthcare professionals*," "*healthy, balanced lifestyle*," "*keeping a work life balanced*," "*managing stress*," and "*maintaining a positive mental attitude*." These traits were rated on 1 (*extremely important*) to 5 (*not at all important*). On a scale from 1 (*agree completely*) to 5 (*disagree completely*), participants rated their agreement to "*I will take whatever means necessary to control my health*" and "*I live a stressful life and look for ways to simplify my life.*"

Physical Health. Participants were asked to answer if they are "actively managing or treating" the following conditions: *acid reflux/heartburn, anxiety, blood sugar levels, cancers, cholesterol, diabetes, food allergies, heart disease, hypertension/high blood pressure, irritable bowel syndrome, memory problems, menopausal issues, prostate issues, seasonal allergies,* and *vision problems.* There were several other such dimensions that were excluded from this study because they were deemed less relevant.

Behavioral Factors. To measure a "need to lose weight (for health reasons)" or a "need to boost immunity," participants were asked to answer if they or anyone in their household was actively managing or treating these issues. Body mass index (BMI) was calculated by manipulating participants' heights (in feet and inches) and weights (in pounds). In a separate measure, participants rated "maintaining proper

weight" and "maintaining a balanced diet" on a scale of 1 (*extremely important*) to 5 (*not at all important*). Participants answered from "no days at all" up to "7 days a week" to the question "*how many days per week do you exercise strenuously or work out for more than 20 minutes?*"

Data Analyses

Data were analyzed using Stata 13.1 (StataCorp LP, TX, USA) by performing an ordinary linear and logistic regression equations with anxiety as the dependent variable and the other items as independent variables. Analyses started with variables available for all 5 samples; these clustered conceptually related variables into blocks that were evaluated sequentially. Non-significant (p>.05) terms were dropped in subsequent models that combined the blocks. A final trimmed model dropped terms that were non-significant.

Results
Descriptive Statistics

Before analyzing the database, it is helpful to see descriptive trends, which provide a context to interpret results. As Table 1 shows, two of the surveys were much larger than the others, 2003 and 2006. The surveys tended to be completed more often by women than men and more often by people in middle age. The most frequent race endorsed was White, followed by African American (or Black), Hispanic, and Asian; these figures are roughly equivalent to U.S. Census trends. Nearly the entire sample graduated high school, and most finished some college; a minority of participants earned the bachelor's degree or higher.

Table 1. Descriptive statistics for the Samples in the United States Surveys, 2003-2013.

Dimension	*n* (%)
Year of survey	
2003	2,139 (11%)
2006	5,584 (30%)
2009	5,607 (29%)
2011	3,015 (15%)
2013	3,015 (15%)
Gender	
Female	10,805 (55%)
Male	8,825 (45%)
Age in years	
18-25	1,709 (11%)
26-35	3,102 (20%)
36-45	3,011 (19%)
46-55	3,119 (20%)
56-65	2,503 (16%)
66-75	1,751 (11%)
76-85	444 (3%)
86+	33 (<1%)
Race/ethnicity	
African American/Black	2,333 (12%)
White	14,800 (77%)
Asian	1,071 (6%)
Pacific Islander	79 (0.5%)
American Native or Alaska Native	144 (0.75%)
Other	672 (4%)
Hispanic	2,176 (11%)
Not Hispanic	17,100 (89%)
Education	
Less than high school	63 (0.3%)
Some high school	317 (2%)
High school graduate or equivalent	3,684 (19%)
Some college, but no degree	5,507 (28%)
Associate's degree	2,089 (11%)
College graduate (e.g., B.S., B.A.)	3,786 (19%)
Some graduate school but no degree	3,706 (19%)
Graduate school (e.g., M.S., M.D.)	453 (2%)

Analyses of Variables Available in All Five Surveys

Analyses commenced with variables available in all five surveys. As Table 2 shows, anxiety is significantly more likely in relation to being female (vs. male), whites (vs. other races and ethnicities), and younger generations, Figures 1 through 3 show the age effects graphically. Figure 1 shows that the mean level of anxiety for every age for which there were at least 15 observations, coupled with the best fitting linear regression line. Figure 1 shows the decline in anxiety starting from the age of 18 and up to 81 years of age. It clearly shows that younger people face higher anxiety compared to the elderly. The upward and downward variations in Figure 1 might relate to different social, economic, and life stressors. Figure 2 displays a gradual increase in the proportion of the population managing anxiety by birth year instead of age, for birth years with at least 10 cases. Finally, Figure 3 combines the information from both Figures 1 and 2, grouping respondents into four broad birth cohorts and showing temporal trends in anxiety levels during the 10 years covered by the surveys; the cohorts are those born before World War II ended (1900-1945), Baby Boomers (1946-1964), post-Boomers (1965-1981), and Millennials (1982-1995). This figure makes it clear that over the 10-year period, only the post-Boomers and Millennials experienced marked changes in anxiety: Post-boomers had increasing levels of anxiety over time (β=0.05, p<.001) but not as much as Millennials (β=0.10, p<.001); year of survey was not significantly correlated with anxiety for the other two cohorts. Finally, the statistically significant female × age interaction showed that among older adults, there was a smaller gender difference

than there was for younger adults. This trend is not graphed because subsequent analyses revealed that it is no longer significant when controlling other variables.

As Table 2 shows, anxiety was also more likely in respondents with lower education levels, and in those living with stress and depression, having problems with concentration, memory problems, having sleep deficits, having acid reflux/heartburn, irritable bowel syndrome and/or vision problems.

These results support the following hypotheses:

Hypothesis 1.1. Following the temporal trend, as time passes the prevalence of anxiety will increase.

Hypothesis 1.2. Women will have higher rates of self-anxiety compared to men.

Hypothesis 1.3. There will be a higher prevalence of anxiety in younger people compared to older people.

Hypothesis 1.4. Whites will have higher rates of anxiety compared to the other races (African American/Black, Asian, and Hispanic).

Hypothesis 2.1. There will be a higher prevalence of anxiety with those experiencing chronic stress, including as well a lack of mental focus, lack of sleep, and lack of concentration.

Hypothesis 2.2. Anxiety is more likely in those who also have depression.

Hypothesis 3.1. Being diagnosed with an important medical illness is associated with increased chance of experiencing anxiety.

In regard to demography, psychosocial factors, and medical conditions, the following factors ceased being significant predictors of anxiety, once other factors

were controlled (Table 2): Hispanic, African American/Black, Asian, the Female ×
Age interaction, spiritual factors, need to lose weight for appearance, cholesterol,
diabetes, food allergies, heart disease, hypertension/high blood pressure, memory
problems, menopausal issues, need to boost immunity, prostate issues, seasonal
allergies. As for behavioral conditions such as BMI and exercise, none of the factors
significantly related to anxiety levels; in the final model, all of these factors ceased
being significant because other included variables explained their effects. A
logistical regression confirmed these trends (logistic regression models are
preferred for binary outcomes but regular regression was in the main used because
the coefficients are more easily interpreted for continuous predictors).

Thus, the following hypotheses were not fully supported:

Hypothesis 2.3. Those who believe in spirituality will experience less anxiety.

Hypothesis 2.4. Anxiety should increase in those who are losing weight for
appearance purposes.

Hypothesis 4.1. Having a higher body mass index (BMI) or a greater need to
lose weight for health reasons is linked to more anxiety.

Hypothesis 4.2. Choosing healthy options such as maintaining weight, diet and
exercise is associated with lower levels of anxiety.

Table 2. Anxiety as a function of variables available in all sampled years.

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Trimmed model	Trimmed model (logistic)
A. Demographics							
Age	-0.0006*				-0.0007***	-0.0009***	0.987***
Year	0.0054***				0.0038***	0.004***	1.054***
Female	0.125***				0.038**	0.017***	1.312***
Education	-0.0107***				-0.0033*	-0.0028*	0.965*
Hispanic	-0.008						
African American/Black	-0.035*				-0.011		
White	0.027*				0.022**	0.025***	1.466***
Asian	-0.049**				0.006		
Female × Age[a]	-0.0012***				-0.0005		
B. Psychosocial							
Stress		0.204***			0.194***	0.195***	4.95***
Depression		0.397***			0.387***	0.387***	9.59***
Spiritual factors		-0.0014					
Lack of mental focus		0.129***			0.121***	0.124***	1.99***
Lack of energy		0.029***			0.018**	0.018**	1.17**
Lack of sleep		0.033***			0.025***	0.026***	1.25***
Need to lose weight (for appearance)		-0.0045					
C. Medical Conditions							
Acid reflux/heartburn			0.116***		0.071***	0.0717***	2.14***
Cholesterol			0.015*		0.009		
Diabetes			-0.004				
Food allergies			0.026**		0.0087		
Heart disease			-0.002				

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Trimmed model	Trimmed model (logistic)
Hypertension/High blood pressure			0.0013				
Irritable bowel syndrome			0.137***		0.053***	0.053***	1.48***
Memory problems			0.239***		0.002		
Menopausal issues			0.048***		0.005		
Need to boost immunity			0.111***		0.009		
Prostate issues			-0.064***		-0.022		
Seasonal allergies			0.054***		0.0004		
Vision problems			0.032***		-0.015**	-0.015**	0.865*
D. Behavioral Factors							
Body mass index (BMI)				-0.0002			
Need to lose weight (health reasons)				0.108***	-0.0096*	-0.008	
Days exercised per week				-0.006***	0.0006		
Maintaining proper weight				0.005			
Maintaining balanced diet				0.0009			
Constant	-10.62	0.028	0.061	0.132	-7.63	-7.88	4.18e-48
R^2	0.021	0.37	0.121	0.022	0.385	0.385	0.375
N	19,250	19,630	19,630	18,988	19,604	19,604	19,604

Note. Managing anxiety is the dependent variable in ordinary linear regression models with conceptually related predictors blocked. Statistically significant ($p<.05$) predictors were carried forward. The "logistic" column evaluates the surviving predictors using logistic regression as a sensitivity analysis. [a]Evaluated by including the relevant main effects (i.e., those for female and age when evaluating the Female × Age interaction) and excluding the other variables. *$p<.05$. **$p<.01$. ***$p<.001$.

Analyses of Variables Not Available in All Five Surveys

Although some variables were not available over the entire ten-year period between 2003 and 2013, most were available for three or more years, as Table 3 shows. Along with the significant factors from Table 2, the prevalence of anxiety is higher for the following factors and groups: household income, marital status (lower in married, single or divorced groups compared to those who only cohabitate), managing stress or living a stressful life, and having cancer. It can be seen that education levels, lack of sleep, and lack of energy were no longer significant in these analyses. Moreover, other factors such as having a healthy balanced lifestyle, keeping a work/life balance, maintaining a positive mental attitude, controlling your own health and blood sugar levels were not significant.

Table 3. Anxiety as a function of variables available in one or more years.

Variable	Year(s)	Model 1	Model 2	Model 3	Model 4	Trimmed model	Combined[a]	Trimmed model (logistic)
A. Demographics								
Household Income	2006-2013	-0.014***			-0.015***	-0.015***	-0.003*	0.96*
Marital Status	2003, 2006, 2013							
Married		-0.087***			-0.076***	-0.076***	-0.033**	0.73**
Single		-0.086***			-0.087***	-0.087***	-0.037***	0.72**
Divorced		-0.068***			-0.067***	-0.066***	-0.037**	0.71*
B. Psychosocial/Behavioral Factors								
Healthy balanced lifestyle	2009-2013		-0.021***		-0.023***	-0.022***	0.002	
Keeping a work/life balance	2009-2013		-0.027***		-0.018***	-0.017***	-0.004	
Managing stress	2009-2013		0.063***		0.058***	0.061***	0.021***	1.34***
Maintaining a positive mental attitude	2009-2013		0.0114*		0.007			
I will take whatever means necessary to control my health	2006-2013		-0.006					
I live a stressful life and look for ways to simplify my lifestyle	2006-2013		0.057***		0.057***	0.057***	0.007**	1.12**
C. Medical Conditions								
Blood sugar level	2006-2013			0.084***	0.069***	0.069***	-0.013	
Cancer	2006-2013			0.103***	0.103***	0.104***	0.051**	1.67*
D. Table 2 Variables								
Age	2003-2013						-0.001***	0.98***
Year							0.005**	1.05*
Female							0.01	1.21*

Variable	Year(s)	Model 1	Model 2	Model 3	Model 4	Trimmed model	Combined[a]	Trimmed model (logistic)
Education							-0.0001	
White							0.039***	1.77***
Stress							0.199***	4.98***
Depression							0.392***	10.23***
Lack of mental focus							0.127***	2.14***
Lack of energy							0.016	
Lack of sleep							0.013	
Acid reflux/heartburn							0.071***	2.21***
Irritable bowel syndrome							0.062***	1.58***
Vision problems							-0.018*	0.83*
Constant		0.313	-0.121	0.142	0.077	0.017	-9.21	4.60e-49
R^2		0.364	0.056	0.008	0.103	0.077	0.401	0.39
N		15,218	11,637	17,491	10,220	10,220	10,220	10,220

Note. Managing anxiety is the dependent variable in ordinary linear regression models with conceptually related predictors blocked. Statistically significant ($p<.05$) predictors were carried forward for the trimmed model. The "logistic" column evaluates the surviving predictors using logistic regression as a sensitivity analysis. [a]Effects when the surviving variables in Table 2, Trimmed Model, are included. *$p<.05$. **$p<.01$. ***$p<.001$.

Figure 1. Prevalence of anxiety throughout adulthood, 2003-2013 (*N*=19,628)
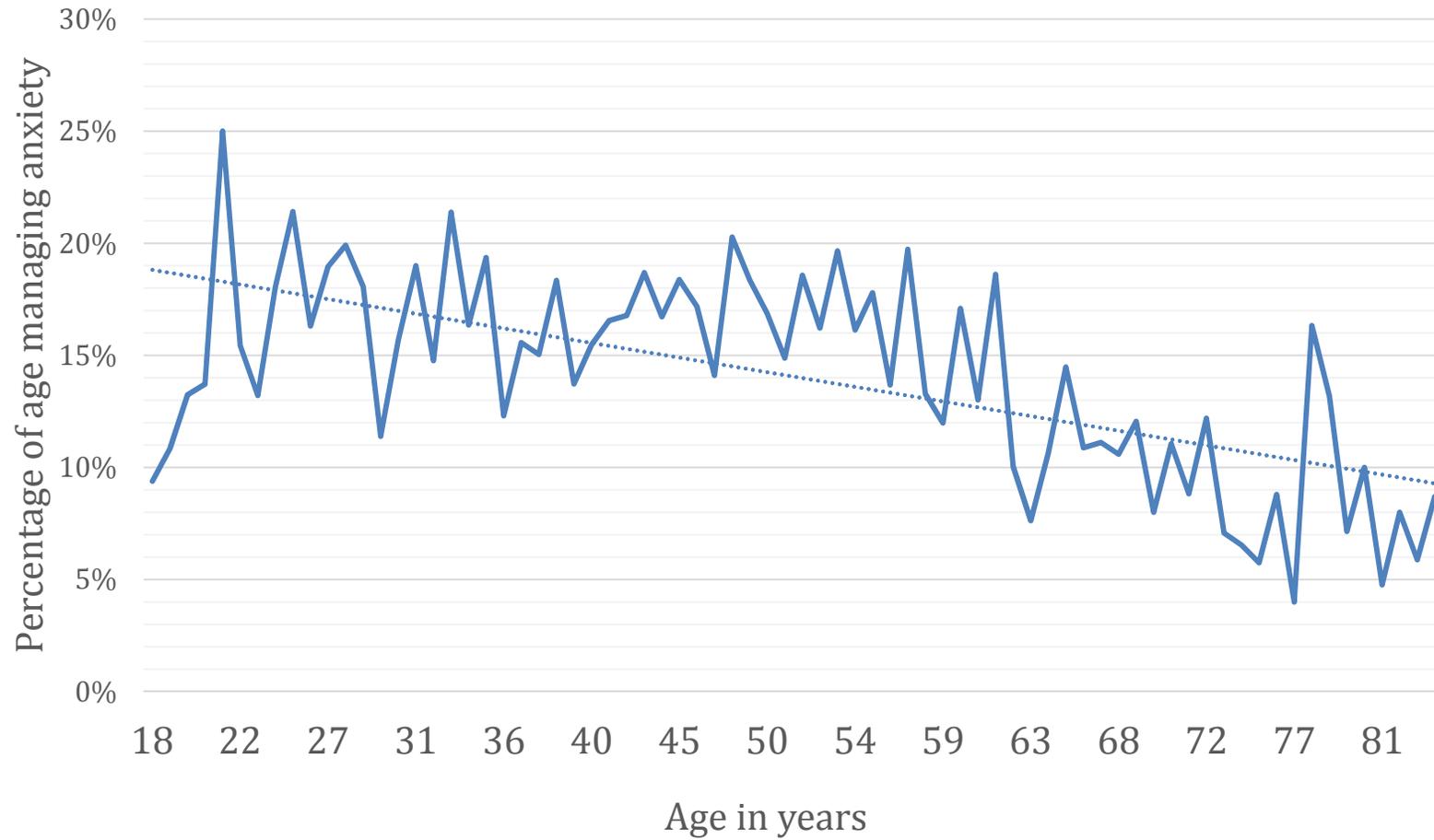
Figure 2. Anxiety by year of birth, 2006-2013, for individuals with known year of birth (not available for the 2003 survey).
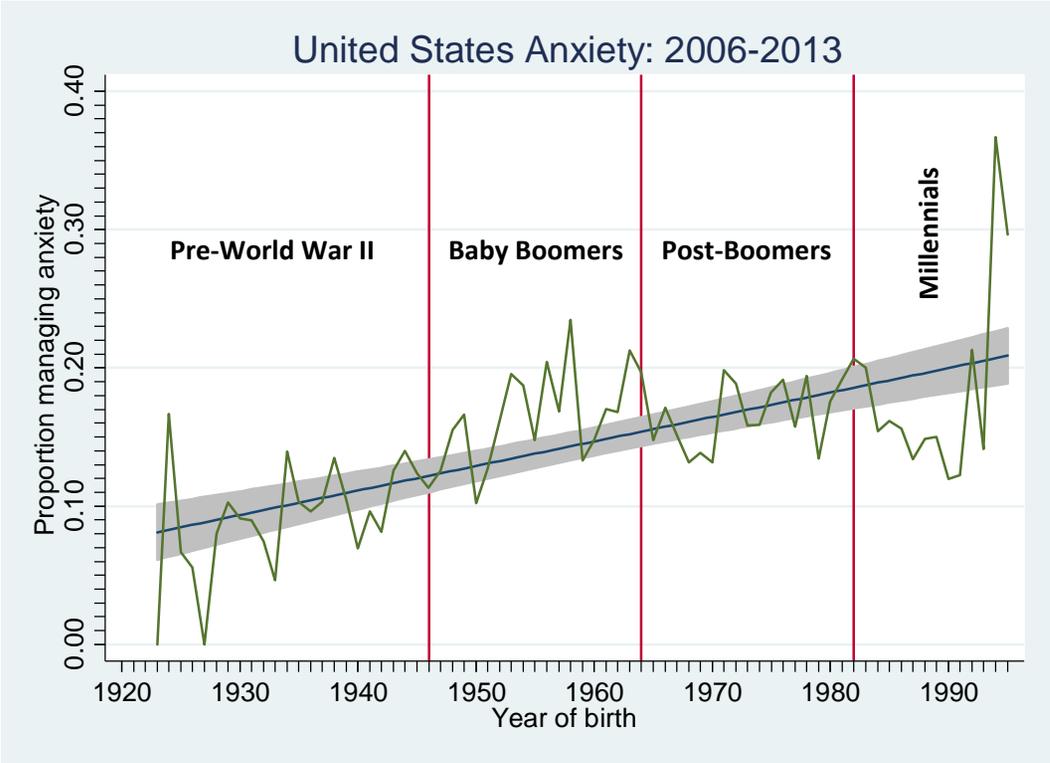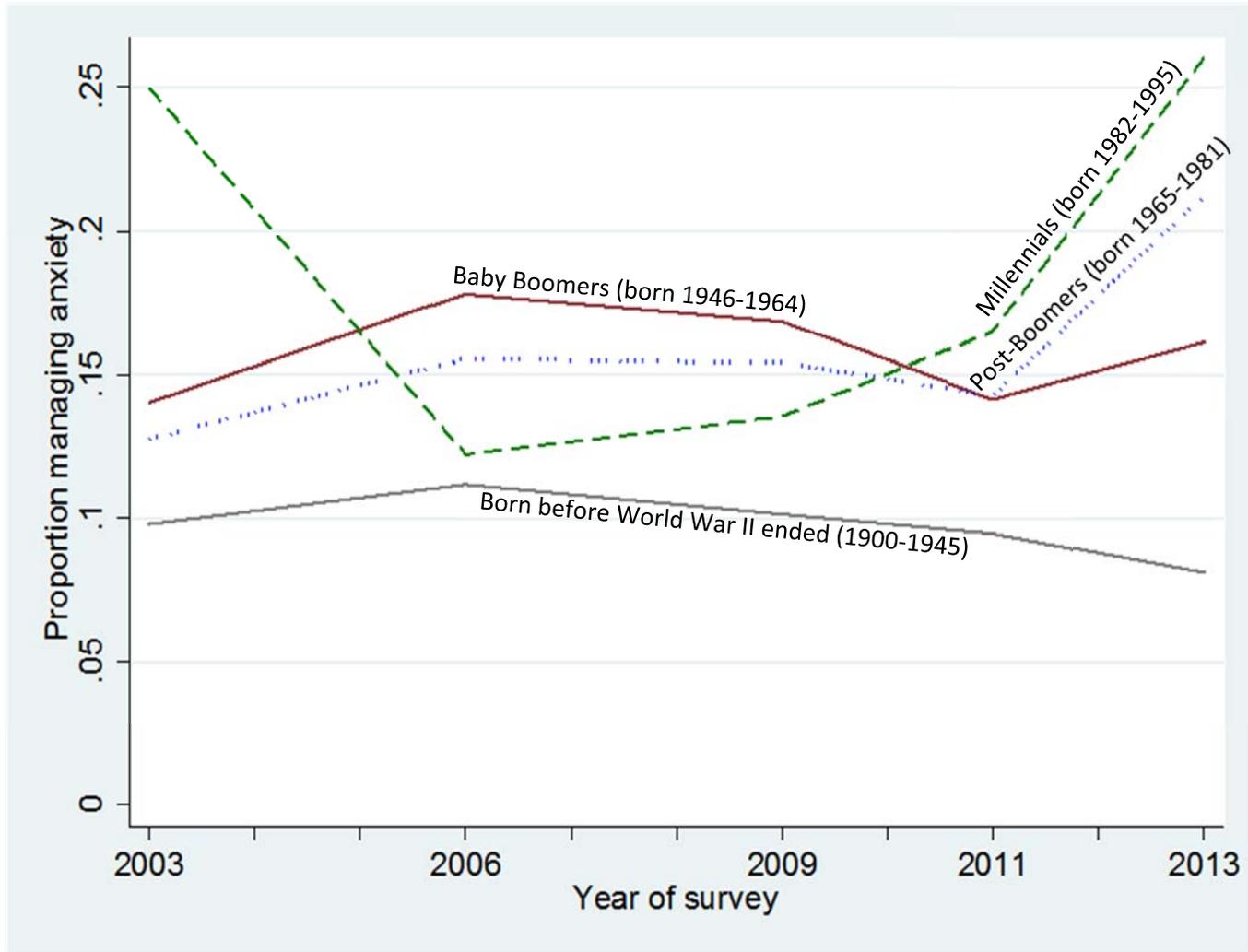
Figure 3. Incidence of anxiety by year of survey and cohort, 2003 to 2013.

Discussion

The goals of this current study were to assess factors that relate to anxiety, especially to try to explain the commonly found gender gap such that females exhibit more anxiety than males. Over the ten-year period (2003-2013) in the present study, being female, white, younger, and less educated are all factors linked to greater anxiety. The results also suggested that experiencing stress, lack of concentration, lack of energy, lack of sleep, depression, acid reflux/heartburn, irritable bowel syndrome (IBS) and vision problems are associated with more anxiety. Although each of these results supports hypotheses made for each of the measures, hypotheses were not supported in terms of respondents being spiritual, needing to lose weight for appearance's sake, exercise, being diagnosed with cholesterol, diabetes, food allergies, heart disease, hypertension/high blood pressure, memory problems, menopausal issues, need to boost immunity, prostate issues, and/or seasonal allergies.

The foregoing results were based on items available in each of the five surveys between 2003 and 2013. Other variables were available in one or more years across the ten-year period. Specifically, household income levels, marital status (single, married or divorced, compared with those co-habiting), managing stress or coping with a stressful life, and being diagnosed with cancer were associated with increased anxiety. In relation to the previous analyses, the prevalence of these measures overpowered the significance of having education, a lack of energy and a lack of sleep. Not supported were hypotheses that anxiety would be lower for those with a healthy balanced lifestyle, those keeping a positive work/life balance, those maintaining a positive mental attitude, and those controlling personal health and blood sugar levels.

Twenge's (2000) study documented a steady increase in young people's anxiety between the 1950s and mid-1990s. Accordingly, the results from the current study also suggest that the prevalence of anxiety is growing over time, especially for younger generations (see Figures 1-3), such that older cohorts express less anxiety than younger cohorts. Within this trend, there are upward and downward fluctuations within each decade. These variations can be examined further and explained by a multitude of social, economical, political, and environmental changes emerging during these periods. For example, it seems likely that events such as the 9/11 attacks increased anxiety especially for those at vulnerable points of the life span. Millennials in the current sample, in particular, were between 6 and 21 years of age when this event occurred. Future research could investigate whether anxiety is greater for Millenials who live in closer proximity to events such as this one. Along with time, results supported Baxter et al.'s (2013) claim that there is a higher prevalence of anxiety among younger people as compared to older people, and especially among post-Boomers and Millenials (see especially Figure 3). Statistics from these United States surveys show a downward trend in anxiety from 18 years of age to 81 (Figure 1). Similar to the year trend, there are also variations in the percentage of anxiety that is managed throughout adulthood. This could be due to factors ranging from school life to work-related stressors to familial interactions mentioned by both Jeffrey (2008) and Patel (2001).

With regard to the gender gap, the results of this experiment supported the fact that women have higher rates of self-anxiety compared to men. In this case, previous findings like Kessler et al.'s (1995) and Baxter et al.'s (2013) demonstration of women being more prone to anxiety disorders was reinforced. Further analyses indicated that,

overall, the combination reflected in the Female × Age interaction was not statistically significant when controlling other variables in the surveys, especially marital status, household income, managing stress, or "looking for ways to simplify my lifestyle," and possibly managing a cancer (see Table 3, right-most columns). Sequentially dropping significant terms from the final trimmed model revealed that removing the three stress terms and the depression term were the factors most associated with increases in the gender effect. Thus, it appears that differences between men and women in how they deal with stress and how much depression they experience is related to the prominent tendency for women to express greater amounts of anxiety, although these factors did not completely explain away the gender effect.

The current study also addresses the role of education in anxiety. It appears that as participant's levels of education increase from less than high school up to graduate school, the prevalence of anxiety decreases. Previous literature cannot back up this finding because, to my knowledge, no research has focused on higher education and anxiety levels. Analyses showed that education maintained a significant effect compared to other variables like household income and marital status (Tables 2 and 3), but expressed as a standardized coefficient (β=-0.02, p<.001), education's effect was quite small. These two variables were not available in all five years of the NMI surveys, but results showed that they play a major role in anxiety. Logically, obtaining greater formal education should increase an individual's competence across wide domains of knowledge relevant to everyday life. Moreover, completing programs of studies is accompanied by public rites of passage that certify graduates' role transformations. Both factors should aid in reducing anxiety.

After investigating race and mental illnesses, the results supported the hypothesis that whites have higher rates of anxiety compared to African Americans/Blacks, Asians and Hispanics. This finding agrees with Salas-Wright et al.'s (2014) study where the highest prevalence of mental illness was among native-born Americans and Baxter et al.'s experiment (2013) where the risk for anxiety was 20-50% lower in sub-cultures other than European/Anglo-Saxon. Further studies can investigate the reason as to why immigrants and minorities do not have as much anxiety compared to whites in America.

Results indicated that there is a higher prevalence of anxiety with those experiencing chronic stress, including as well a lack of mental focus, lack of sleep, and lack of energy. These factors parallel results of Chaby's (2014) demonstration that anxiety-like behavior in rats can be induced through chronic stress. The other three variables intertwine with stress and could lead to a decrease in social connectedness and increase in environmental dangers such as Twenge (2000) suggested. Lack of energy and lack of sleep became non- significant when variables that were not available in all 5 of the surveys were included. Similarly, the hypothesis that anxiety is more likely in those with depression was confirmed. Analyses showed that depression was of one of the largest predictors in relation to anxiety compared to all of the other variables in this study. These results bolster Mineka and Clements' (1990) claim along with Brady and Kendall's (1992) study confirming the comorbidity of anxiety and depression.

The results did not support the hypothesis that those who believe in spirituality will experience less anxiety. Agorastos et al.'s (2014) theory suggested that religiosity buffers stress and leads to less anxiety was not supported. Current results also disagreed with studies conducted both by Ramos (2011) and by Kaczorowski (1989). It is probable

that these past researchers did not control as extensively for such variables as the current study examined.

White and Warren's (2014) results suggesting that women with anxiety are more likely to closely monitor their weight did not hold true in this study: The hypothesis that anxiety increases in those who desire to lose weight for appearances and for health purposes was not supported. In relation to this finding, body mass index (BMI) was not linked to greater anxiety. This finding contradicts Brumpton et al.'s (2013) finding that subjects with anxiety or depression have elevated incidence of obesity, although it should be noted that the current study controlled for factors that Brumpton et al. did not; in fact, on a bivariate basis, BMI *is* significantly correlated in the current study (β=0.07, *p*<.001). Most of the behavioral choices that were hypothesized in this study played no role in influencing anxiety. These factors included: days exercised per week, maintaining proper weight, maintaining a balanced diet, keeping a healthy balanced lifestyle, keeping a work/life balance, maintaining a positive mental attitude, and controlling self-health. The behavioral conditions that did significantly affect anxiety were stress-related. The results indicated that participants who manage stress and "live a stressful life and look for ways to simplify my lifestyle" experience higher levels of anxiety.

As for medical illnesses, the results supported the hypotheses that acid reflux/heartburn, irritable bowel syndrome (IBS), vision problems and cancer significantly increase the chances of experiencing anxiety. These findings add to the research completed by Fond et al. (2014) on anxiety in patients with IBS and Niles et al.'s (2015) focus on the severity of anxiety to those with eyesight difficulties. In contrast, O'Donovan et al.'s (2013) research showing anxiety linked to cardiovascular,

autoimmune, and neurodegenerative illnesses was not supported from this study. The results showed that heart conditions such as cholesterol, heart disease, and hypertension/high blood pressure did not significantly impact anxiety levels. Medical illnesses that were age-related like memory problems, menopausal issues, prostate issues and a need for immunity did not support the hypothesis of an increase in anxiety.

Past literature has found a strong link between diabetes and anxiety (Smith et al., 2013 and Grisby et al, 2002), but the current results did not completely support this hypothesis. In fact, on a bivariate basis, diabetes *was* positively correlated with anxiety (β=0.05, *p*<.001), but this effect disappeared when controlling for other medical conditions (e.g., acid reflux/heartburn, irritable bowel syndrome). In relation to diabetes, it was found that blood sugar levels are also not significant in predicting anxiety. On a separate note, both food allergies and seasonal allergies did not significantly impact levels of anxiety in contrast to Shanahan et al.'s (2014) findings. All of these factors were significant predictors of anxiety on a bivariate basis, but ceased being significant factors when controlling other dimensions. Again, the current study considered a wide range of potential predictors of anxiety; prior research has seldom been as extensive.

Limitations

Limitations in this study are several. First, the surveys included no participants younger than 18, which could have added to the interpretation of anxiety throughout a lifespan; for instance, most depression cases are pediatric (Brady & Kendall, 1992). Second, another weakness is that participants indicated whether they considered themselves to be "male" or "female," which is a personal view rather than actual biological sex. Third, not all variables were available over the entire ten-year period of

the surveys, which meant that entire years had to be omitted when examining these factors. Fourth, self-reports of anxiety were the dependent variable, and it was a dichotomous yes/no response taken in a consumer survey. Much more extensive inventories of anxiety and anxiety disorders are available (e.g., Beck, Epstein, Brown, & Steer, 1988), and it is unclear how much the current reports of anxiety would correlate with these. Moreover, it is possible that societal standards for reporting anxiety have become more lenient for recent generations; thus, earlier cohorts (e.g., Figure 3) may have under-reported their levels of anxiety. Fifth, the surveys were cross-sectional rather than longitudinal, making inferences related to change more difficult. Sixth, the surveys did not address some dimensions that may be important to anxiety, such as life skills or immigration status. Such variables may well fully explain the gender difference in anxiety. Seventh and similar to the preceding limitation, models did not examine environmental factors (e.g., proximity to 9/11; economic cycles) in relation to anxiety. Because the NMI surveys include geography, future studies may do so. Finally, because there was no control for multiple comparisons (e.g., the Bonferroni corrections), it is possible that some findings are Type-I statistical errors, suggesting a linkage that is in fact not present in the population. Yet, the fact that all models used in the current study used at least 10,000 participants means that there was great statistical power to detect links between variables. Invoking a Bonferroni correction, for example, would not have resulted in any change to the study's major conclusions.

Conclusions

The current study's findings suggest a multitude of precursors that are larger factors in anxiety compared to others. Anxiety is significantly more likely to be reported

overtime with the following factors: females, whites, years, younger generations, education levels, household income, marital status, living with stress and depression, managing or coping with stress, having a lack of concentration, a lack of memory and a lack of sleep, having acid reflux/heartburn, cancer, irritable bowel syndrome and/or vision problems. Completing a more in-depth analysis of each of these conditions can add to what is known about the precursors of anxiety. These broad implications proved to be a solid base to further investigate these factors in order to help society control the drastic increase of anxiety in both men and women.

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