ISSN: 1541-745X *www.idrjournal.com*

Some Correlates of Sleep Disturbance Ascribed to Worry

William E. Kelly*
George Fox University

ABSTRACT - This article reports preliminary tests of a theoretical framework for individual differences in the attribution of sleep disturbance to worry. Using the Sleep Disturbance Ascribed to Worry Scale (SAW), the author conducted two correlational studies. Study 1 found that sleep disturbance attributed to worry was related to increased worry, perceptions of stress, anxiety and decreased life satisfaction and happiness. Study 2 replicated the correlations with stress, worry, and anxiety and found that sleep disturbance attributed to worry also was related to increased negative affect and depression as well as decreased self-esteem. Study 2 also demonstrated that sleep disturbance attributed to worry could be considered separate from anxiety, general sleep disturbance, and worry. The results were consistent with the theoretical framework. Limitations of the present studies and suggestions for future research are discussed.

Key Words: Worry, Sleep Disturbance, Anxiety, Insomnia

Previous research suggests a relationship between worry and subjective sleep disturbance (Means, Lichstein, Epperson, & Johnson, 2000; Nicassio, Mendlowitz, Fussell, & Petras, 1985). Other research indicates that in addition to a general relationship between these two variables, a substantial number of individuals attribute sleep disturbance to worry (Lichstein & Rosenthal, 1980; Wicklow & Espie, 2000). There is also evidence to suggest that individuals who attribute sleep disturbance to worry have unique perspectives and experiences when compared to others (Watts, Coyle, & East, 1994).

Despite the apparent relationship between these two variables, studies directly investigating the attribution of sleep disturbance to worry are rare. Kelly (2002a) found that sleep disturbance attributed to worry positively related to worry and negatively related to sleep quantity and quality. Kelly (2002b) found that sleep disturbance attributed to worry was negatively correlated with sense of humor, especially humor production. However, outside of these limited findings, little is known about individual differences in the attribution of sleep disturbance

*William E. Kelly, Ph.D.; Graduate Department of Counseling; George Fox University; 12753 S.W. 68th Avenue; Portland, OR 97223; billkellyphd@yahoo.com (email).

to worry. Knowledge about the characteristics and experiences of individuals who attribute sleep disturbance to worry could provide useful information for better identifying, understanding, and eventually developing clinical interventions specifically tailored to this population.

To provide a springboard for research on this topic, in this article I provide a theoretical framework, and report some preliminary findings which partially test the theory. It is tentatively proposed that sleep disturbance attributed to worry may be accounted for by the following theoretical framework. Initially, individuals who develop sleep disturbance attributed to worry likely possess negative beliefs about the self and a lack of confidence that they can cope with stressors (see Baumgardner, 1990). When they encounter stressors, these individuals have decreased self-esteem, which is needed to serve as a buffer against stressors. Without self-esteem and beliefs that they can manage stressors, they experience an increase in somatic arousal and anxiety (Greenberg et al., 1992). Physiological arousal, in turn, would likely diminish peaceful sleep (Bearpark, 1994). Hence, individuals reporting sleep disturbance attributed to worry might experience a decrease in sleep duration and quality (Kelly, 2002a). The subjective decrease in sleep may not reflect objective findings of sleep disturbance, however (Edinger et al., 2000; McCall & Edinger, 1992). It is also likely that individuals experiencing increased anxiety and somatic tension experience a general tendency to worry, especially when experiencing increased stress (Borkovec, Shadick, & Hopkins, 1991; Gana, Martin, & Canouet, 2001; Russell & Davey, 1993).

Low sleep quantity and quality, increased perceptions of sleep disturbance, and a general tendency to worry may combine psychologically to produce sleep disturbance attributed to worry through a form of the covariation principle: the attribution of a behavior or experience to a causal factor if that factor was present when the behavior occurred (Kelley, 1967; Kelley, 1972). In other words, individuals who worry may attribute their subjective sleep disruption to their commonly experienced worry. However, the underlying basis for both worry and sleep disturbance separately is increased somatic arousal and tension[1]. Alternatively, sleep disruption may be due to poor sleep habits and substance induced sleep disruption (i.e., caffeine) alone or in addition to anxiety-based somatic arousal. A tendency to worry, general negative affect along with decreases in subjective well-being (for a discussion of this topic see Diener & Seligman, 2002), and heightened perceptions of stress and anxiety may serve to maintain a subjective sleep disturbance and perhaps an ongoing belief that worry is disrupting sleep.

This theoretical framework does not dispute the notion that worry sometimes might directly disrupt sleep (Nicassio et al., 1985). Indeed, worry might be considered a cognitive activity that could counteract the low cognitive arousal needed for sleep in some instances. This theory does posit, however, that *habitual* sleep disturbance attributed to worry is better accounted for by the covariation principal framework presented herein. As a preliminary test of this theoretical framework, I conducted two studies to determine whether or not some of the variables theorized to relate do indeed relate to sleep disturbance attributed to worry.

Study 1

According to the theoretical framework in this article, sleep disturbance attributed to worry is associated with a tendency to worry. The experience of trait worry coincides with anxiety and perceptions of stress. Theoretically, these three variables are foundational for sleep disturbance attributed to worry to develop. Thus, sleep disturbance attributed to worry should be positively related to worry, anxiety, and stress. Additionally, decreased subjective well-being was theorized to be associated with sleep disturbance attributed to worry as a maintaining factor. Psychological well-being, therefore, should be negatively related to sleep disturbance attributed to worry. Finally in this study, I wanted to ascertain whether or not the scale used to measure sleep disturbance attributed to worry was correlated with social desirability, a potential confound of self-report measures (Anastasi, 1988).

Method

Ninety-five university students enrolled in graduate and undergraduate courses voluntarily completed a measure of sleep disturbance attributed to worry and several additional measures listed below. The sample included 70 females and 25 males with an average age of 26.5 ($SD = 9.1$). Hypotheses were not disclosed until after participants completed the questionnaires.

As a measure of sleep disturbance attributed to worry, I used the 5-item Sleep Disturbance Ascribed to Worry Scale (SAW; Kelly, 2002a). The SAW was developed as a brief measure of the attribution of sleep disturbance to worry. SAW items (i.e., "How often do you awaken from your normal sleeping time and are completely unable to return to sleep because of worry?") were developed based on ascribing insomnia symptoms, as described in the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV; American Psychiatric Association, 1994), to worry. Kelly (2002a) reported that the SAW measured a single factor accounting for 62.5% of the variance in responses and had a coefficient alpha of .85. The SAW was administered using an 11-point anchored response scale (0 = never; 10 = very often). Higher scores indicated greater levels of sleep disturbance attributed to worry.

Additional measures used in this study included the following:

(1) The 25- item version of the Worry Domains Questionnaire (WDQ; Tallis, Eysenck, & Mathews, 1992) presented in Tallis, Davey, & Bond (1994), as a measure of worry frequency. The WDQ assesses worry frequency across 5 content domains. Participants respond to how much they worry about several topics (i.e., "that others will not approve of me" and "that I cannot afford to pay my bills") on a scale ranging from 1 = "not at all" to 5 = "extremely." Higher scores indicate more worry frequency.

(2) The 16-item Penn State Worry Questionnaire (PSWQ; Meyer, Miller, Metzger, & Borkovec, 1990), which assesses general pathological worry. Participants respond to general items ("Once I start worrying I can't stop") on a 5-point scale ranging from 1 = "strongly disagree" to 5 = "strongly agree." Higher scores indicate more general worry.

(3) The State-Trait Anxiety Inventory - Trait (STAI; Speilberger, 1983). The STAI includes 20-items which measure trait anxiety. Participants respond to items ("I am inclined to take things hard") as they *generally* feel on a 4-point scale ranging from 1 = "almost never" to 4 = "almost always." Higher scores indicate more anxiety.

(4) The short version of the Perceived Stress Scale (PSS; Cohen, Karmarck, & Mermelstein, 1983). The short PSS includes 4-items which assess the experience of stress over the past 90 days. Participants responded to items ("How often have you felt that you were unable to control the important things in your life") using a 5-point scale ranging from 1 = "never" to 5 = "very often." Higher scores indicate greater stress.

(5) The Satisfaction With Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985) which includes 5-items measuring general life satisfaction. Responses to items ("I am satisfied with my life") are made using a 7-point scale ranging from 1 = "strongly disagree" to 7 = strongly agree." Higher scores represent greater life satisfaction.

(6) Fazio's (1977) single-item measure of happiness on which participants described their general, overall state of happiness. Responses were made to Fazio's question using an 11-point scale ranging from "not at all happy" to "very happy."

(7) The 33-item Marlowe-Crowne Social Desirability Scale (Crowne & Marlowe, 1964), which measures the tendency to respond in a socially desirable manner. Participants responded to items ("I am always courteous, even to people who are disagreeable") using a "true" or "false" format.

All of the aforementioned instruments have been validated and possess adequate reliability. The SAW is the only instrument noted above which has had limited validation.

Results and Discussion

The coefficient alpha of the SAW in the current sample was .87. There were no significant gender differences for SAW scores, $t\,(93) = .97$, $p = .33$ and age did not significantly correlate with SAW scores, $r = .09$, $p = .41$. Thus, further analyses were conducted regardless of gender or age. Pearson correlation coefficients between the SAW and the other measures administered in this study, along with their internal consistencies, are presented in Table 1.

As seen in the table, there was evidence of significant relationships between the SAW and scores from six of the other measures used in this study. Individuals endorsing more sleep disturbance attributed to worry reported significantly less life satisfaction and happiness and more worry frequency, pathological worrying, perceived stress, and trait anxiety. SAW scores were not significantly related to social desirability, indicating that the SAW was not evoking a social desirability response set. The correlation results in this study were consistent with the theoretical framework for sleep disturbance attributed to worry presented earlier in this article.

Table 1

Correlations Between the SAW and Other Measures in Study 1

Scale	Correlation with SAW	α
Worry Domains (WDQ)	.49**	.93
General Worry (PSWQ)	.49**	.91
Trait Anxiety (STAI)	.53**	.91
Stress (PSS)	.59**	.71
Life Satisfaction (SWLS)	-.41**	.88
Happiness	-.26*	---
Social Desirability	-.08	.76

Note: $N = 95$. * $p < .01$ ** $p < .001$.

Study 2

For Study 2, I chose to use the WDQ and PSS again in order to replicate a portion of Study 1. Additionally, I included a different anxiety scale which appeared to reflect somatic anxiety more than the STAI. This was done because the theoretical framework suggests that increased physiological arousal would be associated with sleep disturbance attributed to worry. According to the theoretical model, a basic building block for sleep disturbance attributed to worry are negative beliefs about the self and one's abilities to cope. Thus, sleep disturbance attributed to worry should negatively relate to self-esteem. Further, the experience of stress and somatic anxiety elicits the sleep disturbance that coincides with worry. Therefore, sleep disturbance attributed to worry should positively relate to sleep disturbance. The theory also posits that sleep disturbance attributed to worry relates to general negative affect as a maintaining factor. Thus, sleep disturbance attributed to worry should positively relate to negative affect and dysphoria. Because sleep disturbance has sometimes been associated with poor performance (Morin, 1993), I included a measure of academic performance for exploratory purposes.

Method

Undergraduate students ($N = 117$), 47 males and 70 females, voluntarily completed the measures described below. The average age of the sample was 23.9 ($SD = 5.8$). Again, participants were not informed of the hypotheses of the study until after returning questionnaires.

The SAW, WDQ, and PSS were administered using the same format as presented in Study 1. Additional measures used in this study included the following:

(1) The Negative Affect Scale of the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988), which includes 10-items measuring the experience of negative emotions. The PANAS was administered in its trait form. Participants responded to items (i.e., "distressed" and "afraid") using a 5-point

scale ranging from 1 = "strongly disagree" to 5 = "strongly agree." Higher scores denote a greater tendency to experience negative affect.

(2) The Costello-Comrey Anxiety and Depression scales (Costello & Comrey, 1967). The anxiety scale includes 9-items and appears to reflect somatic anxiety ("I am a tense 'high-strung' person"). The depression scale consists of 14 items measuring dysphoria ("I feel blue and depressed"). Participants responded to items using a 9-point scale ranging from 1 = "never" to 9 = "always." Higher scores for each scale denote greater anxiety or depression.

(3) The Rosenberg Self-Esteem Scale (Rosenberg, 1965), which includes 10-items assessing positive attitudes towards oneself ("I feel that I have a number of good qualities"). Responses were based on a 4-point scale ranging from 1 = "strongly disagree" to 4 = "strongly agree." Higher scores indicate more self-esteem.

(4) Overall college GPA was self-reported as a measure of academic performance.

(5) Subjective sleep disturbance was measured by asking participants to respond "yes" or "no" to 10 questions based on those used by Means et al. (2000), which they developed from the International Classification of Sleep Disorders diagnostic criteria (American Sleep Disorders Association, 1990). Participants were asked to answer based on a "typical" night. The questions assessed sleep latency of 30 minutes or greater; awakening during the night for 30 minutes or greater; early awakenings with difficulty returning to sleep; dissatisfaction with sleep; difficulty functioning during the day because of poor sleep; frequent nightmares or bad dreams; restlessness during sleep; feeling tired upon arising from sleep; considering oneself an insomniac; and sleep problem duration of at least 2 months. "No" was scored as 0 and "yes" was scored as 1. Responses to these questions were summed to produce a continuous scale with higher scores indicating more symptoms of sleep disturbance.

Results and Discussion

The internal consistency of the SAW in the current sample was .89. As in Study 2, there were no significant gender differences in SAW scores, $t\,(114) = .29$, $p = .77$, and the SAW did not significantly correlate with age, $r = .12$, $p = .19$. Correlations between the SAW and the other variables used in this study are presented in Table 2.

As shown in the table, the SAW again correlated with worry and stress. The SAW correlated with anxiety: thus demonstrating a relationship with what is presumably somatic anxiety. The SAW was significantly positively related to depression, negative affect, the measure of subjective sleep disturbance, and negatively related to self-esteem. In the current sample, SAW scores were unrelated to self-reported GPA. This finding is somewhat reflective of inconsistencies in previous findings that sleep disturbance sometimes has and sometimes has not related to lower levels of performance (Bearpark, 1994). Future research should examine the possible relationship between sleep disturbance attributed to worry and performance more closely using better measures of performance.

Table 2

Correlations Between the SAW and Other Measures in Study 2

Scale	Correlation with SAW	α
Worry (WDQ)	.35*	.94
Sleep Disturbance	.49*	.75
Negative Affect	.41*	.87
Depression	.39*	.88
Anxiety	.44*	.86
Stress	.41*	.77
Self-Esteem	-.31*	.88
GPA	-.02	---

Note: $N = 117$. GPA = Grade Point Average. * $p < .001$.

To investigate the extent to which sleep disturbance attributed to worry can be considered separate from anxiety, general sleep disturbance, and worry, a series of partial correlations were calculated. First, holding worry constant, the SAW continued to significantly relate to anxiety ($r = .30, p < .001$) and general sleep disturbance ($r = .40, p < .0001$). While holding anxiety constant, the SAW remained significantly correlated with sleep disturbance ($r = .39, p < .0001$), but not with worry ($r = .13, p = .18$). Finally, while holding sleep disturbance constant, the SAW remained significantly correlated with both anxiety ($r = .32, p < .001$) and worry ($r = .19, p < .04$). Based on these results, it appears that, worry, anxiety, and general sleep disturbance can generally be considered separate constructs. These findings are consistent with those of Kelly (2002c). Also, these results support the theoretical framework. For instance, the finding that the variables were separate, but related, allows for a covariation effect, rather than all variables being manifestations of only one construct. Interestingly, after accounting for anxiety, the SAW no longer significantly related with worry. This finding calls into question the direct influence of general worry on sleep disturbance attributed to worry. Based on the results of this study, it would appear that individuals who attribute sleep disturbance to worry do need to commonly experience worry. However, they may need *not* experience worry simultaneously with anxiety and sleep disturbance to attribute sleep disturbance to worry. This provides some support for the theoretical framework presented in this article.

Overall, the results of Study 2 were consistent with the theoretical notion that sleep disturbance attributed to worry may be impacted by decreased self-esteem and increased anxiety and stress. Also, these findings leave open the possibility that worry and sleep disturbance, which both correlated with sleep disturbance attributed to worry, produce this phenomenon through a form of the covariation principle. The relationship between sleep disturbance attributed to worry and negative affect was consistent with the possibility that negative affect is a maintenance factor for sleep disturbance attributed to worry .

General Discussion

The purpose of this article was to provide a foundation for understanding individual differences in sleep disturbance attributed to worry and partially test a theoretical framework. As such, the findings of the two studies reported here make at least three contributions to the literature. First, the consistency of the correlates of sleep disturbance attributed to worry with the theoretical framework provide some support for the theory. Second, and relatedly, the findings of several individual differences for those who endorsed higher sleep disturbance attributed to worry was supportive of the notion that individuals who attribute sleep disturbance to worry have unique perspectives and experiences. Third, these studies provide support for the construct validity of the SAW as a measure of sleep disturbance attributed to worry as evidenced by relations to theoretically related constructs.

The present research was intended as a preliminary test of a newly posited theory for sleep disturbance attributed to worry, not to "prove" the theory. Much additional research will be required to adequately test, and revise if needed, the theory. Such an undertaking will require several studies using methodologies more advanced than those used in the current studies. The results of the present studies do, however, provide some interesting findings which warrant further examination.

The two studies presented in this article have several limitations including methodology and sampling difficulties. Methodologically, these studies used simple correlations. As such, the findings do not indicate a causal relationship. Further, shared variance among the constructs under consideration in these studies need to be accounted for to determine which variables best predict sleep disturbance attributed to worry. Sampling difficulties include the use of relatively small college student samples. Further research using larger samples is needed to replicate and expand the findings reported in this article. Clinical samples may be useful to understand better more severe forms of sleep disturbance attributed to worry.

An important area for future research will be to test the theoretical assertion that worry and sleep disturbance combine through a form of the covariation principle to produce. As such, future research might include measures of general somatic arousability, pre-sleep cognitions, and sleep disturbance to identify which variables best account for sleep disturbance attributed to worry. Sleep diaries might be a helpful tool in studying this phenomenon as well.

References

American Psychiatric Association (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.

American Sleep Disorders Association (1990). *The international classification of sleep disorders: Diagnostic and coding manual.* Rochester, MN: Author.

Anastasi, A. (1988). *Psychological testing* (6th ed). New York: Macmillan.

Baumgardner, A. H. (1990). To know oneself is to like oneself: Self-certainty and self-affect. *Journal of Personality and Social Psychology, 58,* 1062-1072.

Bearpark, H. M. (1994). Insomnia: Causes, effects, and treatment. In R. Cooper (Ed.), *Sleep* (587-613). New York: Chapman & Hall.

Borkovec, T. D., Shadick, R. N., & Hopkins, M. (1991). The nature of normal and pathological worry. In R. M. Rapee & D. H. Barlow (Eds.), *Chronic anxiety: Generalized anxiety*

disorder and mixed anxiety-depression (pp. 29-51. New York: Guilford Press.
Cohen, S., Karmarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior, 24,* 386-396.
Costello, C. G., & Comrey, A. L. (1967). Scales for measuring depression and anxiety. *Journal of Psychology, 66,* 303-313.
Crowne, D. P., & Marlowe, D. (1964). *The approval motive.* New York: Wiley.
Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The Satisfaction With Life Scale. *Journal of Personality Assessment, 49,* 71-75.
Diener, E., & Seligman, M. E. P. (2002). Very happy people. *Psychological Science, 13,* 81-84.
Edinger, J. D., Fins, A. I., Glenn, M., Sullivan, R. J., Bastian, L. A., Marsh, G. R., Dailey, D., Hope, T. V., Young, M., Shaw, E., & Vasilas, D. (2000). Insomnia and the eye of the beholder: Are there clinical markers of objective sleep disturbances among adults with and without insomnia complaints? *Journal of Consulting and Clinical Psychology, 68,* 586-593.
Fazio, A. F. (1977). A concurrent validation study of the NCH1 general well-being schedule. (Dept. Of HEW publication number HRA-78-1347) Hyattsville, MD: National Center for Health Statistics.
Gana, K., Martin, B., & Canouet, M. (2001). Worry and anxiety: Is there a causal relationship? *Psychopathology, 34,* 221-229.
Greenberg, J., Solomon, S., Pyszczynski, T., Rosenblatt, A., Burling, J., Lyon, D., Simon, L., & Pinel, E. (1992). Why do people need self-esteem? Converging evidence that self-esteem serves an anxiety-buffering function. *Journal of Personality and Social Psychology, 63,* 913-922.
Kelley, H. H. (1967). Attribution theory in social psychology. In D. Levine (Ed.), *Nebraska symposium on motivation* (Vol. 15, pp. 192-238). Lincoln, NB: University of Nebraska Press.
Kelley, H. H. (1972). Attribution in social interaction. In E. E. Jones, D. E. Kanouse, H. H. Kelley, R. E. Nisbett, S. Valins, & B. Weiner (Eds.). *Attribution: Perceiving the causes of behavior* (pp. 1-26). Morristown, NJ: General Learning Press.
Kelly, W. E. (2002a). Worry and sleep length revisited: Worry, sleep length, and sleep disturbance ascribed to worry. *Journal of Genetic Psychology, 163,* 296-304.
Kelly, W. E. (2002b). Correlations of sense of humor and sleep disturbance ascribed to worry. *Psychological Reports, 91,* 1202-1204.
Kelly, W. E. (2002c). *Sleep disturbance attributed to worry is distinguishable from general worry and insomnia.* Presented at the 14th meeting of the American Psychological Society, New Orleans, LA.
Lichstein, K. L., Rosenthal, T. L. (1980). Insomniacs' perceptions of cognitive versus somatic determinants of sleep disturbance. *Journal of Abnormal Psychology, 89,* 105-107.
McCall, W. V., & Edinger, J. D. (1992). Subjective total insomnia: An example of sleep state misperception. *Sleep, 15,* 71-73.
Means, M. K., Lichstein, K. L., Epperson, M. T., & Johnson, C. T. (2000). Relaxation therapy for insomnia: Nighttime and day time effects. *Behaviour Research and Therapy, 38,* 665-678.
Meyer, T. J., Miller, M. L., Metzger, R. L., & Borkovec, T. D. (1990). Development and validation of the Penn State Worry Questionnaire. *Behaviour Research and Therapy, 28,* 487-495.
Morin, C. M. (1993). *Insomnia: Psychological assessment and management.* New York: Guilford Press.
Nicassio, P. M., Mendlowitz, D. R., Fussell, J. J., & Petras, L. (1985). The phenomenology of the pre-sleep state: The development of the pre-sleep arousal scale. *Behviour Research and Therapy, 23,* 263-271.
Rosenberg, M. (1965). *Society and the adolescent self-image.* Princeton, NJ: Princeton University Press.
Russell, M., & Davey, G. C. L. (1993). The relationship between life event measures and anxiety and its cognitive correlates. *Personality & Individual Differences, 14,* 317-322.

Spielberger, C. C. (1983). *State-trait anxiety inventory*. Palo Alto, CA: Consulting Psychologists Press.

Tallis, F., Davey, G. C. L., & Bond, A. (1994). The Worry Domains Questionnaire. In G. Davey & F. Tallis (Eds.), *Worrying: Perspectives on theory, assessment and treatment* (pp. 286-297). New York: John Wiley & Sons.

Tallis, F., Eysenck, M., & Mathews, A. (1992). A questionnaire for the measurement of nonpathological worry. *Personality and Individual Differences, 13*, 161-168.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54*, 1063-1070.

Watts, F. N., Coyle, K., & East, M. P. (1994). The contribution of worry to insomnia. *British Journal of Clinical Psychology, 33*, 211-220.

Wicklow, A., & Espie, C. A. (2000). Intrusive thoughts and their relationship to actigraphic measurement of sleep: Towards a cognitive model of insomnia. *Behaviour Research and Therapy, 38*, 679-693.