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### Recommended Citation

Davison, Cameron and Diez, Engracia, "Anxiety, Sleep & Coping: A Survey on College Students" (2023).  
*Psychology Student Scholarship*. 3.  
<https://scholarworks.seattleu.edu/psychology-stdt/3>

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**Anxiety, Sleep & Coping: A Survey on College Students**

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August 7, 2022

### **Abstract**

Anxiety is the most common mental health concern within the collegiate population and is compounded by the fact that, as displayed by past research, about 60% of college students experience trouble with sleep. This coincides with the fact that anxiety and sleep issues are often found to be linked. A third variable, coping style, is influential to one's psychological status and thus this research sets out to investigate if coping style moderates and/or mediates the relationship between sleep and anxiety. Coping style is separated into three different categories: problem-focused, emotion-focused, and avoidant. The 71 individuals that made up this study's sample completed a survey composed of the GAD-7, PSQI, and the Brief-COPE. As expected, the results of this research found a small, significant, positive correlation between level of anxiety and sleep troubles ( $r = .29$ ). However, neither problem-focused, emotion-focused, or avoidant coping styles were found to have a significant moderating or mediating effect on the relationship between anxiety and sleep. While these results were insignificant, this study recommends further investigation into coping within the relationship of anxiety and sleep.

## Introduction

Anxiety and poor sleep quality are both widespread issues within the United States that affect large portions of the population (Ramsawh et al., 2009). College students, in particular, are experiencing a growing prevalence of anxiety as it continues to be the most common mental health concern within this population (Doane et al., 2014). The transition to college specifically is a significant shift in the lives of adolescents, which has shown a rise in anxiety (Doane et al., 2014). Academic, financial, and social stressors are a few factors that have been found to be linked to anxiety in college students (Jones et al., 2018). In addition to anxiety, about 60% of college students experience trouble with sleep, including insomnia, which can lead to a number of negative side effects (Cifre et al., 2020). The busy schedules of college students often result in limited hours that they are able to sleep, which in turn can lead them to acquiring sleep debt (cumulative sleep one must catch up on) and lower quality sleep. Sleep dysfunction, in addition to higher levels of sleep debt, are linked to the inhibition of executive functioning (Cifre et al., 2020). Both anxiety and poor sleep are linked to issues such as poor academic performance and overall mental health quality (Cifre et al., 2020; Jones et al., 2018). Understanding of the circumstances leading to these issues within this population is, however, limited within literature (Cifre et al., 2020; Jones et al., 2018).

The prevalence of both anxiety and sleep issues within the collegiate population is not surprising. Individuals who experience anxiety have been found to be more likely to experience poor sleep quality, sleep disturbances and insomnia (Chellappa & Aeschbach, 2022). This coincides with research displaying a strong association between anxiety and sleep quality (Johnson et al., 2006; Ramsawh et al., 2009). Johnson et al. (2006) finds that, within adolescents, anxiety more often predicts insomnia than vice versa; however, it is posited that this may change

as adolescents move into adulthood. This is reinforced by research which shows that insufficient sleep can instigate or exacerbate anxiety (Chellappa & Aeschbach, 2022). As such, although there is limited research surrounding the directionality around this relationship, it is possible that there is a bidirectional link between sleep and anxiety (Chellappa & Aeschbach, 2022; Johnson et al. 2006). As this relationship likely exists, regardless of directionality, within the collegiate population it is important for more research that investigates moderating and mediating factors.

The purpose of this study is to investigate coping as both a potential moderating and mediating factor to the sleep and anxiety relationship within the college population. The way that individuals cope with stressors can determine how much of an impact stress has on them and their mental well-being. The limited research on this topic tends to focus on adolescents, and thus the collegiate population is one of particular interest (Xiong et al., 2019). Research has shown that while positive coping styles are more likely to lead to a decrease in anxiety symptoms, avoidance and denial are the most common coping styles used by individuals with anxiety (Agha, 2021). Compounded with poor sleep quality, anxiety symptoms are prompted to increase even further with negative coping styles. Within this research, sleep quality was found to be a mediating factor between negative coping style and sleep quality (Xiong et al., 2019). There is less research looking at different coping styles as moderating factors towards the anxiety and sleep relationship. It is because sleep quality is sensitive to psychological status and coping style greatly influences psychological status that we intend to fill this gap (Fu et al., 2020; Xiong et al., 2019).

Coping styles are categorized in a multitude of ways. What is considered a positive or negative coping style is very broad and open for debate. In addition, coping style categories are often broken down into smaller categories as in Carver (1997). This study will use three

categories of coping style; problem-focused, emotion-focused, and avoidant coping. Problem-focused coping styles are those in which aim to change a stressful situation and emotion-focused coping styles are those which aim to regulate emotions associated with a stressor. These types of coping styles are typically considered positive whereas the third type, avoidant coping styles (those which aim to disengage or distract from a stressor), are typically considered negative (Agha, 2021; Buchanan, 2021; Dias et al., 2012).

As college is a life stage with unique and abundant stressors which can lead to decreased sleep quality and heightened anxiety, we (1) expect to find a positive association between sleep issues and levels of anxiety. We furthermore (2) expect that coping style will moderate the relationship between anxiety and sleep quality with (a) emotion-focused and problem-focused styles leading to greater sleep quality and less anxiety and (b) avoidant coping styles leading to worse sleep quality and greater anxiety. Lastly, we (3) expect that coping style will mediate the relationship between anxiety and sleep quality.

## **Methods**

### **Procedure**

After consenting to participation and that they are at least 18 years of age, participants proceeded to read instructions for the survey experiment. It began with four demographics questions including age, gender, race/ethnicity, and class standing. Following this section were two control questions which asked the participant to state how many days a week they consume caffeine and the amount of screen time they believe to spend on an electronic device (screen time). The next survey they encountered was the *Generalized Anxiety Disorder 7* (GAD-7), which gave the participant instructions to select how much they have been affected by various anxiety problems over the past 2 weeks (Spitzer, et al., 2006). After completing this short seven

question survey, they went on to complete the *Pittsburgh Sleep Quality Index* (PSQI) (Buysse, et al., 1989). This presents instructions to answer questions based on one's typical sleep habits and then select the answer that best matches one's experience with trouble sleeping in the past month. Finally, the participants were instructed to complete the *Coping Orientation to Problems Inventory* (Brief-COPE) scale where they were asked how they cope with hardship in their life, according to various statements (Carver, 1997). Individuals could withdraw participation at any point in the survey.

## **Participants**

One hundred fifteen individuals were approached through SONA (an online college survey tool), social media, and other social connections to take our Qualtrics survey. Seventy-five of these individuals completed the survey. Of these, 4 were removed from the sample as they failed to complete important measures on the survey. Of the remaining 71 participants that compose our sample, 19 identify as male (26.8%), 50 as female (70.4%) and 2 as non-binary/third gender (2.8%). This includes 2 Native American (5.6%), 11 Asian (15.5%), 1 Black (1.4%), 50 White (70.4%), and 5 Biracial (7.0%); 11 of these participants identified as Hispanic (15.5%). Of these, 14 are Freshmen (19.7%), 9 are Sophomores (12.7%), 22 are Juniors (31%) and 26 are Seniors (36.6%). The average age of participants was 20.37 years ( $SD = 1.42$ ).

## **Measures**

### ***Demographics***

**Age.** Age was measured on a continuous scale. Each participant was required to report their age in years.

**Gender.** Gender was measured on a nominal scale. Participants were asked to choose between 5 options: Woman, Man, Non-binary/third gender, prefer not to say, and prefer to self-describe. Participants who chose prefer to self-describe were able to fill in their desired answer.

**Race/ethnicity.** Race and ethnicity were combined and measured on a nominal scale; participants were asked to select all options that applied. Participants were given 9 options to choose from: American Indian or Alaska Native, Asian, Black or African American, Native Hawaiian or Other Pacific Islander, White, Hispanic, don't know, prefer not to say, and prefer to self-describe.

**Class Standing.** Class standing was measured on a nominal scale. As we are collecting information only from college students this question is in reference to the students' class standing in college. Class standing was measured not by year but by number of credits; as such each participant had 4 options to choose from: Freshman (0-44 Credits), Sophomore (45-89 Credits), Junior (90-134 Credits), and Senior (135+ Credits).

### ***Controls***

**Caffeinated Beverage Consumption.** Caffeinated beverage consumption was measured on a continuous scale. As caffeine has effects on both anxiety and sleep quality this was asked in order to control for effects it may have on our study (Faris et al., 2017). Participants were asked to assign a number to how many days of the week they consumed caffeine.

**Screen Time.** Screen time was recorded on a nominal scale. As screen time has effects on both anxiety and sleep quality this was asked in order to control for effects it may have on our study (Feng et al., 2014). Participants were asked to choose between 6 options: less than 1 hour, 1-2 hours, 2-4 hours, 4-7 hours, 7-10 hours, and more than 10 hours.

### ***Main Scales***



**Anxiety.** Anxiety was measured using the *Generalized Anxiety Disorder 7* scale (GAD-7). The GAD-7 is a well validated seven-item scale developed by Spitzer et al. (2006) that refers participants to answer how often they have been experiencing the 7 items over the last weeks. Each item is scored from 0 to 3 in parallel to the following answers: not at all, several days, over half the days, or nearly every day. Scores range from 0-21; scores of 0-4 are considered to have no anxiety, scores 5-9 are considered to have mild anxiety symptoms, scores of 10-14 are considered to have moderate anxiety, scores of greater than 15 are considered to have severe anxiety (Fu et al., 2020). Average GAD-7 score was 9.01 ( $SD = 5.43$ ) within this study (Cronbach's  $\alpha$  in this sample = .90). This score is consistent with other studies of medical students in Brazil (Sartorão et al., 2020;  $M = 9.18$ ,  $SD = 4.5$ ) or students in the US at this time (Wang et al., 2020,  $M = 10.1$ ,  $SD = 5.6$ ). The current sample is on the upper threshold in of mild anxiety.

**Sleep Quality.** Sleep quality was measured using a modified Pittsburgh Sleep Quality Index (PSQI). The PSQI is a well validated 19-item measure of sleep developed by Buysse et al. (1989). The modified PSQI has 17 items; these items combine to form seven “component” scores and one global score. Each component score is from 0 to 3 and are labeled as follows: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction. These scores are combined to form the global score which ranges from 0 to 21 points with “0” indicating no difficulty and “21” indicating severe difficulties in all areas (Buysse et al., 1989). Average PSQI score was 7.63 ( $SD = 3.08$ ) within this population (Cronbach's  $\alpha$  in this sample = .58). This average is notably higher than displayed in pre-COVID-19 research ( $M = 5.64$ ,  $SD = 2.79$ ; Dietch et al., 2016).

**Coping style.** Coping was measured using the Coping Orientation to Problems Experienced Inventory (Brief-COPE). This 28-item scale, originally developed by Carver (1997), was designed using a 14-factor model. For the purpose of generalizability, we did not use the original scale factors but will be using a well validated three factor model as developed by Dias (2012) and cited in Buchanan (2021). These three factors are as follows: problem-focused coping (Cronbach's  $\alpha$  in this sample = .81), emotion-focused coping (Cronbach's  $\alpha$  in this sample = .68), and avoidant coping (Cronbach's  $\alpha$  in this sample = .68). Participants were asked to focus on their current most impactful stressor and are asked to place each item on a 4-point Likert scale ranging from "I have not been doing this at all" to "I've been doing this a lot". Within this study, average level of problem-focused coping was 2.69 ( $SD = .59$ ); average level of emotion-focused coping was 2.47 ( $SD = .43$ ); average level of avoidant coping was 1.97 ( $SD = .47$ ).

#### Research questions

Preliminary analyses were performed to ensure no violation of the assumptions of normality, linearity, and homoscedasticity. The use of the Process program in SPSS (Hayes, 2012) directed the specific for both the moderation and mediation analysis. Briefly a moderation model will examine under what conditions the relationship may happen and mediation examines if another variable is influencing the relationship (Elite Research, 2013)

### Results

The results will be presented with the three hypotheses noted earlier: there will be an association between sleep quality and levels of anxiety, coping style will moderate the relationship between sleep quality and anxiety, an exploratory analysis to see if there are group differences in coping

style preference, sleep problems and anxiety and last, coping style will mediate the relationship of sleep quality and anxiety.

### **Is there an Association Between Sleep Quality and Levels of Anxiety?**

The relationship between levels of sleep issues (as measured by the PSQI) and levels of anxiety (measured by the GAD-7) was investigated using a Pearson correlation coefficient. There was a small positive correlation between the two variables,  $r = .29$ ,  $n = 67$ ,  $p = .018$ , with higher levels of anxiety associated with higher levels of sleep issues,  $R^2 = .084$  (Figure 1).

### **Is Coping Style a Moderator to the Sleep Quality and Anxiety Relation?**

To test the hypothesis that the relationship between sleep and anxiety is moderated by coping style, three hierarchical multiple regression analyses were conducted. For the first of which, in the first step, two variables were included: level of problem-focused coping and GAD score. These variables accounted for a significant amount of variance in PSQI score,  $R^2 = .11$ ,  $F(2, 62) = 3.92$ ,  $p = .025$ . To avoid potentially problematic high multicollinearity with the interaction term, the variables were centered and an interaction term between level of problem-focused coping and GAD score was created (Aiken & West, 1991 as cited in Elite Research, 2013). Next, this interaction term was added to the regression model, which did not account for a significant proportion of the variance in PSQI Score,  $\Delta R^2 < .001$ ,  $\Delta F(3, 61) = 2.57$ ,  $p = .062$ ,  $b = -.004$ ,  $t(61) = -.03$ ,  $p = .97$ . While non-significant, examination of the interaction plot (Figure 2) suggests a possible buffering effect in which it appears as levels of problem-focused coping increased, the effect of GAD score on predicting PSQI score was decreased.

In the first step of the second hierarchical multiple analysis, two variables were included: level of emotion-focused coping and GAD score. These variables accounted for a significant amount of variance in PSQI score,  $R^2 = .11$ ,  $F(2, 64) = 4.01$ ,  $p = .023$ . These variables were

centered, and an interaction term between level of emotion-focused coping and GAD score was created (Aiken & West, 1991 as cited in, Elite Research, 2013). Next, this interaction term was added to the regression model, which did not account for a significant proportion of the variance in PSQI score,  $\Delta R^2 = .03$ ,  $\Delta F(3, 63) = 3.46$ ,  $p = .022$ ,  $b = -.28$ ,  $t(63) = -1.49$ ,  $p = .143$ . While non-significant, examination of the interaction plot (Figure 3) showed a buffering effect in which, as levels of emotion-focused coping increased, the effect of GAD score on predicting PSQI score was decreased. At a low GAD score, PSQI score was similar for those with low, average, or high levels of emotion-focused coping. Those with the highest GAD scores and the lowest levels of emotion-focused coping had the highest PSQI scores.

In the first step of the third hierarchical multiple analysis, two variables were included: level of avoidant coping and GAD score. These variables accounted for a significant amount of variance in PSQI score,  $R^2 = .09$ ,  $F(2, 63) = 3.21$ ,  $p = .047$ . These variables were centered and an interaction term between level of avoidant coping and GAD score was created (Aiken & West, 1991 as cited in Elite Research, 2013). Next, this interaction term was added to the regression model, which did not account for a significant proportion of the variance in PSQI score,  $\Delta R^2 = .02$ ,  $\Delta F(3, 62) = 2.52$ ,  $p = .066$ ,  $b = .151$ ,  $t(62) = 1.07$ ,  $p = .29$ . While non-significant, examination of the interaction plot (see Figure 4) suggested a buffering effect at low GAD scores and an enhancing effect at average to high GAD scores. At low scores, high levels of avoidant coping decreased the effect of GAD score on predicting PSQI score. At average to high GAD scores, as both GAD score and levels of avoidant coping increased, so did PSQI scores.

To establish if different coping styles had different effects on levels of anxiety, a one-way between-groups multivariate analysis of variance was performed to investigate group differences of primary coping style on the relation between sleep quality and anxiety. Two dependent

variables were used; sleep quality and level of anxiety. The independent variable was primary coping style. Preliminary assumption testing was conducted to check for normality, linearity, univariate and multivariate outliers, homogeneity of variance-covariance matrices, and multicollinearity, with no serious violations noted. There was not a statistically significant difference between coping styles on the combined dependent variables,  $F(2, 67) = 1.63, p = .166$ ; Wilks' Lambda = .90; partial eta squared = .05. Details are displayed in Table 1.

### **Is Coping Style a Mediator to the Sleep Quality and Anxiety Relation?**

Three mediation analyses were run using the PROCESS macro for IBM SPSS developed by Hayes (2012) to evaluate if coping style mediates the relationship between anxiety and sleep. In the first of which, evaluating problem-focused (PF) coping, results displayed that the total effect of GAD score on PSQI score was significant, total effect = .17, 95% confidence (CI) [.04, .30]. As shown in Figure 5 and Table 2, GAD score did not significantly predict PF coping,  $\beta = .01, p = .50, 95\% \text{ CI } [-.02, .04]$  nor did PF coping significantly predict PSQI score,  $\beta = -.69, p = .27, 95\% \text{ CI } [-1.91, .54]$ . The residual direct effect was, however, significant,  $\beta = .18, p = .01, 95\% \text{ CI } [.04, .30]$ . Problem focused coping, therefore, did not play a mediating role in the link between GAD score and PSQI score, indirect effect =  $-.01, 95\% \text{ CI } [-.05, .01]$ .

A mediation analysis evaluating emotion-focused (EF) coping displayed that the total effect of GAD score on PSQI score was significant, total effect = .16, 95% confidence (CI) [.03, .29]. As shown in Figure 6 and Table 3, GAD score positively predicted level of EF coping,  $\beta = .03, p < .01, 95\% \text{ CI } [-.01, .05]$ , however, level of EF coping did not significantly predict PSQI score,  $\beta = -1.28, p = .16, 95\% \text{ CI } [-3.06, .51]$ . The residual direct effect was significant,  $\beta = .20, p < .01, 95\% \text{ CI } [.06, .34]$ . Emotion focused coping, therefore, did not play a mediating role in the link between GAD score and PSQI score, indirect effect =  $-.04, 95\% \text{ CI } [-.12, .02]$ .

A mediation analysis evaluating avoidant coping displayed that the total effect of GAD score on PSQI score was significant, total effect = .17, 95% confidence (CI) [.03, .30]. As shown in Figure 7 and Table 4, GAD score positively predicted level of avoidant coping,  $\beta = .03$ ,  $p < .01$ , 95% CI [-.01, .05], however, level of avoidant coping did not significantly predict PSQI score,  $\beta = .44$ ,  $p = .60$ , 95% CI [-1.23, 2.11]. The residual direct effect was significant,  $\beta = .15$ ,  $p < .04$ , 95% CI [.01, .30]. Avoidant coping, therefore, did not play a mediating role in the link between GAD score and PSQI score, indirect effect = .01, 95% CI [-.04, .07].

### **Discussion**

As was expected, higher levels of anxiety were found to be associated with higher levels of trouble sleeping. Variables of poor sleep included not enough hours of sleep, disturbances during sleep from external and internal sources, and self-reported accounts of bad sleep quality. This suggests that any of these variables could lead to general anxiety, and vice versa. In congruence with previous research, sleep and anxiety appeared to be significant issues within the collegiate population (Doane et al., 2014). These findings reinforce past research outlining a positive relationship between increasing anxiety and increasing sleep troubles (Chellappa & Aeschbach, 2021; Johnson et al., 2006; Ramsawh et al., 2009). It is notable that when controlling for caffeine and screen time the relationship between sleep and anxiety was dulled, suggesting these variables also account for why someone is experiencing poorer sleep or increased anxiety.

It was expected that problem-focused and emotion-focused coping would cause a buffering effect in the relationship between anxiety and sleep issues while avoidant coping would cause an enhancing effect. Results did not portray this; inconsistent with our hypothesis, neither problem-focused, emotion-focused, or avoidant coping style were found to have a

significant moderating effect on the relationship between Anxiety and Sleep. These findings suggest that any given coping style may not influence whether a given level of anxiety will lead to sleep issues. Our work must be caveated by this historic time where anxiety and sleep problems were high for many and gave high population base rates (Pasquini & Keeter, 2022). It is notable that interaction plots (Figures 1, 2 & 3), although statistically insignificant, visually displayed expected results. It is possible that due to the voluntary nature of sample we may not have obtained the range of individuals with varied coping levels. Compounded with past research displaying that coping style is influential to psychological status, this suggests a possibility in which future research may reveal significant results given more power (Fu et al., 2020; Xiong et al., 2019) or different historic stressors. A second analysis revealed that there were no significant group differences in sleep and anxiety between individuals grouped by primary coping style.

Within each mediation analysis the direct effect of Anxiety on PSQI score (Sleep Issues) was the driving path on the total effect of each model. These findings reinforce hypothesis one as well as past research outlining a positive relationship between anxiety and sleep troubles (Chellappa & Aeschbach, 2021; Johnson et al., 2006; Ramsawh et al., 2009). It, however, suggests that there was no mediation effect of emotion focused, problem focused, or avoidant coping on this relationship. These findings suggest that any given coping style does not have an effect on how a given level of anxiety will lead to sleep issues. It is, however, notable that significant positive regressions were found between GAD score and emotion focused coping as well as between GAD score and avoidant coping. This suggests that level of anxiety positively predicts one's level of avoidant or emotion focused coping, reinforcing past research suggesting similar correlations between anxiety and coping (Agha, 2021).

## **Limitations**

It is important to note where the study was limited, which could have had an effect on the results. The demographics show that the results were skewed heavily towards individuals who were white and/or female. In certain studies, it has been found that women are worse sleepers than men (Ramsawh et al., 2009). Results may, thus, be less generalizable towards other populations that extend beyond this heavy majority. In addition, the researchers did not control for prior mental health diagnoses. Further, coping was categorized into more general categories and thus results may be different within more nuanced categories. As compared to our 3-factor analysis, for example, the original brief-COPE uses a more nuanced 14-factor analysis.

The Covid-19 pandemic has severely altered everyone's lives over the past two years. As such, the uncertainty and fear that this pandemic has brought, has contributed to a great rise in mental health problems around the world (Fu et al., 2020). This, and prior mental health diagnoses, were not controlled for within our study making it likely that both of these variables impacted all major components of our study.

### **Future Research**

As it is both true that our findings did not reveal coping style as a moderating factor to the anxiety and sleep relationship and that our study was limited in the ways mentioned, we believe it is pertinent to continue research on the influence of coping on this relationship. Research should investigate coping with a more nuanced lens; while we used a broad view for the purpose of having more generalizable findings, nuanced categorizations of coping could lead to significant findings. The original Brief Cope recognizes 14 categories (planning, religion, humor, self-distraction, etc.) which could be used in a variety of focused methodological ways (Carver, 1997). For example, research has both displayed relations between religion and sleep quality and religion and anxiety (Krause & Ironson, 2017; Nikfarjam et al., 2018). Future



research would find it valuable to investigate specific categories of coping, such as religiosity, as a moderating factor to the anxiety and sleep relationship.

Our research, as discussed, is limited in that it takes place in a time with an immense number of stressors. Future research may find it valuable to look at this more directly. As coping is done to deal with stressors, research on moderation and mediation effects of coping between widespread stressors (ex: Covid-19) on sleep and/or anxiety would be valuable to better understanding relationships between sleep, anxiety and coping. It would further be valuable to explore the role of compounding stressors, financial, academic, and social (Jones et al., 2018), within the anxiety and sleep relationship.

### **Conclusion**

Results reinforce existing research displaying a relationship between sleep and anxiety. This research does not, however, find any significant results to suggest that coping style is in any way influential to this relationship. It is suggested that more research should be done in investigating the potential influence of coping styles. Anxiety and sleep quality continue to be an issue within the collegiate population and a deeper understanding of how one can cope in order to lessen these issues, as well as coinciding adversities, remains valuable.

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**Table 1*****Primary Coping Style by GAD-7 Score and PSQI Score***

| Primary Coping Style | <i>M</i>                 | <i>SD</i> | <i>N</i> |
|----------------------|--------------------------|-----------|----------|
|                      | <u>GAD Score</u>         |           |          |
| Problem-Focused      | 7.76                     | 5.16      | 41       |
| Emotion-Focused      | 10.61                    | 5.556     | 18       |
| Avoidant             | 12.25                    | 5.976     | 8        |
| Total                | 9.06                     | 5.55      | 67       |
|                      | <u>Global PSQI Score</u> |           |          |
| Problem-Focused      | 7.34                     | 3.01      | 41       |
| Emotion-Focused      | 7.94                     | 3.17      | 18       |
| Avoidant             | 8.38                     | 3.46      | 8        |
| Total                | 7.63                     | 3.08      | 67       |

**Table 2****Mediating Effect Problem Focused Coping**

|                                   | Effect<br>Value | Boot <i>SE</i> | Lower<br>Boot CI | Upper<br>Boot CI |
|-----------------------------------|-----------------|----------------|------------------|------------------|
| Total effect of GAD on<br>PSQI    | .17             | .07            | .04              | .30              |
| Direct effect of GAD on<br>PSQI   | .18             | .07            | .04              | .30              |
| Indirect Effect of GAD on<br>PSQI | -.01            | .01            | -.05             | .01              |

**Table 3****Mediating Effect Emotion Focused Coping**

|                                   | Effect<br>Value | Boot <i>SE</i> | Lower<br>Boot CI | Upper<br>Boot CI |
|-----------------------------------|-----------------|----------------|------------------|------------------|
| Total effect of GAD on<br>PSQI    | .16             | .07            | .03              | .29              |
| Direct effect of GAD on<br>PSQI   | .20             | .07            | .06              | .34              |
| Indirect Effect of GAD on<br>PSQI | -.04            | .03            | -.11             | .02              |



**Table 4****Mediating Effect Avoidant Coping**

|                                   | Effect<br>Value | Boot <i>SE</i> | Lower<br>Boot CI | Upper<br>Boot CI |
|-----------------------------------|-----------------|----------------|------------------|------------------|
| Total effect of GAD on<br>PSQI    | .17             | .07            | .03              | .30              |
| Direct effect of GAD on<br>PSQI   | .15             | .07            | .01              | .30              |
| Indirect Effect of GAD on<br>PSQI | .01             | .03            | -.04             | .07              |

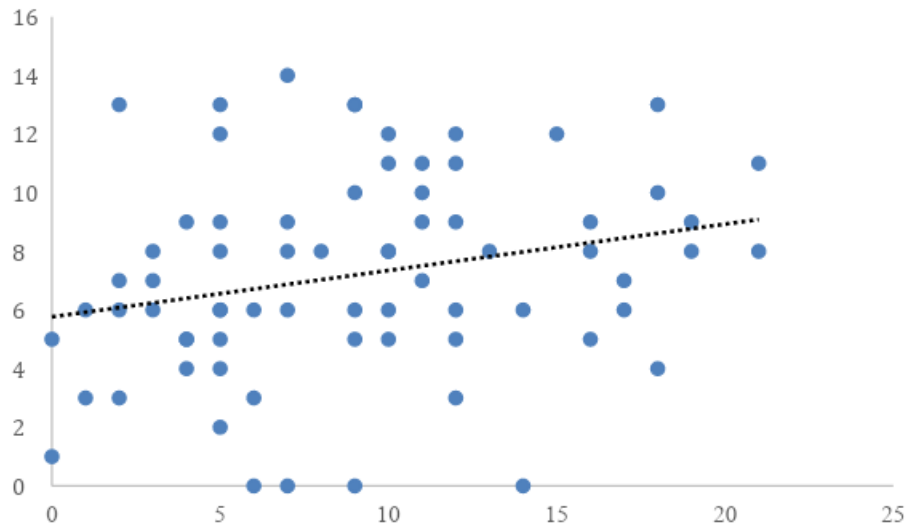
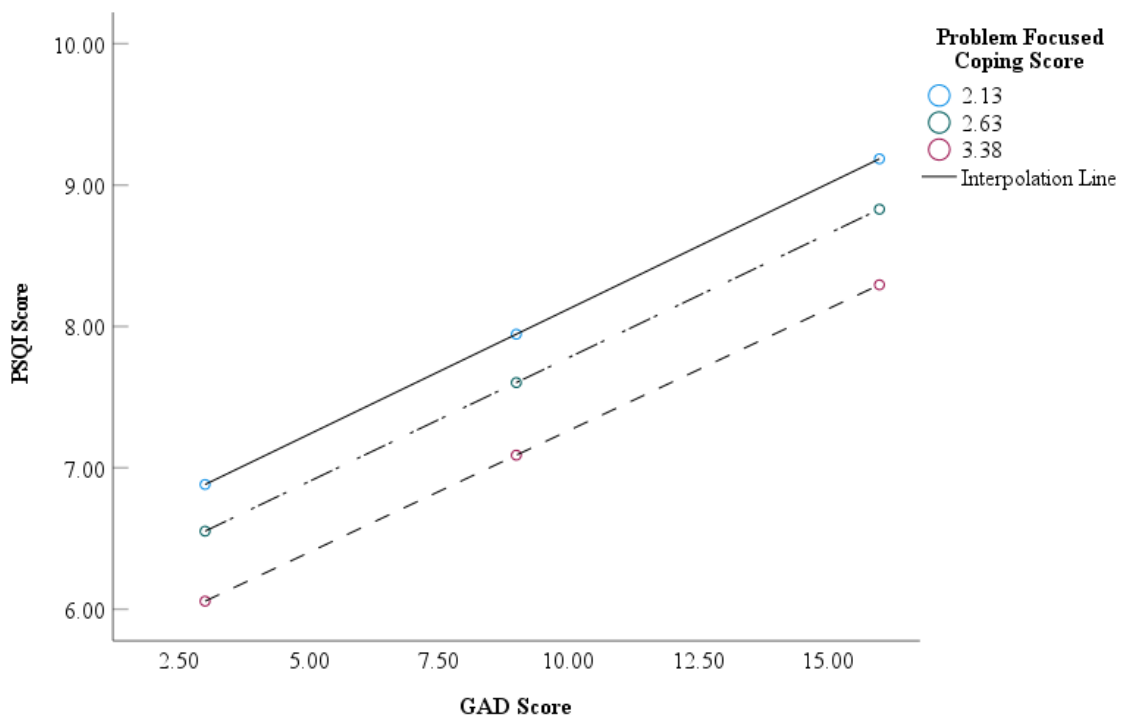
**Figure 1***GAD Score by PSQI Score*

Figure 2

*Problem-Focused Coping Interaction Plot*

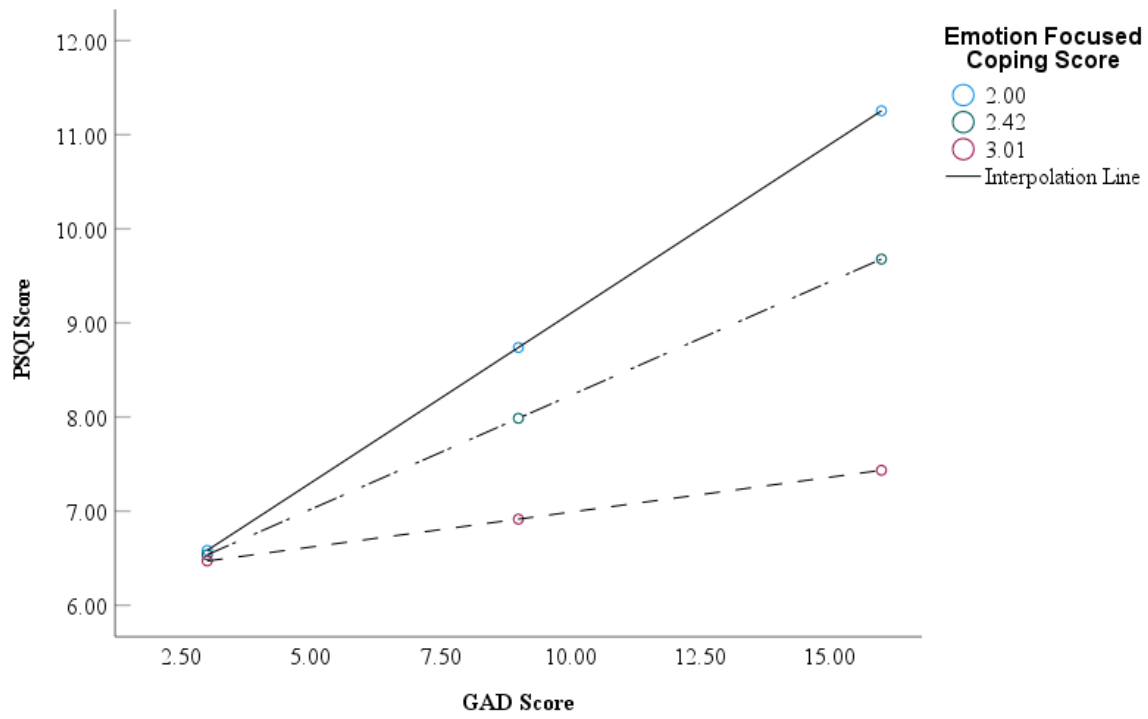
**Figure 3*****Emotion-Focused Coping Interaction Plot***

Figure 4

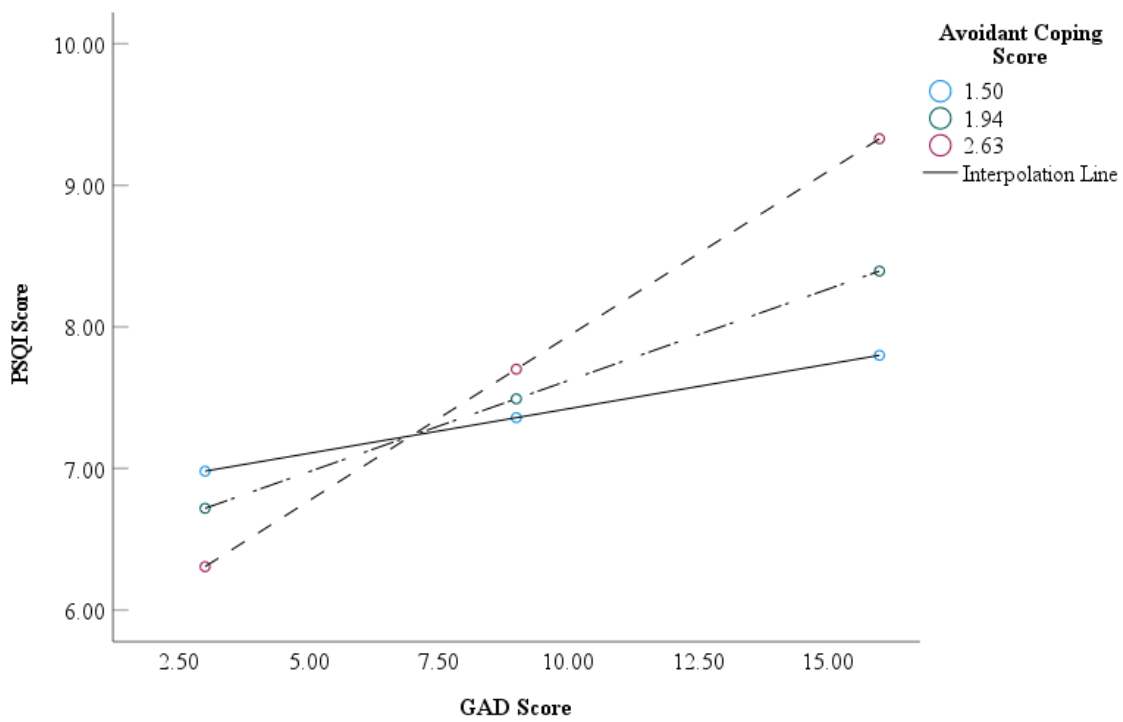
*Avoidant Coping Interaction Plot*

Figure 5

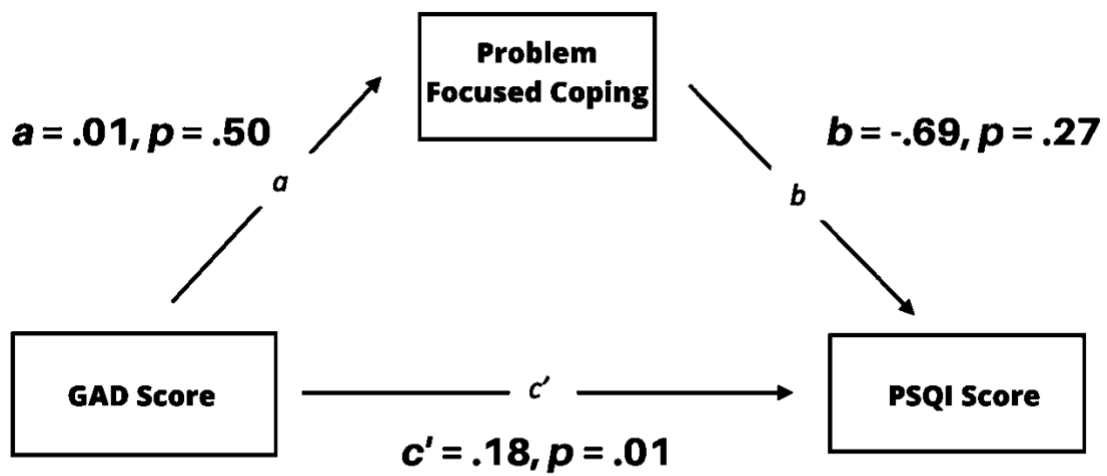


Figure 6

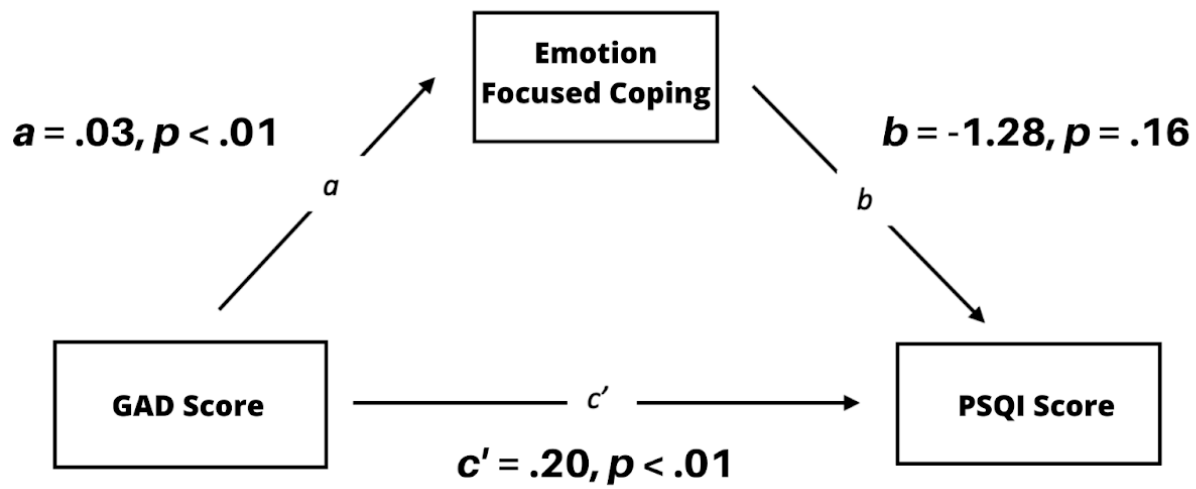


Figure 7

