The Two-Factor Structure of Sleep Complaints and Its Relation to Depression and Anxiety

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Abstract

Although sleep complaints are common in depression and anxiety, there is little agreement as to how they should be organized and assessed. It is also unclear whether sleep complaints show specificity with certain disorders or if they are nonspecific symptoms. We examined the structure of sleep complaints and the relations of these complaints to depression and anxiety in three samples: college students, older adults, and psychiatric patients. Exploratory and confirmatory factor analyses indicated that sleep complaints consistently defined two distinct dimensions: Insomnia and Lassitude. The Insomnia factor included indicators of early, middle, and late insomnia, as well as poor sleep quality. The Lassitude factor included measures of hypersomnia, fatigue, and sleepiness. Both factors were significantly related to symptoms and diagnoses of depression and anxiety. However, Lassitude was more strongly related to symptoms of depression and anxiety than was Insomnia. In addition, Lassitude showed specificity to measures and diagnoses of depression compared to anxiety disorders. This specificity can be explained by Lassitude's relation with negative and positive emotionality, both of which are components of depression.

Keywords: major depression, anxiety disorders, sleep, factor analysis

The Two-Factor Structure of Sleep Complaints and Its Relation to Depression and Anxiety

Sleep complaints are common in people with depression and anxiety disorders. People with depression report difficulties falling asleep, nighttime and early morning awakenings, oversleeping, and feelings of fatigue and sleepiness during the day (Benca, 1996). The diagnostic criteria for depression include self-reported symptoms of insomnia, hypersomnia (i.e., oversleeping), and fatigue (American Psychiatric Association, 2000). Many anxiety disorders are also associated with self-reported symptoms of insomnia and fatigue, including generalized anxiety disorder (GAD), posttraumatic stress disorder (PTSD), social phobia, and panic disorder (Mellman, 2006; Papadimitriou & Linkowski, 2005). Despite the association of sleep complaints and anxiety disorders, only two anxiety disorders actually have diagnostic criteria that involve sleep-related symptoms. The diagnostic criteria for GAD include difficulties falling or staying asleep; restless, unsatisfying sleep at night; and fatigue during the day (American Psychiatric Association, 2000). The criteria for PTSD include difficulties falling or staying asleep (American Psychiatric Association, 2000).

When looking at the relation of sleep complaints with depression and anxiety, there is little agreement as to (a) which nighttime and daytime variables are important to measure and (b) how sleep complaints should be organized and assessed. For example, it is unclear if daytime complaints (e.g., sleepiness, fatigue) and nighttime complaints (e.g., insomnia, poor sleep quality) should be assessed separately or if they should be combined into a single measure. Self-reported insomnia at night significantly relates to both fatigue and sleepiness during the day (Roberts, Roberts, & Chen, 2001; Theorell-Haglow,

Lindberg, & Janson, 2006). Moreover, several questionnaires—including the Pittsburgh Sleep Quality Index (PSQI; Buysse, Reynolds, Monk, Berman, & Kupfer, 1989) and the Insomnia Severity Index (ISI; Morin, 1993)—combine nighttime sleep complaints and daytime fatigue in a single total score.

Conversely, studies that have examined the structure of sleep complaints model daytime and nighttime complaints separately. Cole et al. (2006) conducted confirmatory factor analysis on the seven PSQI component scales and obtained three factors: Sleep Efficiency, Perceived Sleep Quality, and Daily Disturbances. On the basis of these results, they suggest that using a single score from the PSQI ignores the multidimensional nature of sleep complaints. Similarly, Watson et al. (2007) conducted factor analyses of sleep items in the process of creating a multidimensional inventory of depression and anxiety symptoms. They found that items referring to early, middle, and late insomnia and poor sleep quality loaded onto a factor that subsequently became the Insomnia scale, whereas items referring to hypersomnia and fatigue loaded onto a separate factor that became the Lassitude scale.

Although these studies suggest that two or three factors can be used to model daytime and nighttime sleep complaints, they are limited in a number of ways. The study by Cole et al. (2006) relied on a single instrument, and as a result, each factor was defined by only two or three markers. The small number of scales defining each factor, combined with a relatively small sample size (N = 210), makes it less likely that this structure will replicate and show stability across samples (MacCallum, Widaman, Zhang, & Hong, 1999). The study by Watson et al. (2007) was primarily a scale development project and was not designed to provide a definitive analysis of the structure of self-

reported sleep problems. As a result, it did not include comprehensive measures of daytime and nighttime complaints. Consequently, the primary goal of this paper is to examine the structure of sleep complaints common to anxiety and depression, including insomnia, hypersomnia, sleepiness, and fatigue. We submitted multiple measures of these nighttime and daytime sleep complaints to factor analysis so that the resulting factor structure would be overdetermined and less subject to sampling error (MacCallum et al., 1999).

It is important to note that both age and patient status potentially may influence the number of sleep dimensions that can be identified. Both daytime and nighttime sleep complaints are associated with aging and mental illness (Benca, 1996; Ohayon, 2002). If older adults and patients report a wider variety of sleep complaints than younger adults and non-patients, this potentially could allow more sleep dimensions to emerge in structural analyses. As a result, the factor structures would not replicate across groups (O'Connor, 2002). In this paper, we report results from two studies; the first examines the structure of sleep complaints in college students and older adults, whereas the second tests the generalizability of these findings in a sample of psychiatric outpatients.

A second goal of this paper is to determine if daytime and nighttime sleep complaints have differential relations with depression and anxiety. Although the symptoms of insomnia and daytime fatigue are given equal weights in the diagnosis of major depression and GAD, it is not clear that they are equally strong markers of depression and anxiety. Moreover, it is unclear if sleep complaints show specificity to certain psychological disorders. This issue is complicated by the fact that the current diagnostic system results in high rates of comorbidity between the mood and anxiety

disorders, particularly depression and GAD (Kessler, Chiu, Demler, & Walters, 2005). It has been suggested that the comorbidity between mood and anxiety disorders can be accounted for by basic dimensions of temperament, especially Neuroticism/Negative Emotionality (N/NE) and Extraversion/Positive Emotionality (E/PE). N/NE is defined as a tendency to experience negative emotions, whereas E/PE is defined as pleasurable engagement with the environment.

In an early model, Watson, Clark, and Carey (1988) suggested that depression and anxiety disorders share a component of general distress represented by high levels of N/NE. In addition, low levels of E/PE are specific to depression and distinguish it from the anxiety disorders. Clark and Watson (1991) subsequently expanded this scheme into a "tripartite" model by positing a specific anxiety factor that is characterized by symptoms of physiological hyperarousal. These models have received strong support in a number of studies; most notably, indicators of low E/PE are more strongly related to depression than to the anxiety disorders (although subsequent research also has established a consistent link between low E/PE and social anxiety (see Clark, Watson, & Mineka, 1994; Mineka, Watson, & Clark, 1998; Watson, 2005; Watson et al., 1988).

The studies reported in this paper examine correlations between specific sleep complaints and the temperament dimensions of N/NE and E/PE, as well as the correlations between sleep complaints and measures of anxiety and depression. Sleep complaints that are exclusively related to N/NE can be considered nonspecific symptoms of both anxiety and depression. In contrast, sleep complaints that also are related to E/PE can be expected to show stronger relations with depression than with the anxiety disorders. Previous research suggests that self-reported fatigue has stronger correlations

with both N/NE and E/PE compared to self-reported insomnia, although the significance of these differences has not been formally tested (Watson et al., 1988; Watson, Gamez, & Simms, 2005).

Study 1: Structural Analyses of Sleep Complaints in Students and Older Adults

In this study, we used structural analyses to determine the number and types of distinct sleep complaints that can be measured in two separate samples: college students and older adults. This study also examined how the sleep dimensions obtained in the structural analyses relate to the temperament dimensions of N/NE and E/PE and to measures of depression and anxiety. Based on the findings from previous studies, we hypothesized that at least two dimensions of sleep complaints, Lassitude and Insomnia, would emerge in the college student sample and that Lassitude would show strong associations with measures of both N/NE and E/PE. In addition, we expected Lassitude to be related to depression and anxiety, but to show specificity with depression based on its stronger links to E/PE.

For the older adult sample, there were several possible outcomes. First, as noted previously, older adults may report a greater variety of sleep complaints than younger adults, resulting in a more complex structure that goes beyond Insomnia and Lassitude. Alternatively, older adults may have quantitatively but not qualitatively different sleep than younger adults, resulting in structural invariance across samples.

Method

Participants and Procedure

College student sample. The participants were 349 undergraduate students (age range = 18-30, *M* = 19 years) enrolled in an introductory psychology course at a large,

midwestern public university. After obtaining written informed consent, participants completed questionnaire packets in small group sessions. The sample consisted of 247 women and 101 men (one participant did not report sex). The sample included 302 Whites (86.5%), 20 Asian Americans (5.7%), 11 African Americans (3.2%), and 16 participants (4.6%) whose racial status was either unknown or from another category.

Older adult sample. This sample consisted of 213 older adults (age range 57-92, M = 74 years) recruited at a local senior center. After hearing an explanation of the study, the participants were given questionnaire packets to complete at home and return in a prepaid envelope. They were paid $15 on receipt of the packet. The sample consisted of 141 women and 71 men (one participant did not report sex). It included 202 Whites (94.8%) and 11 participants (5.2%) whose racial status was either unknown or from another category.

The following measures were completed by both the students and the older adults unless otherwise indicated.

Temperament Measures

Positive and Negative Affect Schedule-Expanded Form (PANAS-X). To obtain measures of positive and negative affectivity, participants completed the general, trait form of the PANAS-X (Watson & Clark, 1994). The Positive and Negative Affect scales had coefficient alphas of .87 (college students) and .89 (older adults) in our samples.

Big Five Inventory (BFI). Participants completed the BFI to obtain measures of extraversion and neuroticism (John & Strivastava, 1999). Coefficient alphas for Extraversion were .85 (college students) and .77 (older adults), whereas the corresponding values for Neuroticism were .84 (college students) and .83 (older adults).

Depression and Anxiety Measures

Overview. Participants completed multiple measures of depression and anxiety. Several of these instruments, including the Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996), PTSD Checklist-Civilian Version (PCL-C; Weathers, Litz, Herman, Huska, & Keane, 1993), and the Geriatric Depression Scale (GDS; Yesavage et al., 1982), contain items measuring sleep problems and fatigue. Total scores on these instruments were calculated leaving out all sleep-related items in order to avoid inflating correlations between depression/anxiety and sleep complaints due to overlapping content.

BDI-II. Depression scores were obtained from the BDI-II (Beck et al., 1996), which had coefficient alphas of .90 (college students) and .92 (older adults) in our samples.

GDS. Older adults completed the GDS (Yesavage et al., 1982). This scale has 30 true/false items that are specifically designed to measure depression in older adults; it had a coefficient alpha of .93 in our sample.

Inventory of Depression and Anxiety Symptoms (IDAS). Participants also completed the IDAS, a multi-dimensional measure of depression and anxiety that contains 10 specific symptom scales and 2 broad scales of General Depression and Dysphoria. We used an expanded version of the IDAS that contains 99 items; this version includes the 12 standard IDAS scales plus several additional content-based scales (see Watson et al., 2007, for more details). The Dysphoria scale was used as a measure of depression in this study because it does not contain items asking about sleep problems or fatigue.

Several specific IDAS scales also were assessed in this study. The 8-item Panic scale measures physiological responses associated with panic attacks (e.g., "My heart was racing"). The 5-item Social Anxiety scale measures anxiety in interpersonal situations (e.g., "I felt self-conscious knowing that others were watching me"). The 4-item Traumatic Intrusions scale measures the extent to which people re-experience a traumatic event, which is a symptom of PTSD (e.g., "I had disturbing thoughts of something bad that happened to me"). All of these IDAS scales had coefficient alphas of .75 or higher in both samples.

Beck Anxiety Inventory (BAI). Participants completed the BAI (Beck & Steer, 1990), which had coefficient alphas of .91 (college students) and .92 (older adults) in our samples.

The Anxiety Sensitivity Index (ASI). The ASI (Reiss, Peterson, Gursky, & McNally, 1986) was used as a measure of how fearfully people respond to anxiety-related symptoms. The ASI had coefficient alphas of .85 (college students) and .90 (older adults) in our samples.

PCL-C. Students completed the PCL-C (Weathers et al., 1993), an instrument that measures the 17 basic symptoms of PTSD. The scale had a coefficient alpha of .91 in this sample.

Phobic Stimuli Response Scales (PSRS). Students also completed items from the Social Fears scale of the PSRS (Cutshall & Watson, 2004). Coefficient alpha for this scale was .87 in the student sample.

Sleep Complaints Measures

IDAS. Participants completed a variety of sleep questionnaires in order to obtain multiple markers of self-reported insomnia, hypersomnia, fatigue, and sleepiness. First, several scales from the IDAS were used to measure sleep complaints. The IDAS Insomnia scale asks questions about the extent to which respondents experienced long sleep latency (e.g., "had trouble falling asleep"), awakenings during the night (e.g., "woke up frequently during the night"), early morning awakenings (e.g., "woke up early and couldn't get back to sleep"), and poor sleep quality (e.g., "slept very poorly"). A 2-item Hypersomnia scale was used as a measure of oversleeping (e.g., "slept too much at times"; see Watson et al., 2007, Supplement G). The IDAS Lassitude scale was used as a measure of sleepiness and fatigue (e.g., "I felt exhausted," "It took a lot of effort for me to get going," "I felt drowsy, sleepy"). One item on this scale overlapped with Hypersomnia and was removed, making this a 5-item measure. These scales had coefficient alphas of .80 or higher in our samples, with the exception of Hypersomnia (.72 in college students, .79 in older adults).

PSQI. The PSQI (Buysse et al., 1989) was used to obtain information about both nighttime and daytime complaints. The PSQI has seven components: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction. The component scores have shown good test-retest reliability (*r*s ranging from .65-.84) and have been shown to differentiate groups of psychiatric and sleep disorders patients from control groups (Buysse et al., 1989).

Epworth Sleepiness Scale (ESS). Self-reported sleepiness was measured using the ESS (Johns, 1991), an 8-item questionnaire that asks participants to rate their general tendency to doze off during the day. The ESS had coefficient alphas of .70 (college students) and .81 (older adults) in our samples.

Women's Health Initiative Insomnia Rating Scale (WHIIRS). Participants also completed the WHIIRS (Levine et al., 2003), a 5-item scale measuring nighttime sleep complaints, including early, middle, and late insomnia. This scale had coefficient alphas of .82 (college students) and .79 (older adults) in our samples.

Sleep Calendar. All participants also completed a retrospective 7-day sleep calendar. The purpose of this calendar was to obtain a more specific assessment of sleep complaints. Although prospective sleep calendars have been shown to have good test-retest reliability and convergent validity with questionnaire measures of sleep complaints (Manber et al., 2005; Monk et al., 1994), less is known about retrospective assessments of specific sleep complaints. Monk et al. (2003) found that retrospective self-report measures of bedtime, wake-up time, time awake during the night, and sleep latency were highly correlated with prospective diary ratings, with *r*s ranging from .79-.85. In the current study, for each day over the previous week, participants estimated *nap* time during the day, sleep *latency* (minutes until sleep onset), number of *awakenings* during the night, and *minutes awake* during the night. *Sleep* was defined as the number of minutes between bedtime and wake-time, minus sleep latency and minutes spent awake during the night. *Late insomnia* was calculated for people who reported waking up earlier than they had planned and was defined as the number of minutes between actual wake up time and planned wake up time. Each variable was averaged across the 7 days.

On the sleep calendars, participants were asked to rate their overall level of *fatigue* each day over the past week, from 0 (very energetic) to 100 (very fatigued). Participants were also asked to rate their *sleep quality* for each day over the past week, ranging from very poor to excellent, with higher numbers representing poorer sleep quality.

Results and Discussion

Preliminary Analyses

Tables 1-2 present the means and standard deviations for all measures, as well as the range of possible scores for the questionnaire measures. We also examined the convergent and discriminant validity of the sleep questionnaire and calendar data in the two samples. Table 3 reports the correlations between the IDAS Insomnia and Lassitude scales and the sleep calendar variables in the college students and older adults. It is noteworthy that the overall pattern of the correlations is very similar in the student and older adult samples, suggesting that the measures generally are operating in the same way in these two groups.

In terms of convergent validity, the IDAS scales were significantly related to their sleep calendar counterparts in both samples. For instance, IDAS Insomnia was strongly related to poor sleep quality in both the college students (r = .58) and older adults (r = .68). To test discriminant validity, we determined whether measures of the same construct (e.g., IDAS Insomnia and calendar measures of insomnia) correlated more highly than measures of different constructs (e.g., IDAS Insomnia and calendar measures of lassitude). After transforming the correlations to Fisher's z to correct for non-normal distributions (Fisher, 1921), the average convergent correlations for insomnia were |.41|

and |.49| in the student and older adult samples, respectively, whereas the average discriminant correlations were |.14| and |.22|, respectively. The average convergent correlations for lassitude were |.30| and |.42|, respectively, whereas the average discriminant correlations were |.16| and |.29|, respectively.

In addition, we conducted significance tests using the Williams modification of the Hotelling test for dependent correlations (Kenny, 1987), comparing convergent correlations to the discriminant correlations in the same row or column. Overall, 46 of these 64 comparisons (71.9%) were significant at $p < .05$, 1-tailed, which offers strong evidence of discriminant validity. Given these findings, it appears acceptable to use the calendar and questionnaire measures to model sleep complaints in both the students and older adults.

Structure of Sleep Complaints

To determine the number of distinct dimensions of sleep complaints that can be identified in students, the sleep variables in this sample were submitted to principal factor analyses with promax rotation. We used an oblique rotation in order to model the moderate correlation that has been obtained between measures of lassitude and insomnia in the past (Watson et al., in press). The prior communality estimate was calculated using squared multiple correlations (SMCs). The goal in these analyses was to extract the greatest number of factors that were interpretable and distinct from one another. In addition, we employed several procedures for determining the optimal number of factors to extract, including scree tests and parallel analysis (Floyd & Widaman, 1995; Russell, 2002). In parallel analysis, the observed eigenvalues are compared with the eigenvalues

of random sets of data that incorporate characteristics of the actual data; this method is thought to be more objective than scree tests (O'Connor, 2000).

Our analyses revealed the presence of a large and relatively broad factor of sleep complaints, which was defined by the majority of sleep measures and accounted for 65% of the common variance. In the next step, we extracted two clear, well-defined factors representing Insomnia and Lassitude. These two factors jointly accounted for 83% of the common variance. They were moderately correlated at $r = .40$. When examining the eigenvalues (the eigenvalues of the first four unrotated factors were 5.61, 1.60, .84 and .61), the scree plot leveled off after the second factor, suggesting that two factors are the minimum number of factors to retain. Parallel analysis indicated that the maximum number of factors to retain was three. However, when a third factor was extracted, it was defined by a subset of insomnia measures (e.g., sleep latency, sleep duration, sleep efficiency), and half of these variables had loadings above .30 on the original insomnia factor. Given that the three-factor model involved considerable overlap among the factors and was not readily interpretable, we report results on the two-factor model. Table 4 shows the factor loadings in the student sample. Variables that loaded highly on the Insomnia factor include measures of insomnia, poor sleep quality, long sleep latency, and minutes awake at night. In contrast, the Lassitude factor was defined by measures of fatigue, sleepiness, and hypersomnia.

Next, we conducted identical analyses using the older adult data. Once again, we extracted a large, non-specific factor of sleep complaints that accounted for 61% of the common variance. In the next step, we extracted two factors of Insomnia and Lassitude, which jointly accounted for 77% of the common variance in this sample and were

moderately correlated, r = .43. In older adults, the eigenvalues of the first four unrotated factors were 6.92, 1.84, 1.01 and .89 and the scree plot leveled off after the second factor. Parallel analysis suggested that four factors were the maximum number of factors that could be extracted. Accordingly, we next extracted a third and a fourth factor. The third factor contained a subset of insomnia variables (e.g., sleep latency, minute awake, late insomnia) that differed from the variables that defined the third factor in the student sample. The fourth factor represented a subset of lassitude variables. There was considerable overlap among factors in both the three- and four-factor models. Given that the three- and four-factor models are uninterpretable and do not replicate across samples, we retained the two-factor model.

Table 4 shows the factor loadings for the older adults. These analyses strongly resembled the student results and revealed the same basic structure. Specifically, of the 20 analyzed variables, 11 had loadings of |.30| or greater on Insomnia in both samples, and another 6 had loadings of |.30| and greater on Lassitude in both samples. In addition, one variable (PSQI sleep disturbances) split and had high loadings on both factors in each solution. Finally, PSQI sleeping medication consistently had low loadings on both factors.

To compare the factor structure across samples more formally, we computed congruence coefficients (Gorsuch, 1983; O'Connor, 2002). Congruence coefficients are computed by summing the product of the factor loadings on factors from two different samples. This number is divided by the square root of the product of the sums of the squared factor loadings within each sample. Coefficients greater than .90 indicate that the factor replicates across samples. We obtained congruence coefficients of .97 for

Insomnia and .95 for Lassitude, establishing that the same basic dimensions of sleep complaints are observed in college students and older adults.

Group Differences on Measures of Lassitude and Insomnia

In order to examine differences between the two age groups on measures of sleep complaints, we combined the data from the two samples. Next, in order to put all of the sleep variables on the same metric, we standardized them in this combined sample. Finally, we created factor-based scales. That is, variables that loaded onto the Lassitude factor were added together for a total Lassitude score, and variables that loaded onto the Insomnia factor were summed to create a total Insomnia score (with the sleep calendar variable reverse keyed). PSQI sleeping medication and sleep disturbances were not included since they did not consistently load on a single factor. We calculated independent samples *t*-tests to examine differences between the two age groups on these two scales. College students had significantly higher scores on Lassitude ($t = 5.36$, $p < .01$), whereas older adults had significantly higher scores on Insomnia ($t = -2.87$, $p < .01$). To examine effect sizes, we computed Cohen's *d* (Cohen, 1988), which represents the standardized difference between the group means. The results indicated medium effect sizes for Lassitude ($d = .47$) and Insomnia ($d = -.27$). Thus, insomnia problems appear to increase with age, whereas lassitude complaints are more common in young adults. As discussed earlier, however, the same two-factor structure of sleep complaints emerged in both age groups, suggesting that younger and older adults have quantitative and not qualitative differences in self-reported sleep.

Relations of Sleep Complaints and Temperament

We next calculated correlations between sleep complaints and the temperament dimensions of N/NE and E/PE using regression-based factor scores on the Lassitude and Insomnia factors in each sample. Factor scores are weighted scores for each individual on each factor. They are obtained by multiplying the individual's standardized response on each variable by the corresponding factor scoring (i.e., regression) weight and summing across variables. We also compared differences in the correlations for Insomnia and Lassitude. In these analyses, and all other analyses involving dependent correlations, we used the Williams modification of the Hotelling test for two correlations involving a common variable (Kenny, 1987).

Table 5 shows that the strongest correlations are between measures of N/NE and Lassitude, with *r*s ranging from .43-.48 in the students and from .56-.59 in the older adults. The next highest correlations were between measures of E/PE and Lassitude. In contrast, Insomnia does not show correlations above |.29| and |.37| with any temperament measure in the students and older adults, respectively. Consistent with our predictions, in 7 out of 8 comparisons, Lassitude showed significantly stronger correlations with measures of temperament than did Insomnia at $p < .05$, 1-tailed. The only exception was BFI Extraversion in the student sample.

As discussed earlier, based on its strong relation with N/NE, we would expect Lassitude to be more strongly related to both depression and anxiety than Insomnia. In addition, we would expect Lassitude to show greater specificity to depression due to its stronger relation with E/PE. Conversely, Insomnia should show weaker, nonspecific correlations with depression and anxiety.

Relation of Sleep Complaints to Depression and Anxiety Symptoms

Table 5 also presents the correlations between the regression-based factor scores for Insomnia and Lassitude and measures of depression and anxiety in both samples. It is noteworthy that in both samples, compared to Insomnia, the Lassitude factor had significantly stronger correlations with measures of anxiety and depression. Overall, Lassitude had a significantly stronger correlation than did Insomnia in 14 of the 17 individual comparisons (see Table 5).

We also examined whether Lassitude and Insomnia correlated differently with various types of depression and anxiety symptoms. After Fisher's *z* transformations (Fisher, 1921), the average correlation between depression measures and Lassitude was .67 in students and .69 in older adults. Conversely, the average correlation between anxiety measures and Lassitude was .47 in students and .53 in older adults. In addition, Lassitude had significantly stronger correlations with measures of depression than with measures of anxiety in 25 of 29 individual comparisons, at $p < .05$, 1-tailed. Across both samples, Lassitude showed specificity to depression versus anxiety symptoms (e.g., panic, traumatic intrusions, social anxiety).

In contrast to Lassitude, Insomnia had more moderate, nonspecific correlations with measures of depression and anxiety. The average correlation between depression measures and Insomnia was .44 in students and .43 in older adults. The average correlation between anxiety measures and Insomnia was .33 in both the students and older adults. Insomnia had significantly stronger correlations with measures of depression than with measures of anxiety in 18 out of 29 individual comparisons, at $p < .05$, 1-tailed. Thus in 62% of the comparisons, Insomnia showed specificity to

depression; in contrast, Lassitude showed specificity to depression in 86% of the comparisons.

Study 2: Structural Analyses of Sleep Complaints in Psychiatric Patients

In Study 1, we obtained two highly replicable dimensions of sleep complaints from samples of college students and older adults. To determine whether these results further replicate in clinical samples, a second study was conducted on a similar set of measures with psychiatric outpatients using confirmatory factor analysis. More specifically, we conducted confirmatory factor analysis on a subset of 266 patients that completed many of the same sleep measures used in Study 1. As noted previously, patients may report a greater variety of sleep complaints than non-patients, resulting in a more complex structure that goes beyond Insomnia and Lassitude. Alternatively, patients may have quantitatively but not qualitatively different sleep than non-patients, resulting in structural invariance across samples.

In this regard, O'Connor (2002) found structural invariance of psychopathology measures across clinical and non-clinical samples, suggesting that clinical samples have more severe symptoms, but not qualitatively different symptoms. Therefore, it was hypothesized that a two-factor structure of sleep complaints would fit the data well. Based on the results of Study 1, we also hypothesized that Lassitude would show stronger relations to measures of N/NE and E/PE compared to Insomnia. We expected Lassitude to be more strongly related to both depression and anxiety than Insomnia, although we also expected Lassitude to show greater specificity to depression.

Method

Participants and Procedure

The participants were 657 psychiatric patients (age range = 18-83, *M* = 42.2 years) recruited from the local Community Mental Health Center and the Psychiatry Outpatient Clinic at a university hospital as part of a larger, ongoing study. Patients who were interested in participating came to the lab and were paid $50 to complete the questionnaires and interviews. The sample consisted of 425 women and 228 men (four participants did not report sex). It included 589 Whites (89.6%), 13 African Americans (2.0%), 10 native Americans (1.5%). 9 Asian Americans (1.4%), 16 multiracial participants (2.4%), and 20 respondents (3.0%) whose racial status was either unknown or from another category.

Various subgroups of these patients were assessed on different sets of measures. Consequently, we subsequently report results based on data from 266 (confirmatory factor analysis), 565 (questionnaire analyses), and 604 (interview analyses) patients.

Interview Measures

Structured Clinical Interview for DSM-IV (SCID-IV). Participants were interviewed using the SCID-IV (First, Spitzer, Gibbon, & Williams, 1997). The interviewers were trained staff members who had masters' level training in clinical/counseling psychology or public health. The diagnoses obtained from the mood and anxiety disorders modules of the SCID-IV included major depression (MDD), GAD, panic disorder, PTSD, and social phobia. To assess interrater reliability, the interviews were audiotaped and 76 of them were scored independently by a second interviewer (because of audiotape problems, the actual *N* ranged from 74 to 76 across various

disorders). Good to excellent interrater reliability was found for MDD (κ = .95), social phobia (κ = .87), PTSD (κ = .86), panic disorder (κ = .84), and GAD (κ = .70) (Cicchetti, 1994).

Clinician Rating version of the IDAS (IDAS-CR). Participants also were interviewed using the IDAS-CR (Watson et al., in press). The IDAS-CR consists of a series of ratings representing each of the standard IDAS scales, including the Insomnia and Lassitude scales. Ratings are made on a 3-point scale (*absent, subthreshold, present*). In order to make these ratings, the clinicians asked a standard initial probe question, as well as several standard follow up questions, for each symptom. In addition, the clinicians were free to ask additional questions to ensure the individual received a proper rating on the dimension. To assess inter-rater reliability, interviews were audiotaped and 76 of them were scored independently by a second interviewer (due to audiotape problems, *N*s ranged from 75-76). Intraclass correlations ranged from .74 (Well-Being) to .99 (Appetite Gain), with a mean value of .90 and a median value of .89. Intraclass correlations in this range indicate good to excellent interrater reliability (see Cicchetti, 1994).

Questionnaires

In addition to the interviews, the participants completed many of the same self-report measures that were described earlier in Study 1. As before, total scores on these instruments were calculated leaving out all sleep-related items in order to avoid inflating correlations between depression/anxiety and sleep complaints due to overlapping content. Specifically, they again were assessed on the PANAS-X Positive and Negative Affect scales[1] (coefficient alphas = .90 in this sample) and the BFI Extraversion and

Neuroticism scales (coefficient alphas ranged from .82-.83 in this sample). Participants completed the BDI-II (coefficient alpha = .93 in this sample) and BAI (coefficient alpha = .94 in this sample). Participants also completed the same IDAS scales used in Study 1 (coefficient alphas were all above .80 in this sample), as well as the PSRS Social Fears scale (coefficient alpha = .88 in this sample). Finally, a subgroup of 266 participants completed the PSQI.

As would be expected, the patients had higher symptom scores than both the older adults and college students examined in Study 1. Effect sizes, calculated using Cohen's *d* (Cohen, 1988), ranged from .23 to 1.21 across the various measures. Specifically, the average BDI-II score for patients was 17.78 (standard deviation = 11.66), which was higher than students (*d* = .74) and older adults (*d* = .94). The average BAI score for patients was 17.47 (standard deviation = 13.24), which was higher than students (*d* = .57) and older adults (*d* = .71). The average IDAS Lassitude score for patients was 14.62 (standard deviation = 5.09), which was higher than students (*d* = .25) and older adults (*d* = .96). The average IDAS Insomnia score for patients was 15.89 (standard deviation = 6.73), which was higher than students (*d* = .33) and older adults (*d* = .55).

Results and Discussion

Structure of Sleep Complaints

In previous analyses, two basic dimensions of sleep complaints emerged: Insomnia and Lassitude. To determine if this structure replicates in psychiatric patients, questionnaire and interview measures of sleep complaints were submitted to confirmatory factor analyses; these analyses were restricted to the 266 participants who completed the PSQI. Two models were compared in these analyses: 1) a model with one content factor

in which all sleep complaints loaded onto a single dimension of general sleep complaints and 2) a model consisting of two content factors, one of which was defined by measures of insomnia and the other of which was defined by measures of lassitude. Measures of lassitude in this sample included the IDAS Lassitude and Hypersomnia scales, the IDAS-CR Lassitude scale, and PSQI daytime dysfunction. Measures of insomnia included the IDAS Insomnia scale, the IDAS-CR Insomnia scale, and the remaining PSQI component scores. We initially fit the models without specifying method factors; however, neither model provided an excellent fit to the data. Consequently, following the recommended procedure in analyses of multitrait-multimethod data (e.g., Byrne, 1994), we specified two method factors and obtained a better fit. One method factor was defined by the IDAS questionnaire and interview scales, and the other was defined by all the PSQI component scores.

These analyses were conducted using EQS (Bentler & Wu, 1995) and were tested using covariance matrices and the maximum-likelihood estimation method. The two content factors in the second model were allowed to be correlated given the moderate correlations between the Insomnia and Lassitude factors that were obtained in Study 1. The method factors were constrained to be uncorrelated with each other and with the content factors. Six different fit indices were used to evaluate these models, including the overall model χ^2, the Bentler-Bonett normed fit index (NFI), the comparative fit index (CFI), the goodness-of-fit index (GFI), the standardized root-mean-square residual (SRMR), and the root-mean-square error of approximation (RMSEA). In general, fit is considered acceptable if NFI, CFI, and GFI are .90 or greater and SRMR and RMSEA are .10 or less (Finch & West, 1997; Hu & Bentler, 1998). However, more stringent

cutoffs for these indices have been recommended, including values of .95 for CFI, .08 for SRMR, and .06 for RMSEA (Hu & Bentler, 1999). In these analyses, we consider NFI, CFI, and GFI values of .90 or greater to reflect an adequate fit and values of .95 or greater to reflect an excellent fit. Similarly, SRMR and RMSEA values of .10 or less are interpreted as representing an adequate fit and values of .06 or less represent an excellent fit.

Table 6 reports the fit indices for both models. The first model with one content factor provided an adequate fit to the data. In contrast, the second model with two content factors generally provided an excellent fit to the data. CFI and GFI both exceeded .95, whereas SRMR and RMSEA were less than .06. Although the NFI was lower than the CFI and GFI (.940), it still indicated an adequate fit. In addition, it is important to note that the second model fit the data significantly better than the first model [χ^2 diff (1) = 35.42, $p < .001$]. Finally, although the correlation between the two sleep factors was substantial (.65), it was not high enough to indicate a serious problem in differentiating these dimensions from one another. The factor loadings for the two sleep factors were consistently high and are reported in Table 7, along with the loadings for the two method factors. The Insomnia factor is defined by questionnaire and interview measures of insomnia (e.g., poor sleep quality, short sleep duration), whereas Lassitude is defined by questionnaire and interview measures of hypersomnia and fatigue. Thus, consistent with the findings in Study 1, daytime and nighttime sleep complaints can be distinguished from one another.

Relation of Sleep Complaints and Temperament

To replicate the analyses conducted in Study 1, we performed an exploratory factor analysis on the reduced set of sleep measures that had been completed by a majority of the patients; this consisted of the IDAS Insomnia, Lassitude and Hypersomnia scales, as well as the IDAS-CR Insomnia and Lassitude scales. We again obtained two distinct factors of Insomnia and Lassitude and used regression-based factor scores to correlate these factors with measures of temperament. The correlations between these sleep factors and temperament are reported in Table 8. As in Study 1, the strongest correlations were between N/NE and Lassitude, with *r*s ranging from .43-.48. Insomnia showed generally weaker correlations with temperament measures. Lassitude had significantly higher correlations with the PANAS-X scales compared to Insomnia at $p < .05$, 1-tailed. Although BFI Neuroticism and Extraversion followed this same pattern, the differences were not statistically significant. Once again, this pattern of correlations would lead to the prediction that Lassitude is more strongly related to depression and anxiety compared to Insomnia. It also leads to the hypothesis that Lassitude is more specific to depression, a disorder that is characterized by both high levels of N/NE and low levels of E/PE.

Relation of Sleep Complaints to Depression and Anxiety

Table 8 presents the correlations between the regression-based factor scores for Lassitude and Insomnia and the measures of depression and anxiety symptoms. Although Lassitude did not show significantly higher correlations with measures of anxiety compared to Insomnia, it was significantly more strongly related to measures of depression than was Insomnia (see Table 8). As in Study 1, we examined whether

Lassitude and Insomnia correlated differently with various types of depression and anxiety symptoms. After Fisher's *z* transformations (Fisher, 1921), Lassitude had average correlations of .60 with the depression measures and .41 with the anxiety measures. In addition, Lassitude had significantly stronger correlations with measures of depression than with measures of anxiety in all 10 individual comparisons, at $p < .05$, 1-tailed. Combining these findings with the results from Study 1, it appears that Lassitude shows specificity to depression symptoms.

We next examined whether Insomnia shows the same degree of specificity to depression as Lassitude. Insomnia had average correlations of .49 with the depression measures and .39 with the anxiety measures. Insomnia had significantly stronger correlations with measures of depression than with measures of anxiety in 8 out of 10 individual comparisons, at $p < .05$, 1-tailed, which is slightly less than the corresponding comparisons with Lassitude. Across Study 1 and Study 2, the data suggest that Insomnia is relatively nonspecific (26 of 39 significant comparisons, or 66.7%) in comparison with Lassitude (35 of 39 significant comparisons, or 89.7%), although these findings are less robust in the patient sample than in the student and older adult samples.

In order to examine the differential relations of sleep complaints across disorders, we calculated point-biserial correlations between SCID-IV diagnoses and the Insomnia and Lassitude factors, which are presented in Table 9; in these analyses, diagnoses are scored as 0 = absent, 1 = present, so that positive correlations indicate that higher scores on a factor are associated with an increased likelihood of receiving the diagnosis.

Paralleling the self-report data, Lassitude was significantly more strongly related to MDD ($r = .43$) compared to Insomnia ($r = .36$; see Table 9). However, Lassitude did

not have stronger correlations with the anxiety disorders diagnoses (*r*s ranged from .18 to .28; mean $r = .22$) than did Insomnia (*r*s ranged from .15 to .26; mean $r = .23$); in fact, Insomnia had nonsignificantly higher correlations with both GAD and PTSD than did Lassitude. Examining the correlations between Lassitude and the diagnoses, we found that Lassitude was more highly correlated with MDD than with all anxiety disorder diagnoses at $p < .01$, 1-tailed. However, Insomnia was also more highly correlated with MDD than with all anxiety disorder diagnoses at $p<.05$, 1-tailed. Overall, these data provide mixed support for our hypotheses. Most notably, consistent with prediction, Lassitude is more strongly related to MDD than is Insomnia, but there is no systematic difference in the strength of their associations with the anxiety disorders.

General Discussion

Using structural analyses, we obtained two clear, replicable dimensions of self-reported sleep complaints: Insomnia and Lassitude. Insomnia represents problems sleeping at night, including long sleep latency, awakenings at night, waking up too early in the morning, poor sleep quality, and short sleep duration. The second factor, Lassitude, represents a combination of oversleeping and feelings of fatigue and sleepiness. Although many instruments combine sleep complaints of insomnia and lassitude into a total score, they can be modeled as separate dimensions that are only moderately correlated. Information may be lost by calculating a total insomnia score that combines nighttime and daytime complaints. Further evidence for viewing Insomnia and Lassitude as separate constructs comes from the confirmatory factor analysis in Study 2, in which a model with two content factors of Insomnia and Lassitude fit the data significantly better than a model with one content factor of general sleep complaints.

It is noteworthy that neither age nor mental health status influences the number of basic dimensions of sleep complaints. The two-factor structure of sleep complaints presented in this paper is robust and replicates across three samples. Although we did not find qualitative differences in sleep complaints across samples, we did find evidence of quantitative differences. In Study 1, older adults reported higher levels of insomnia, whereas students reported higher levels of lassitude. In Study 2, patients reported higher levels of many symptoms, including lassitude and insomnia, compared to non-patient samples.

In addition to determining the structure of self-reported sleep complaints, one of the main goals of this paper was to determine if sleep complaints show specificity to certain psychological disorders. We examined the associations of sleep complaints with the temperament dimensions of N/NE and E/PE to determine if insomnia and lassitude are nonspecific symptoms of both depression and anxiety, or if they are symptoms specific to depression. In all three samples, N/NE is more strongly related to Lassitude than to Insomnia. E/PE is also more strongly negatively related to Lassitude than to Insomnia, although these correlations are weaker than the correlations with N/NE. Thus, Lassitude is both a marker of both general distress (N/NE) and anhedonia (E/PE). Given its relation with N/NE, we would expect Lassitude to be more strongly related to measures of anxiety and depression than Insomnia. In addition, Lassitude should show greater specificity to depression than to anxiety as a result of its relation with E/PE.

These predictions generally were supported by the pattern of correlations between sleep complaints and measures of depression and anxiety. As expected, Lassitude was more strongly correlated with measures of both depression and anxiety than was

Insomnia in the student and older adult samples. In patients, Lassitude was more strongly correlated with measures and diagnoses of depression than was Insomnia; the differences on anxiety were non-significant. In all three samples, Lassitude was more highly correlated with measures of depression than with measures of anxiety disorders. In addition, Lassitude was more strongly related to a diagnosis of major depression than to diagnoses of various anxiety disorders, including panic disorder, GAD, PTSD, and social phobia. Conversely, Insomnia showed a tendency to have more nonspecific associations with self-report and interview measures of depression and anxiety, particularly in the student and older adult samples. The literature examining the overlap of sleep complaints and psychopathology tends to focus on insomnia complaints; however, the results of these studies suggest that lassitude actually may be a more informative symptom because of its greater diagnostic specificity.

Directions for Future Research

Although sleep complaints are frequently evaluated in medical and psychiatric patients, very little research is devoted to the structure of these complaints. The findings presented in this paper demonstrate that the two-factor structure of sleep complaints is highly robust and replicates well across samples. Our structural analyses indicate that Insomnia and Lassitude are distinct constructs and should be evaluated independently. In future research, it will be important to examine the structure of sleep complaints in additional populations with self-reported insomnia and lassitude symptoms, including medical patients and patients diagnosed with sleep disorders. In addition, it will be necessary for future studies to determine if objective sleep disturbances correspond to the two-factor structure of sleep complaints reported in this paper. Although studies have

shown that sleep complaints are not equivalent to objective sleep disturbances (Argyropoulos et al., 2003; Tsuchiyama, Nagayama, Kudo, Kojima, & Yamada, 2003), it is possible that certain objective sleep variables are related to the sleep complaints of lassitude and insomnia. Several studies have examined the structure of objective sleep disturbances (Buysse et al., 1998; Tucker, Dinges, & Van Dongen, 2007), and it would be interesting to examine how these structures map onto the two-factor structure of sleep complaints discussed in this paper.

The studies reported in this paper were limited to measures of sleep complaints commonly seen in depression and anxiety disorders, including insomnia, poor sleep quality, hypersomnia, fatigue, and sleepiness. As such, the two-factor model of Insomnia and Lassitude is directly relevant to anxiety and depression. However, it is likely that other forms of psychopathology involve additional sleep complaints. For example, unusual sleep experiences—such as nightmares and hallucinations before falling asleep and waking up—are significantly related to measures of dissociation and schizotypy (Fassler, Knox, & Lynn, 2006; Giesbrecht & Merckelbach, 2004; Watson, 2001, 2003). Additional research is needed to see if unusual sleep experiences can be modeled as a third factor, in addition to Insomnia and Lassitude. In preliminary analyses, we have found evidence for a more elaborated hierarchical structure of sleep complaints; in this scheme, specific sleep complaints tend to cluster under three higher order factors of Insomnia, Lassitude, and Unusual Sleep Experiences (e.g., narcolepsy symptoms, nightmares). Although much work clearly remains to be done, we believe the results of our two studies provide a solid foundation for future research on the structure of sleep

complaints. We hope that our findings stimulate further examination of the nature and structure of this important domain of human functioning.

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Footnote

[1] Some patients received instructions to rate the extent to which they generally feel various emotions (as in Study 1), whereas others were asked to rate the extent to which they felt various emotions during the last week. We conducted separate analyses for each subgroup and found very similar patterns of correlations. We therefore averaged these results and report weighted mean correlations between the sleep factors and the PANAS-X scales in Table 8.

Table 1

Mean Scores (SD) for Measures of Temperament, Depression, and Anxiety (Study 1)

Measure	College Students	Older Adults	Potential Range
Temperament Scales			
PANAS-X Positive Affect	32.67 (6.50)	34.13 (6.89)	10-50
PANAS-X Negative Affect	20.85 (6.55)	17.06 (6.03)	10-50
BFI Extraversion	26.37 (6.34)	25.76 (5.92)	8-40
BFI Neuroticism	24.00 (6.34)	19.96 (7.04)	8-40
Depression Scales			
IDAS Dysphoria	22.19 (7.48)	17.69 (7.39)	9-45
BDI-II	9.58 (7.78)	6.71 (7.64)	0-54
GDS	.__	6.81 (6.92)	0-29
Anxiety Scales			
IDAS Panic	12.62 (4.58)	11.22 (3.91)	8-40
IDAS Social Anxiety	9.26 (3.88)	7.21 (2.95)	5-25
IDAS Traumatic Intrusions	6.98 (3.33)	5.83 (2.67)	4-20
BAI	10.31 (9.51)	8.31 (9.12)	0-63
ASI	14.85 (8.94)	15.64 (10.64)	0-64
PCL-C	28.61 (10.61)	.__	16-80
PSRS Social Fears	26.96 (6.37)	.__	11-44

Note. n = 349 (college students), 213 (older adults). PANAS-X = Positive and Negative Affect Schedule-Expanded Form. BFI = Big Five Inventory. IDAS = Inventory of Depression and Anxiety Symptoms. BDI-II = Beck Depression Inventory-II. GDS = Geriatric Depression Scale. BAI = Beck Anxiety Inventory. ASI = Anxiety Sensitivity Index. PCL-C = PTSD Checklist-Civilian Version. PSRS = Phobic Stimuli Response Scales.

Table 2

Mean Scores (SD) for Sleep Measures (Study 1)

	College Students	Older Adults	Potential Range
Questionnaires			
IDAS Insomnia	13.75 (5.42)	12.22 (5.34)	6-30
IDAS Hypersomnia	4.23 (2.31)	3.13 (1.75)	2-10
IDAS Lassitude	13.35 (4.78)	9.47 (4.09)	5-25
PSQI	6.36 (3.23)	6.51 (4.01)	0-21
ESS	8.99 (3.67)	7.79 (4.37)	0-24
WHIIRS	7.52 (4.33)	7.65 (4.56)	0-20
Sleep Calendar			
Nap	27.83 (35.95)	28.54 (33.95)	
Latency	27.32 (20.56)	31.12 (35.08)	
Awakenings	.99 (.96)	2.01 (1.13)	
Minutes Awake	9.24 (13.67)	27.63 (30.76)	
Sleep	449.77 (63.67)	416.99 (84.25)	
Late Insomnia	10.70 (18.86)	26.10 (34.61)	
Fatigue	41.10 (15.05)	39.89 (21.50)	
Poor Sleep Quality	2.64 (.67)	2.51 (.79)	

Note. n = 349 (college students), 213 (older adults). IDAS = Inventory of Depression and Anxiety Symptoms. PSQI = Pittsburgh Sleep Quality Index. ESS = Epworth Sleepiness Scale. WHIIRS = Women's Health Initiative Insomnia Rating Scale.

Table 3

Correlations Between Calendar and Questionnaire Measures of Sleep Complaints (Study 1)

	IDAS Insomnia		IDAS Lassitude	
Sleep Calendar	College Students	Older Adults	College Students	Older Adults
Poor Sleep Quality	**.58**	**.68**	.31	.43
Minutes Awake	**.47**	**.52**	.14	.20
Awakenings	**.45**	**.36**	.20	.26
Latency	**.38**	**.52**	.13	.31
Sleep	**-.31**	**-.41**	-.14	-.19
Late Insomnia	**.23**	**.41**	-.03	.31
Fatigue	.21	.28	**.34**	**.53**
Nap	.07	.15	**.26**	**.30**

Note. n = 349 (college students), 213 (older adults). Convergent correlations are highlighted. IDAS = Inventory of Depression and Anxiety Symptoms.

Correlations of |.12| and greater are significant at $p < .05$, 2-tailed for college students.

Correlations of |.15| and greater are significant at $p < .05$, 2-tailed for older adults.

Table 4

Factor Structure of Sleep Measures in College Students and Older Adults (Study 1)

Scales/Calendar Data	Factor I (Insomnia)		Factor II (Lassitude)	
	College Students	Older Adults	College Students	Older Adults
WHIIRS	**0.84**	**0.77**	0.01	0.11
PSQI Sleep Latency	**0.72**	**0.76**	-0.05	-0.06
SC Latency	**0.72**	**0.74**	-0.18	-0.01
IDAS Insomnia	**0.71**	**0.78**	0.16	0.13
SC Minutes Awake	**0.71**	**0.71**	-0.14	-0.03
PSQI Poor Sleep Quality	**0.70**	**0.77**	0.20	0.12
SC Poor Sleep Quality	**0.65**	**0.74**	0.16	0.16
SC Awakenings	**0.56**	0.27	0.02	0.22
PSQI Poor Sleep Efficiency	**0.51**	**0.69**	-0.09	0.01
PSQI Short Sleep Duration	**0.48**	**0.77**	0.04	-0.12
SC Sleep	**-0.42**	**-0.68**	0.03	0.18
SC Late Insomnia	**0.39**	**0.40**	-0.21	-0.01
PSQI Sleep Disturbances	**0.38**	0.26	0.27	**0.33**
PSQI Sleeping Medication	0.26	0.22	0.12	0.14
IDAS Lassitude	0.06	0.10	**0.75**	**0.76**
PSQI Daytime Dysfunction	0.04	0.00	**0.58**	**0.69**
ESS	-0.10	-0.07	**0.57**	**0.55**
IDAS Hypersomnia	-0.14	-0.11	**0.55**	**0.69**
SC Nap	-0.11	0.01	**0.41**	**0.52**
SC Fatigue	0.11	0.01	**0.35**	**0.53**

Note. n = 349 (college students), 213 (older adults). Factor loadings of |.30| and greater are highlighted. WHIIRS = Women's Health Initiative Insomnia Rating Scale. PSQI = Pittsburgh Sleep Quality Index. SC = Sleep Calendar. IDAS = Inventory of Depression and Anxiety Symptoms. ESS = Epworth Sleepiness Scale.

Table 5

Correlations of Lassitude and Insomnia Factors with Temperament, Depression, and Anxiety (Study 1)

Measure	Lassitude		Insomnia	
	College Students	Older Adults	College Students	Older Adults
Temperament Scales				
PANAS-X Negative Affect	.48	.56	.27	.37
BFI Neuroticism	.43	.59	.29	.37
PANAS-X Positive Affect	-.30	-.53	-.19	-.24
BFI Extraversion	-.10 [a]	-.34	-.12 [a]	-.13
Depression Scales				
IDAS Dysphoria	.69	.72	.45	.41
BDI-II	.64	.67	.42	.47
GDS	.__	.67	.__	.41
Anxiety Scales				
PCL-C	.57	.__	.40	.__
IDAS Panic	.55	.63	.36	.36
BAI	.51	.65	.33	.43
ASI	.46	.41	.28	.24
IDAS Social Anxiety	.44	.40 [a]	.31	.30 [a]
IDAS Traumatic Intrusions	.42 [a]	.50	.36 [a]	.33
PSRS Social Fears	.34 [a]	.__	.25 [a]	.__

Note. n = 349 (college students), 213 (older adults). Within a row and sample, correlations differ from one another ($p < .05$, 1-tailed), unless marked with the same superscript. PANAS-X = Positive and Negative Affect Schedule-Expanded Form. BFI = Big Five Inventory. IDAS = Inventory of Depression and Anxiety Symptoms. BDI-II = Beck Depression Inventory-II. GDS = Geriatric Depression Scale. PCL-C = PTSD Checklist-Civilian Version. BAI = Beck Anxiety Inventory. ASI = Anxiety Sensitivity Index. PSRS = Phobic Stimuli Response Scales.
Correlations of |.12| and greater are significant at $p < .05$, 2-tailed for college students. Correlations of |.15| and greater are significant at $p < .05$, 2-tailed for older adults.

Table 6

Fit Indices for Models of Sleep Complaints (Study 2)

Model	*df*	χ^2	NFI	CFI	GFI	SRMR	RMSEA
One content factor	42	111.52	.912	.942	.937	.065	.079
Two content factors	41	76.10	.940	.971	.956	.054	.057

Note. n = 266. *df* = degrees of freedom. NFI = normed fit index. CFI = comparative fit index. GFI = goodness-of-fit index. SRMR = standardized root-mean-square residual. RMSEA = root-mean-square error of approximation.

Table 7

Factor Structure of Sleep Measures in Patients (Study 2)

Scales	Content Factor I (Insomnia)	Content Factor II (Lassitude)	Method Factor I (IDAS)	Method Factor II (PSQI)
IDAS Insomnia	**.83**	.00	-.14	.00
PSQI Poor Sleep Quality	**.81**	.00	.00	.16
IDAS-CR Insomnia	**.66**	.00	**-.31**	.00
PSQI Short Sleep Duration	**.64**	.00	.00	**.49**
PSQI Sleep Latency	**.64**	.00	.00	-.04
PSQI Poor Sleep Efficiency	**.56**	.00	.00	**.42**
PSQI Sleep Disturbances	**.53**	.00	.00	-.05
PSQI Sleeping Medication	**.39**	.00	.00	-.11
IDAS Lassitude	.00	**.88**	**.36**	.00
PSQI Daytime Dysfunction	.00	**.63**	.00	-.10
IDAS-CR Lassitude	.00	**.62**	.17	.00
IDAS Hypersomnia	.00	**.32**	**.68**	.00

Note. n = 266. Factor loadings of |.30| and greater are highlighted. IDAS = Inventory of Depression and Anxiety Symptoms. PSQI = Pittsburgh Sleep Quality Index. IDAS-CR = Clinician Rating version of the IDAS.

Table 8

Correlations of Lassitude and Insomnia Factors with Temperament, Depression, and Anxiety (Study 2)

Measure	Lassitude	Insomnia
Temperament Scales		
PANAS-X Negative Affect	.48	.41
BFI Neuroticism	.43 [a]	.39 [a]
PANAS-X Positive Affect	-.35	-.25
BFI Extraversion	-.20 [a]	-.16 [a]
Depression Scales		
IDAS Dysphoria	.64	.52
BDI-II	.55	.45
Anxiety Scales		
IDAS Panic	.49 [a]	.45 [a]
BAI	.45 [a]	.46 [a]
IDAS Social Anxiety	.44 [a]	.39 [a]
IDAS Traumatic Intrusions	.37 [a]	.37 [a]
PSRS Social Fears	.29 [a]	.27 [a]

Note. $n = 565$. All correlations are significant at $p < .01$. Within a row, correlations differ from one another ($p < .05$, 1-tailed), unless marked with the same superscript. PANAS-X = Positive and Negative Affect Schedule-Expanded Form. BFI = Big Five Inventory. IDAS = Inventory of Depression and Anxiety Symptoms. BDI-II = Beck Depression Inventory-II. BAI = Beck Anxiety Inventory. PSRS = Phobic Stimuli Response Scales.

Table 9

Correlations of Lassitude and Insomnia Factors with Diagnoses of Depression and Anxiety Disorders (Study 2)

Diagnosis	Lassitude	Insomnia
MDD	.43	.36
Panic disorder	.28 [a]	.26 [a]
GAD	.21 [a]	.26 [a]
PTSD	.20 [a]	.26 [a]
Social phobia	.18 [a]	.15 [a]

Note. $n = 604$. All correlations are significant at $p < .01$. Within a row, correlations differ from one another ($p < .05$, 1-tailed), unless marked with the same superscript. MDD = major depression. GAD = generalized anxiety disorder. PTSD = posttraumatic stress disorder.