Insomnia and Anxiety

By

Ashna Kapoor

A Thesis Submitted to The W.A. Franke Honors College

In Partial Fulfillment of the Bachelors degree

With Honors in Psychological Science

THE UNIVERSITY OF ARIZONA

M A Y 2 0 2 1

Approved by:

_____

Dr. Michael Grandner

Department of Psychiatry

ABSTRACT

INTRODUCTION: Previous research within the field of sleep psychology has shown that there is a relationship between the specific symptoms of depression and insomnia. Through this study, we will try to gain a deeper understanding of the relationship between anxiety and insomnia, particularly the main 7 specific symptoms of anxiety present on the GAD-7, and the daytime, nighttime, and perception symptoms of insomnia. The findings of this research will be able to further guide health professionals in being able to effectively treat patients with this comorbidity.

METHODS: Data from the Sleep and Healthy Activity, Diet, Environment, and Socialization (SHADES) study were used, including N=1003 community-dwelling adults age 22-60 from southeastern Pennsylvania. All participants completed the Insomnia Severity Index (ISI) and the GAD7 anxiety questionnaire. The ISI was divided into 3 sections, based on prior work: SLEEP symptoms (difficulty falling asleep or staying asleep or early morning awakening), DAYTIME symptoms (difficulty functioning, noticeable effects), and PERCEPTION symptoms (dissatisfaction and worry about sleep). The items of the GAD7 were assessed separately, including anxiety level, loss of control, worry about many things, difficulty relaxing, restlessness, irritability, and feelings of fear; these were coded as yes/no indicating presence often. Binary logistic regression analyses examined each symptom, with each component of the ISI as predictor (adjusting for the others), as well as age, sex, race/ethnicity and education level. Post-hoc analyses included forward stepwise analyses to determine which components of the ISI contribute to each symptom.

RESULTS: SLEEP symptoms were uniquely, independently associated with control (OR=1.09, p=0.03), many worries (OR=1.1, p=0.017), restlessness (OR=1.1, p=0.009), and irritability (OR=1.1, p=0.04). DAYTIME symptoms were uniquely, independently associated with anxiety level (OR=1.3, p<0.0005), control (OR=1.2, p<0.0005), many worries (OR=1.3, p<0.0005), difficulty relaxing (OR=1.2, p=0.004), restlessness (OR=1.3, p=0.001), and irritability (OR=1.2, p<0.0005). PERCEPTION symptoms were uniquely, independently associated with anxiety level (OR=1.1, p=0.03), control (OR=1.2, p=0.001), many worries (OR=1.2, p=0.001) , difficulty relaxing (OR=1.4, p<0.0005), irritability (OR=1.2, p=0.018), and feelings of fear (OR=1.2, p=0.002). In stepwise analyses, fear was predicted only by PERCEPTION symptoms; anxiety level and difficulty relaxing were predicted by DAYTIME and PERCEPTION symptoms; restlessness was predicted by SLEEP and DAYTIME symptoms; and control, many worries and irritability were predicted by all three symptoms.

CONCLUSIONS: The results of this study suggest that daytime and perception symptoms of insomnia played a more significant role in the symptoms of anxiety than nighttime symptoms of insomnia. This information offers new insight into this topic and can be used by health professionals to approach this issue differently by focusing on daytime symptoms in the experience of insomnia and overall perception symptoms when treating insomnia and anxiety as a comorbidity.

INTRODUCTION

Anxiety and insomnia are prevalent mental disorders in the field of psychology and psychiatry. Over the years, a significant amount of research has been conducted on each of these disorders individually and has revealed many of the intricacies within each issue, such as the common symptoms and their impact on daily life. For anxiety, these symptoms include restlessness, uncontrollable worry, etc (Behar et al, 2009) while insomnia symptoms include factors that lead to poor quality of sleep (Sutton 2014). Previous studies pertaining to this topic have uncovered important information about specific aspects of these disorders, such as emotional dysregulation (Akram et al 2019), the effects of ethnicity (Zvolensky et al 2019), etc Although it is clear that insomnia and anxiety affect one another, the relationship between these factors has still not been fully understood.

There are many types of anxiety disorders, such as social anxiety and PTSD (DSM 5), but for the purposes of this research, Generalized Anxiety Disorder will be the focus of this paper. Insomnia is common, affecting most people at some point in a year and 10% to 20% of people chronically, and is commonly associated with a wide range of psychosocial, psychiatric, medical, and underlying sleep disorders. Both short-term and long-term insomnia can impair daytime functioning (Sutton, 2014). One important component of insomnia observed in many studies is that it is often comorbid, meaning that it occurs with another disorder, commonly a psychiatric disorder (Morin et al 2015). The importance of this relationship is that both anxiety and insomnia are thought to

have an impact on the quality of life as they are known to significantly diminish it (Kirwan et al 2017).

Insomnia can be divided into three different types of symptoms: nighttime symptoms, daytime symptoms, and symptoms related to the perception of sleep. Daytime symptoms consist of the issues that insomnia causes in the daytime, nighttime symptoms consist of issues related to the onset of sleep such as how long one spends in bed while trying to fall asleep, how many times one wakes up, etc. The perception of sleep has to do with how well one thinks the quality of their sleep was. These variables are important to consider in the relationship between insomnia and anxiety because the breakdown of these symptoms has yet to be evaluated in the context of this research and may offer insight into improving interventions. (Ji et al 2019).

This paper will attempt to identify the specific symptoms of anxiety that correlate with specific daytime, nighttime and perception functioning of insomnia in an effort for this comorbidity to be treated more cohesively by focusing on the factors that regulate this relationship as a whole, instead of focusing on one aspect of the issue individually. This will allow health professionals to work out a cause and effect relationship within this comorbidity and allow for more effective treatment overall. However, this will only be possible if we further explore the relationship between particular symptoms of both insomnia and anxiety in greater detail and gain more knowledge about the intricacies of this relationship.

METHODS

Data source

The data used in this study was acquired from the SHADES study (Sleep and Healthy Activity, Diet, Environment and Social Factors) and was funded by the National Institute of Environmental Health Sciences. This study included a survey which was conducted throughout the Philadelphia area, and included N=1003 community dwelling participants ranging from ages 22-60 years. The study had 3 parts. First, a population-based survey of the specific geographic location, next there was a geospatial map created with neighborhood-level data taken into account, and lastly a 2-week home monitoring study which included visiting participants' homes and observing their sleeping habitats.

Measures

All participants completed the Insomnia Severity Index (ISI, which is an instrument designed to assess the extent of symptoms associated with insomnia. This scale includes 7 questions, all answered on a scale from 0-4, 0 meaning no severity and 4 meaning very severe. The 7 questions address difficulty falling asleep, difficulty staying asleep, issues waking up too early, level of satisfaction with sleep pattern, how noticeable sleep problem is to others, worry about sleep problems and whether sleep problem interferes with daily functioning ("Insomnia Severity Index"). Furthermore, these symptoms were split up into three separate categories for the purposes of this specific study. Items 1, 2 and 3 were added to form sleep symptoms, addressing difficulty falling asleep, staying asleep and early morning awakening. Items 5 and 6 were added to form daytime symptoms, addressing difficulty in functioning and noticeable effects, and items 4 and 7 were added to form perception symptoms, addressing dissatisfaction and worry about sleep ("Insomnia Severity Index").

The specific symptoms of insomnia were measured using the GAD-7 anxiety questionnaire. This tests for the 7 main symptoms of generalized anxiety disorder on a 0-3 scale, 0 meaning participants were unsure whether they experienced these issues in the past 2 weeks, and 3 being they experienced issues nearly every day. The 7 main symptoms being tested are feeling nervous, uncontrollable worrying, worrying about different things, difficulty relaxing, being restless, irritability and feelings of fear (Spitzer et al 2006). These responses were then coded for a yes or no indicating whether or not they were present often.

According to the DSM 5 diagnostic criteria, GAD is characterized by excessive, uncontrollable worry about a variety of topics that occurs more days than not for a period of at least six months. The worry causes distress and/or functional impairment and is associated with at least three of the following features: restlessness or feeling keyed up or on edge, being easily fatigued, difficulty concentrating or having one's mind go blank, irritability, muscle tension, and sleep disturbance (Behar et al 2009; DSM5). On the other hand, the criteria for insomnia (DSM 5) is defined as typically described in terms of dissatisfaction with, and distress from, the quality or quantity of sleep obtained, despite attempts to obtain sleep.

Covariates

Self-reported age, race, sex, ethnicity and levels of education were included as covariates in all statistical analyses.

Data Analysis

First, a binary logistical regression was performed. This examined each of the ISI symptoms (daytime, nighttime, perception) as a predictor for each of the 7 symptoms of anxiety. Next, a post hoc analysis was conducted which consisted of a stepwise analysis. These analyses were done to determine which specific symptoms of insomnia were contributors to the specific subjective symptoms of anxiety. Only p values <0.05 were considered significant.

RESULTS

Characteristics of Sample

The sample characteristics are summarized in Table 1. There were far more female participants (61%) than males (39%), and the average age for all participants was about 34 years. A majority of the sample was non-Hispanic white (59.52%) and had received a college diploma (55.91%). As seen on Table 1, the average ISI score is about 10 and when split into symptoms the average scores were about 4 for sleep symptoms, 3 for daytime symptoms and about 3.7 for perception symptoms. In the sample, the average GAD-7 score was about 7, indicating mild levels of anxiety overall. For each specific item, symptoms were shown at a rate of 15-32%.

Relationships Between Sleep, Daytime, and Perception Symptoms of Insomnia and Individual Anxiety Symptoms

Table 2 is split into three sections, individual items, combined, and then both individual and combined. The first section records the relationship between individual anxiety symptoms and type of insomnia symptoms. This includes the odds ratio, z ratio,

95% confidence interval and the p value. For this study, a p value of less than .05 is

considered significant. There are many tests for this data, so the p value becomes less

significant; however, even after adjustment it is still quite significant. The confidence

level is the margin of error around the odds ratio (OR), and the OR is the way we

express the change in likelihood of an outcome. For this case, the OR is saying that

with every 1 unit of x, does yes (the presence of a symptom) become more or less

likely. It considers how every 1 point change in the insomnia subscale affects the

anxiety scale. In addition, the z score tells us how extreme the data is, as in how many

standard deviations away the numbers from the average. When examined on their own,

the first section of Table 2 shows that each type of insomnia symptoms is associated

with each anxiety symptom. Anxiety levels have a 1.26 OR for sleep symptoms, 1.47 for

daytime symptoms and 1.42 for perception symptoms. Loss of control has a 1.31 OR for

sleep symptoms, 1.49 for daytime symptoms and 1.50 for perception symptoms. Worry

about many things has a 1.33 OR for sleep symptoms, 1.54 for daytime symptoms and

1.544 for perception symptoms. Difficulty relaxing has a 1.33 OR for sleep symptoms,

1.51 for daytime symptoms and 1.58 for perception symptoms. Restlessness had a 1.39

OR for sleep symptoms, 1.52 for daytime symptoms and 1.53 for perception symptoms.

Irritability had a 1.30 OR for sleep symptoms, 1.46 for daytime symptoms and 1.45 for

perception symptoms. Fear had a 1.29 OR for sleep symptoms, 1.38 for daytime

symptoms and 1.43 for perception symptoms.

     The second section of Table 2 shows the combined model, which is the effects of

one kind of insomnia controlling for the other. It looks for unique effects of each

symptom of insomnia, to determine if there are some aspects of insomnia that are more

important than others. This category essentially assesses the role of each insomnia

symptom over and above the effects of other insomnia symptoms. For anxiety levels,

after adjusting, only daytime symptoms were independently associated such that each

point on the daytime scale was associated with a 29.0% increase in anxiety symptoms.

For loss of control, only daytime symptoms were independently associated such that

each point on the daytime scale was associated with a 22.5% increase in the symptom.

For worry about many things only daytime symptoms were independently associated

such that each point on the daytime scale was associated with a 25.3% increase in the

symptom. For difficulty relaxing only perception symptoms were independently

associated such that each point on the perception scale was associated with a 33.3%

increase in the symptom. For restlessness, both sleep and daytime symptoms were

associated such that each point on the sleep scale was associated with an 18.2%

increase in the symptom, and each point on the daytime scale was associated with a

25.5% increase in the symptom. For irritability, only daytime symptoms were

independently associated such that each point on the daytime scale was associated

with a 23.9% increase in the symptom. For fear, none of the symptoms proved to be

associated with a significant p value.

The last section of table 2 is the combined and adjusted model, in which all

insomnia symptoms are being controlled for one another, but all covariates from Table 1

are also factored in. This is the most conservative model. For anxiety levels, only

daytime symptoms were independently associated such that each point on the daytime

scale was associated with a 29.8% increase in anxiety symptoms. For loss of control,

only daytime symptoms were independently associated such that each point on the

daytime scale was associated with a 23.2% increase in the symptom. For worry about

many things only daytime symptoms were independently associated such that each

point on the daytime scale was associated with a 25.9% increase in the symptom. For

difficulty relaxing only perception symptoms were independently associated such that

each point on the perception scale was associated with a 35.2% increase in the

symptom. For restlessness, none of the symptoms proved to have a significant

association. For irritability only daytime symptoms were independently associated such

that each point on the daytime scale was associated with a 22.9% increase in the

symptom. For fear, none of the symptoms proved to be associated.

Forward Stepwise Regression Analysis of Insomnia Symptoms Associated with Each

Anxiety Symptom

Table 3 shows a stepwise analysis of the data, which is a different approach than

the combined method shown in Table 2. A stepwise analysis builds a model step by

step and determines which insomnia symptom has the greatest effect on the anxiety

symptom by rank, 1 being the greatest effect, 2 being the second greatest and 3 being

the least. The stepwise analysis also takes all demographic information into account.

For the first symptom, anxiety levels, the stepwise analysis shows that the largest

independent predictor was daytime symptoms. For loss of control, worry about many

things and difficulty relaxing the largest predictor is perception symptoms. For

restlessness and irritability, the largest predictor is daytime symptoms. For fear the

largest predictor is also perception symptoms.

DISCUSSION

This study attempted to find associations between the specific symptoms of anxiety and those of insomnia. The results show that the symptoms of feeling anxious and difficulty relaxing were associated with both sleep and daytime symptoms of insomnia. This means that these feelings and the inability to relax were more affected by the physiological properties of insomnia than the psychological. The same can be said for feelings of restlessness, which were also associated with both sleep and daytime symptoms of insomnia. However, the fear aspect of anxiety was associated only with the perception symptoms of insomnia, meaning this emotional facet of anxiety is more affected by the psychological aspects of insomnia than the physiological.

One important finding of this study was that the fear aspect of anxiety was solely associated with perception symptoms of insomnia, or how one perceived they slept during the night. This specific relationship was not expected but does confirm our hypothesis that specific symptoms of anxiety are closely associated with specific symptoms of insomnia. This relates to previous studies, suggesting emotional regulation is moderated by anxiety symptoms and insomnia symptoms severity (Kirwan et al, 2017). However, a more recent study found that specific symptoms of depression are also associated with specific symptoms of insomnia (Ji et al, 2019). Although anxiety and depression are vastly different psychiatric disorders and their symptoms present in completely different ways, it is not uncommon to have both disorders at the same time (Pollack et al, 2004). There be other underlying factors that may be associated with the perception of fear and perception of how they slept during the night. Screening for other

potential health conditions may help improve the effectiveness of behavioral interventions.

Another important finding of the study is that daytime symptoms of insomnia are quite relevant in the onset of anxiety symptoms. We can speculate that this may occur because daytime symptoms of insomnia include experiences that overlap with daytime symptoms of anxiety. Therefore, people who are more anxious may simply be more aware of a sleep problem affecting their overall performance, as daytime anxiety and the fatigue that may come with insomnia may make difficulties more noticeable. If anxiety symptoms are driven by reactions to daytime experiences, then it would be logical to assume that the symptoms on insomnia would be more noticeable during the daytime when compared to evening.

In addition, these findings are quite significant due to the way insomnia and anxiety are currently treated when presented as a comorbidity. Traditionally, anxiety and insomnia are looked at through a broad lens in a generalized manner. However, this study shows the importance of breaking these multi-faceted disorders down and looking at specific aspects of them to further understand how they could best be alleviated. By finding these associations, health professionals can identify these issues on a more "molecular level." If a patient has uncontrollable feelings of fear along with insomnia, these findings suggest that Cognitive Behavioral Therapy may be more beneficial than a prescription of sleeping pills, as it would aid in adjusting the psychological perception of sleep instead of the physiological properties associated with daytime and nighttime symptoms. Similarly, professionals could attempt to adjust a patient's daytime routine, sleep cycle, dietary habit and physical activity. in order to control for anxiety symptoms

related to daytime symptoms of insomnia. These findings show that there are many

possible pathways to alleviating the comorbidity of insomnia and anxiety, instead of the

traditional methods used when looking at these issues in a generalized manner. It can

also prevent over prescribing of sleep medications before behavioral interventions are

attempted.

Although these findings offer great insight to the issues at hand, there are also a

few limitations noteworthy. All survey responses were self--reported, meaning there is a

possibility that not all questions were responded to in an honest manner, or that they

were perceived in a different manner than intended by experimenters. Due to the fact

that the study was only conducted in the Philadelphia area, it lacks external validity; the

results of the study cannot be generalized to other subjects as the social and

geographic location of the study are very focused. Also due to the cross-sectional

nature of the study, causal inferences cannot be made suggesting replication in a larger

sample size and longitudinal in nature would be beneficial. In addition, the social/cultural

perceptions of insomnia and anxiety most likely vary greatly within cultures, meaning

the way participants perceive and approach these comorbidities presents itself

completely differently in other countries. This study would be beneficial if conducted in a

many different of countries with varying cultural beliefs. There were many variables

taken into account, such as age, ethnicity, etc. but previous medical and psychiatric

illnesses were not assessed. In addition, there was no physiological measure of either

insomnia or anxiety, meaning that it is possible there was only one experience,

measured in two different ways. This acts as a major confounding variable, since

previous health problems may be a contributor to the anxiety and/or insomnia

symptoms that participants presented, or participants may only be expressing one experience in different ways. Lastly, a major limitation of this study is that the participants were not selected from a clinical setting who may have been predisposed to insomnia or anxiety, therefore making it difficult to translate to a clinical setting.

CONCLUSION

Overall, this study found that there were specific associations between the symptoms of insomnia and anxiety. Certain symptoms of anxiety, such as fear, were associated solely with the perception symptoms of insomnia. Additionally, daytime symptoms of insomnia also proved to be significantly relevant in the experience of anxiety. This specific finding is extremely important because many current treatments for insomnia focus almost exclusively on nighttime symptoms, such as the prescription of sleeping pills, which might actually exacerbate daytime symptoms in the short term. In order to optimize treatment for this comorbidity, we may need to focus more on daytime symptoms altogether as managing factors that may contribute to anxiety symptoms, may improve insomnia symptoms all together.

Future studies should expand on these findings by taking a more clinically relevant sample with predispositions to both insomnia and anxiety in order to gather data that can be applied to clinical setting. Future studies can also leverage this information to see if adding components of daytime symptoms for insomnia treatments aids in the reduction of overall anxiety symptoms.

ACKNOWLEDGEMENTS

REFERENCES

Akram, U., Gardani, M., Riemann, D., Akram, A., Allen, S. F., Lazuras, L., & Johann, A.

F.

(2019). Dysfunctional sleep-related cognition and anxiety mediate the

relationship between multidimensional perfectionism and insomnia

symptoms. *Cognitive Processing*. doi: 10.1007/s10339-019-00937-8

Digital Communications Division. (2015, August 21). What are the five major types of

anxiety

disorders? Retrieved from https://www.hhs.gov/answers/mental-health-and-

substance-abuse/what-are-the-five-major-types-of-anxiety-disorders/index.html.

Behar, E., Dimarco, I. D., Hekler, E. B., Mohlman, J., & Staples, A. M. (2009). Current

theoretical models of generalized anxiety disorder (GAD): Conceptual review and

treatment implications. *Journal of Anxiety Disorders*, *23*(8), 1011–1023. doi:

10.1016/j.janxdis.2009.07.006

Ji, X., Bastien, C. H., Ellis, J. G., Hale, L., & Grandner, M. A. (2019). Disassembling

insomnia

symptoms and their associations with depressive symptoms in a community

sample: the differential role of sleep symptoms, daytime symptoms, and

perception symptoms of insomnia. *Sleep Health*, *5*(4), 376–381. doi:

10.1016/j.sleh.2018.12.009

Insomnia Severity Index. (n.d.). Retrieved from https://www.myhealth.va.gov/mhv-

portal-

web/insomnia-severity-index

Kirwan, M., Pickett, S. M., & Jarrett, N. L. (2017). Emotion regulation as a moderator between

anxiety symptoms and insomnia symptom severity. *Psychiatry Research*, *254*,

40–47.

doi: 10.1016/j.psychres.2017.04.028

Morin, C. M., Drake, C. L., Harvey, A. G., Krystal, A. D., Manber, R., Riemann, D., &

Spiegelhalder, K. (2015). Insomnia disorder. *Nature Reviews Disease*

Primers, *1*(1). doi: 10.1038/nrdp.2015.26

Spitzer, R. L., Kroenke, K., Williams, J. B. W., & Löwe, B. (2006). A Brief Measure for

Assessing Generalized Anxiety Disorder. *Archives of Internal Medicine*, *166*(10),

1092. doi: 10.1001/archinte.166.10.1092

Sutton, E. L. (2014). Insomnia. *Medical Clinics of North America*, *98*(3), 565–581. doi:

10.1016/j.mcna.2014.01.008

Zvolensky, M. J., Kauffman, B. Y., Bogiaizian, D., Viana, A. G., Bakhshaie, J., & Peraza, N.

(2019). Worry among Latinx college students: relations to anxious arousal, social

anxiety, general depression, and insomnia. *Journal of American College Health*,

1–8. doi: 10.1080/07448481.2019.1686004

TABLE 1: Characteristics of the Sample

Variable	Category/Units	% or M±SD
Age	Years	34.0 ± 9.4
Sex	Male	38.53%
	Female	61.47%
Race/Ethnicity	Non-Hispanic White	59.52%
	Black/African-American	25.02%
	Hispanic/Latino	4.59%
	Asian	5.48%
	Other/Multiracial	5.38%
Education	College	55.91%
	Some College	30.98%
	High School	10.53%
	Less than high school	2.58%
Insomnia Severity Index	Total Score	10.6 ± 6.3
	SLEEP Symptoms	3.91 ± 2.70
	DAYTIME Symptoms	2.97 ± 2.15
	PERCEPTION Symptoms	3.67 ± 2.21
Anxiety Symptoms	GAD7 Total Score	7.17 ± 5.63
Item 1: Anxiety Level	Yes	32.17%
Item 2: Loss of Control	Yes	31.68%
Item 3: Worry About Many Things	Yes	35.85%
Item 4: Difficulty Relaxing	Yes	31.18%
Item 5: Restlessness	Yes	15.59%
Item 6: Irritability	Yes	29.99%
Item 7: Fear	Yes	19.36%

TABLE 2: Relationships Between Sleep, Daytime, and Perception Symptoms of

Insomnia and Individual Anxiety Symptoms

		OR	z	95% CI	p
		Individual			
Item 1: Anxiety Level	Sleep	1.261	8.68	(1.197, 1.329)	<0.0005
	Daytime	1.466	10.7	(1.367, 1.573)	<0.0005
	Perception	1.420	10.14	(1.327, 1.519)	<0.0005
Item 2: Loss of Control	Sleep	1.310	9.75	(1.241, 1.383)	<0.0005
	Daytime	1.490	10.98	(1.388, 1.600)	<0.0005
	Perception	1.500	11.22	(1.397, 1.610)	<0.0005
Item 3: Worry About Many Things	Sleep	1.334	10.41	(1.264, 1.409)	<0.0005
	Daytime	1.540	11.76	(1.433, 1.655)	<0.0005
	Perception	1.544	11.99	(1.438, 1.658)	<0.0005
Item 4: Difficulty Relaxing	Sleep	1.332	10.17	(1.260, 1.407)	<0.0005
	Daytime	1.511	11.21	(1.406, 1.624)	<0.0005
	Perception	1.579	12.07	(1.466, 1.700)	<0.0005
Item 5: Restlessness	Sleep	1.382	9.41	(1.292, 1.478)	<0.0005
	Daytime	1.521	9.54	(1.396, 1.658)	<0.0005
	Perception	1.525	9.37	(1.396, 1.665)	<0.0005
Item 6: Irritability	Sleep	1.300	9.45	(1.231, 1.372)	<0.0005
	Daytime	1.464	10.54	(1.364, 1.571)	<0.0005
	Perception	1.451	10.45	(1.353, 1.557)	<0.0005
Item 7: Fear	Sleep	1.289	8.32	(1.214, 1.368)	<0.0005
	Daytime	1.375	8.23	(1.274, 1.483)	<0.0005
	Perception	1.431	8.96	(1.323, 1.547)	<0.0005
		Combined			
Item 1: Anxiety Level	Sleep	1.051	1.31	(0.975, 1.134)	0.192
	Daytime	1.290	4.9	(1.165, 1.429)	<0.0005
	Perception	1.128	2.03	(1.004, 1.267)	0.042
Item 2: Loss of Control	Sleep	1.075	1.85	(0.996, 1.160)	0.064
	Daytime	1.225	3.89	(1.106, 1.357)	<0.0005
	Perception	1.214	3.22	(1.079, 1.366)	0.001
Item 3: Worry About Many Things	Sleep	1.080	1.99	(1.001, 1.165)	0.046
	Daytime	1.253	4.34	(1.132, 1.387)	<0.0005
	Perception	1.228	3.46	(1.093, 1.379)	0.001
Item 4: Difficulty Relaxing	Sleep	1.059	1.47	(0.981, 1.144)	0.142
	Daytime	1.175	3.05	(1.060, 1.304)	0.002
	Perception	1.333	4.67	(1.181, 1.504)	<0.0005
Item 5: Restlessness	Sleep	1.182	3.5	(1.076, 1.298)	<0.0005
	Daytime	1.255	3.54	(1.107, 1.424)	<0.0005
	Perception	1.106	1.32	(0.953, 1.283)	0.187
Item 6: Irritability	Sleep	1.094	2.31	(1.014, 1.181)	0.021
	Daytime	1.239	4.08	(1.118, 1.373)	<0.0005

	Perception	1.146	2.25	(1.018, 1.290)	0.024
Item 7: Fear	Sleep	1.104	2.3	(1.015, 1.202)	0.022
	Daytime	1.111	1.81	(0.991, 1.245)	0.0710
	Perception	1.207	2.74	(1.055, 1.381)	0.006
	Combined + Adjusted				
Item 1: Anxiety Level	Sleep	1.075	1.8	(0.994, 1.162)	0.071
	Daytime	1.298	4.85	(1.168, 1.442)	<0.0005
	Perception	1.140	2.14	(1.011, 1.286)	0.033
Item 2: Loss of Control	Sleep	1.089	2.14	(1.007, 1.178)	0.032
	Daytime	1.232	3.91	(1.109, 1.368)	<0.0005
	Perception	1.216	3.18	(1.078, 1.373)	0.001
Item 3: Worry About Many Things	Sleep	1.100	2.39	(1.017, 1.189)	0.017
	Daytime	1.259	4.34	(1.135, 1.397)	<0.0005
	Perception	1.234	3.45	(1.095, 1.391)	0.001
Item 4: Difficulty Relaxing	Sleep	1.064	1.53	(0.983, 1.151)	0.125
	Daytime	1.165	2.85	(1.049, 1.294)	0.004
	Perception	1.352	4.78	(1.195, 1.530)	<0.0005
Item 5: Restlessness	Sleep	1.136	2.6	(1.032, 1.250)	0.009
	Daytime	1.252	3.4	(1.100, 1.426)	0.001
	Perception	1.123	1.48	(0.963, 1.308)	0.138
Item 6: Irritability	Sleep	1.084	2.03	(1.003, 1.173)	0.042
	Daytime	1.229	3.86	(1.107, 1.364)	<0.0005
	Perception	1.157	2.36	(1.025, 1.306)	0.018
Item 7: Fear	Sleep	1.084	1.83	(0.994, 1.183)	0.068
	Daytime	1.094	1.51	(0.974, 1.230)	0.130
	Perception	1.243	3.09	(1.083, 1.426)	0.002

TABLE 3: Forward Stepwise Regression Analysis of Insomnia Symptoms Associated

with Each Anxiety Symptom

		Rank	OR	z	95% CI	p
Item 1: Anxiety Level	Sleep	N/A				
	Daytime	1	1.308	5	(1.177, 1.453)	<0.0005
	Perception	2	1.205	3.49	(1.085, 1.337)	<0.0005
Item 2: Loss of Control	Sleep	3	1.089	2.14	(1.007, 1.178)	0.032
	Daytime	2	1.232	3.91	(1.109, 1.368)	<0.0005
	Perception	1	1.216	3.18	(1.078, 1.373)	0.001
Item 3: Worry About Many Things	Sleep	3	1.100	2.39	(1.017, 1.189)	0.017
	Daytime	2	1.259	4.34	(1.135, 1.397)	<0.0005
	Perception	1	1.234	3.45	(1.095, 1.391)	0.001
Item 4: Difficulty Relaxing	Sleep	N/A				
	Daytime	2	1.172	2.97	(1.056, 1.302)	0.003
	Perception	1	1.418	6.35	(1.273, 1.579)	<0.0005
Item 5: Restlessness	Sleep	2	1.179	3.89	(1.085, 1.281)	<0.0005
	Daytime	1	1.327	5.22	(1.193, 1.475)	<0.0005
	Perception	N/A				
Item 6: Irritability	Sleep	3	1.084	2.03	(1.003, 1.173)	0.042
	Daytime	1	1.229	3.86	(1.107, 1.364)	<0.0005
	Perception	2	1.157	2.36	(1.025, 1.306)	0.018
Item 7: Fear	Sleep	N/A				
	Daytime	N/A				
	Perception	1	1.426	8.36	(1.312, 1.550)	<0.0005