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The Role of Financial Strain in College Students' Work Hours, Sleep, and Mental Health

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Abstract

Objective: To examine poor sleep quality as a potential mediator between college students' employment hours and depressive symptoms, and to examine if this mediation model might differ across students reporting different levels of financial strain.

Participants: The sample was collected through a multi-site study during the Spring of 2019 and included 792 undergraduates (M = 20.1, *SD* = 1.9) in Upstate New York.

Methods: Moderated mediation analyses based on cross-sectional self-report, online questionnaires.

Results: Increased work hours predicted greater sleep disturbance, which, in turn, predicted more depressive symptoms. Compared to students in more comfortable financial situations, this mediation model only emerged for students reporting more financial strain and lower family socio-economic status.

Conclusions: Student employment hours are a significant predictor of students' mental well-being when considering their potential impact on their sleep. Furthermore, students reporting higher levels of financial stress are most at risk of being impacted by this process.

Key words: College; work hours; sleep; depressive symptoms; financial strain

With approximately 30% of college students reporting depressive disorders and over 60% of students reporting poor quality or insufficient sleep, the enormous scope of college students' mental health and sleep problems leaves few undergraduates untouched.[1–3] Given the extensive links between these two areas,[4–6] understanding potential predictors of college students' sleep and mental health problems remains paramount. One often over-looked area of stress in college students' lives involves their pursuit of part-time or full-time employment during their undergraduate studies. Although working during college may help students develop time management skills or help defray the costs of their education, such work is not without its challenges. Whereas the majority of undergraduates work either part- or full-time while attending college, research suggests that increased work hours appear to negatively impact students' sleep and mental health.[7,8] In addition, it is often college students who report the highest levels of financial strain, defined by their perceptions of economic stress or lack of financial support from their families, that feel most compelled to work during their undergraduate studies.[9] Accordingly, the current study sought to examine two interrelated models linking students' work hours with their sleep and mental health issues. First, we sought to test a mediation model in which students' work hours were indirectly associated with their depressive symptoms via their reports of sleep disturbance. Second, given the greater propensity for more economically stressed students to work during college, we examined if this mediation model might be more robust in students reporting higher levels of financial strain.

Student Employment and Associated Outcomes

The prevalence of students being employed during college has been increasing over the past few decades such that recent data suggest that approximately 70% of undergraduate students are employed.[10] Although student employment has been associated with persistence toward

degree completion,[11] working in addition to pursuing one's education can also increase levels of stress and negatively impact one's academic performance.[7,12] The negative impact is significantly higher when students work 20 hours or more per week.[12] Furthermore, such stress and its associated negative consequences can be particularly acute in students experiencing high levels of financial strain.[9] In addition to the impact that student employment has on academic outcomes, work hours have also been shown to negatively influence both college students' sleep and mental health.[13,14] Completing academic work on top of maintaining one's work schedule leaves less time for sleep, especially when students are working 20 hours per week or more, and likely results in both poorer quality and insufficient sleep.[13] It is also possible that the stress of balancing academic work and employment hours contributes to problematic levels of stress, thus predisposing students to depression.[7] Despite this emerging body of research, findings have revealed little about potential processes through which students' employment might ultimately impact their mental health. In the current study, we propose a process model in which work hours are associated with symptoms of depression via the mediating influence of students' reports of sleep disturbance.

Sleep Problems and Depressive Symptoms

Previous research highlights robust associations between poor sleep quality and depressive symptoms in college-aged students.[6,22] Not only has decreased sleep been linked to increased depressive symptoms,[23] but also students who report both high levels of sleep disturbance and depressive symptoms have endorsed higher levels of anxiety and poorer cognitive and physical functioning.[6] The impact of students' elevated depressive symptoms has also been shown to contribute to greater levels of fatigue during class and more difficulty with academics.[22] Recent evidence suggests that the associations between sleep problems and

depressive symptoms are bidirectional,[7] but regardless of directionality, understanding predictors of both sleep disturbance and depressive symptoms could provide researchers, clinicians and university staff with greater opportunities to intervene and support students' well-being.

Students at Risk

Understanding the factors that support not only students' retention in higher education but also their success in college remain critical, especially for first-generation and lower-income students. First-generation college students are not exclusively from low-income families, but the two groups often converge, resulting in even greater risks for not completing college. Specifically, these students are half as likely as their advantaged peers to complete their undergraduate studies, and both employment commitments and psychological distress are critical predictors of their attrition.[15,16] In addition, financial strain has been linked with sleep disturbance such that students experiencing poverty or severe financial stressors may be at greater risk for sleep problems.[17] Given the risks associated with financial stress, the current study sought to test a process-oriented model linking work hours, sleep disturbance, and depressive symptoms for students who were specifically experiencing financial strain. Although the current study did not examine rates of degree completion, as a key predictor of completion, psychological distress (i.e., depression) is a highly preventable mental health problem, and its effective prevention may decrease the likelihood of associated consequences, such as dropping out of college.[18]

The Current Study

The current study sought to examine a process-oriented mediation model in which undergraduate students' work hours might predict their depressive symptoms via their levels of sleep disturbance. In addition, given the greater need for lower income and first-generation

college students to work in college,[16] we sought to assess if economic strain might moderate this mediation model. **Hypothesis 1:** We expected that increased work hours would be indirectly associated with higher levels of depressive symptoms via the mediator of increased sleep disturbance. Thus, we predicted that higher work hours would be associated with increased sleep disturbance (Hypothesis 1A) and that increased sleep disturbance would be associated with greater depressive symptoms (Hypothesis 1B), thereby indirectly linking work to depressive symptoms. **Hypothesis 2:** We further hypothesized that the pattern of associations within our mediation model would be strongest in students experiencing higher levels of financial strain. To more fully capture both the subjective experience of financial strain as well as the objective realities of students from notably lower socioeconomic backgrounds, we used two different conceptualizations to assess this moderator: (1) a single item assessing students' self-perceptions of their own financial situations and (2) a measure consisting of two items assessing more concrete markers of family socio-economic status (i.e., highest parental degree and family annual income).

Method

Participants

The mean age of the current sample ($n = 792$, 79% female) was 20.1 years ($SD = 1.9$), and students were from either small (1,500 – 2,000 students; 53% of sample) or mid-sized (6,000 – 7,000; 47%) private institutions. The majority of participants were Caucasian (62%), with 21% Asian or Pacific Islander, 6% multi-racial, 7% Latino, and 4% African American. Participants were fairly equally distributed across the four years of college, with 22% reporting as first-years students, 30% as sophomores, 23% as juniors, 24% seniors, and 2% in their fifth year or beyond. Students reported a median family income of $90,000, with approximately 29% of students

reporting family incomes of $50,000 or less. Finally, approximately 21% of students reported being the first generation in their families to go to college.

Procedure

The study was approved by all of the Institutional Review Boards associated with each data collection site and informed consent was obtained prior to participation. Participants were recruited primarily from psychology classes from small (< 2,500 students) and mid-sized (< 6,000 students) colleges/universities in Upstate New York. The online survey took roughly 20-25 minutes to complete. As incentives to participate, all respondents were given a chance to win one of four $50 cash prizes, and eligible participants received course credit for completing the survey.

Measures

Depressive symptoms. Depressive symptoms were assessed with seven of the 9 items of the Patient Health Questionnaire (PHQ-9).[19] After removing the two items measuring sleep disturbance and fatigue in order to decrease the likelihood of inflating the association with our sleep disturbance measure, the remaining 7 items corresponded to the criteria for Major Depressive Disorder in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition—Revised (DSM-V),[20] specifically pertaining to anhedonia, depressed mood, change in appetite, guilt or worthlessness, trouble concentrating, feeling slowed down or restless, and suicidal thoughts. Respondents indicated for each of the seven depressive symptoms whether during the previous 2 weeks, the symptom had bothered them: 0 = "not at all" to 3 = "nearly every day." The continuous variable was the sum of scores of the 7 items ($\alpha = .85$), which ranged from 0 to 21 (M = 4.9, $SD = 4.2$) with higher scores indicating more depressive symptoms.

Sleep disturbance. Sleep disturbance was assessed with the 19-item Pittsburgh Quality Sleep Index (PSQI).[21] The PSQI assesses dysfunction regarding the respondent's past month of sleep using seven subcomponents: sleep duration, sleep latency, sleep disturbance, use of sleeping medication, daytime problems due to sleepiness, sleep efficiency, and overall sleep quality. The scores of the seven subcomponents are summed to form one global score (ranging from 0 to 21) with higher scores indicating higher levels of sleep disturbance. Research suggests that scores greater than 5 indicate poor sleep quality.[21] The measure demonstrated adequate internal consistency in the current study ($\alpha = .68$), and past studies have demonstrated good test-retest reliability and criterion validity.[22,23]

Moderating variables: Financial strain/comfort. Based on best practices for assessing social class/status by Diemer and colleagues,[24] we included separate measures to assess students' perceived financial situations in addition to their families' socio-economic status. Students' perceived financial situation was assessed with a 1-item measure ("Indicate the response that best describes your family's financial situation"). The item was rated on a 4-point response scale (0 – "*experiencing extreme financial hardship*" to 3 – "*having more than enough money (i.e., financially comfortable)*"), with higher scores indicating that they and their families were in a more comfortable financial situation. Accordingly, lower levels of students' perceptions of their financial situations is indicative of greater financial strain. Students' families' socio-economic status (SES) was assessed with a 2-item composite of parents' total annual income and the highest educational degree attained by parents. These two items were standardized then summed, with higher values reflecting higher SES. To remain consistent with the original direction of all of these items, higher scores on these two indices reflected higher levels of financial

support/comfort. Thus, financial strain would be reflected in the students reporting low levels on one or both of these indices.

   Additional Predictors. For respondents that endorsed working either a part-time or full-time job while completing their undergraduate studies (approximately, 63% of the sample), work hours were self-reported on a 1-item measure ("On average, how many hours per week do you work?"). In addition, given the financial challenges often encountered by first-generation college students, we included a 1-item measure of respondents' status, first-generation or not ("*Are you a first-generation college student (meaning that you are the first in your family to attend a 4-year college)?*"), as a control in our analyses.

   Analytic Strategy. To test both our mediation and our moderated mediation models (Figure 1), we employed the PROCESS macro (models 4 and 59, respectively) for SPSS (v. 23).[25] Our mediation model allowed us to test our first set of hypotheses regarding the indirect effect of work hours on students' self-reported depressive symptoms via students' self-reported sleep disturbance. Following best practices, our moderated mediation model allowed us to evaluate if financial strain, either the students' perceived family financial situation or their family's SES, moderated any of the paths, both direct and indirect, within the mediational model simultaneously.[26] Thus, the SES and financial strain variables were entered as continuous moderators, thereby retaining the maximum information on between-student differences in our models. PROCESS uses common metrics to represent average levels of the moderator (e.g., estimating the mediation paths for individuals with mean levels of SES), high levels of the moderator (e.g., estimating the paths for individuals one standard deviation above the mean on SES), and low levels of the moderator (e.g., estimating the model predicted paths for individuals one standard deviation below the mean on SES). Both models tested the significance of those

indirect paths by using bootstrapping to accommodate the asymmetry in their confidence intervals.[27] Bootstrapping assesses the effects of variables in a manner that maximizes power and is robust against non-normality; in the current study, we employed a 95% bias-corrected bootstrap model with confidence intervals resampled 10,000 times for each analysis. As seen in Table 2, the variables gender, year in college, and being first-generation in college were included as covariates (i.e., additional predictors) in the model to help control for their potentially confounding effects. Although PROCESS is unable to provide standardized path coefficients, all variables (predictors, controls, and outcomes) were standardized (i.e., z-scored) before entering them into the analysis, thereby yielding rough approximations of standardized path coefficients within this multivariate context. Finally, missing data were extremely rare in the current sample (0.17%) and Little's MCAR test was not significant ($\chi^2(25) = 27.10$, p = .351), failing to find significant deviance from the data missing completely at random. As a result, the handful of points of missing data were allowed to drop out of the analyses.

Results

Preliminary Analyses

Group Differences and Bivariate Associations. Overall, the reported levels of depressive symptoms and poor sleep quality are consistent with past studies on college populations.[2,28] Although the continuous variables in the study displayed small amounts of skew and kurtosis, these generally fell within acceptable limits (see [29] for guidelines), supporting the planned analyses. Table 1 presents comparisons of means as a function of gender. Although females reported significantly higher levels of sleep disturbance ($d = .24$) and depressive symptoms ($d = .29$), these differences were modest in size and the two groups were generally comparable across the measures in the study. Intercorrelations among the key variables are also

presented in Table 1. Across both males and females, perceptions of the family's financial situation were negatively associated with number of hours of work per week and depressive symptoms such that students who were in a more comfortable financial situation reported that they worked fewer hours per week and experienced fewer symptoms of depression. Greater sleep disturbance was associated with more depressive symptoms, and class year was positively associated with the number of hours worked per week and negatively associated with the number of depressive symptoms. Furthermore, being a first-generation college student was associated with being in a lower class year. For females, their family's SES was negatively associated with the average number of hours of work per week, sleep disturbance, and depressive symptoms. In addition, working more hours per week were associated with higher levels of sleep disturbance.

Mediation Model

As shown in Table 2, the mediation model predicted approximately 2.2% of the variance in college students' levels of sleep disturbance, $F(4,780) = 4.3$, $p < .01$. Specifically, the average number of hours worked per week ($B = .11$, $p < .01$; Hypothesis 1A) and female gender ($B = -.10$, $p < .01$) significantly predicted higher levels of sleep disturbance.

The mediation model also predicted approximately 30.9% of the variance in students' self-reported number of depressive symptoms, $F(5,779) = 69.7$, $p < .001$ (Table 2). Specifically, higher levels of sleep disturbance ($B = .54$, $p < .001$; Hypothesis 1B) and lower class year ($B = -.10$, $p < .01$) predicted a greater number of depressive symptoms. In addition, first-generation students reported marginally higher levels of depressive symptoms ($B = .05$, $p < .08$).

As shown in Figure 2A, and in support of Hypothesis 1, students' sleep disturbance mediated the association between hours worked per week and depressive symptoms as evidenced by a significant indirect effect ($B = .06$, $SE = .02$; 95% Confidence Interval (CI) [.02, .10]).

Taken together, these results suggest that greater number of hours worked per week were associated with more sleep disturbance (Hypothesis 1A), which, in turn, was associated with higher levels of depressive symptoms (Hypothesis 1B).

Moderated Mediation Model: Family Socio-economic Status as Moderator

As shown in top half of Table 3, the more concrete assessment of family SES moderated the mediational paths within the model. Specifically, significant mediation emerged in families from lower SES levels (-1 SD; B = .06, SE = .03; 95% CI [.01, .11]; see Figure 2B). Thus, for students from families in which parents have nothing higher than associates degrees and combined incomes of about $41,000, student job hours were linked to higher depressive symptoms via greater sleep problems. In contrast, this mediation failed to emerge as significant for students reporting above average family SES (+1 SD; B = .03, SE = .04; 95% CI [-.04, .11]; see Figure 2C). Consistent with our second hypothesis, in families with lower SES, more student-reported work hours predicted greater levels of sleep disturbance, which, in turn, predicted higher levels of depressive symptoms, suggesting that financial strain might potentiate adverse effects of work on sleep and depressive symptoms in college.

Moderated Mediation Model: Perceived Financial Situation as Moderator

As shown in top half of Table 3, students' subjective assessments of their families' financial situations also moderated the mediational paths within the model in a highly similar manner. Specifically, significant mediation emerged for those students reporting below average, or more strained, financial situations (-1 SD; B = .08, SE = .03; 95% CI [.02, .14]). In contrast, this mediation failed to emerge as significant for students reporting above average financial situations (+1 SD; B = .01, SE = .03; 95% CI [-.05, .08]). Consistent with our second hypothesis, for students perceiving themselves to be in more dire financial situations, more work hours

predicted greater levels of sleep disturbance, which, in turn, predicted higher levels of depressive symptoms.

Discussion

Building on research linking college students' work hours to their mental well-being, the current study provides initial support for the significant role that financial strain might play in college students' sleep and mental health. Specifically, we demonstrated that students' reports of sleep disturbance (i.e., poor sleep quality) mediated the association between their work hours and depressive symptoms. By further examining this mediation model in the context of different levels of students' reports of financial strain, we found that significant mediation only emerged for students reporting higher levels of either subjective or objective financial stress. Accordingly, for students who reported higher levels of financial strain, increased work hours were associated with more sleep disturbance, which subsequently predicted higher levels of depressive symptoms. Given the greater likelihood of lower-income and financially stressed students to drop out of college,[15] results from the current study provide another avenue through which college students might be supported in successfully pursuing and attaining their undergraduate degrees.

Research has established clear links between college students' sleep and mental health, yet poor quality and insufficient sleep remain at epidemic proportions in this population.[2,6,28,30] The confluence of the academic workload, environmental impediments (e.g., living in a noisy dormitory), poor sleep hygiene habits, and a lack of supervision present an almost insurmountable challenge to college students' sleep. In addition to these influences, however, remains the fact that the majority of college students work during their undergraduate studies,[10] and that this time commitment potentially impinges on students' other responsibilities. Not only

are increased work hours associated with decreased sleep hours,[7,13] but the stress of managing a busy schedule can also lead to poorer quality sleep.[31] Although preventative interventions geared toward improving college students sleep exist,[32] they are infrequently used within student populations in general. With that said, research suggests that work hours in excess of 20 hours per week place students at particular risk for negative outcomes, including insufficient sleep and psychological distress.[13] This risk is also heightened for students earlier in their college careers (i.e., first-years and sophomores).[12] It is important to note that when including sleep disturbance as a mediator in our model (i.e., indirect effect), we did not find a direct association between students' work hours and psychological well-being. This indirect association of work hours on depressive symptoms through sleep disturbance underscores the importance of sleep for undergraduates and will hopefully further compel college administrators and counselors to support students in finding effective ways to balance students' sleep and employment needs.

As demonstrated by our moderation findings, the associations between work hours, sleep, and depressive symptoms are strongest in students experiencing financial strain. These findings further challenge low-income and first-generation students' pursuits of their undergraduate degrees as they are most likely the ones to be experiencing high levels of financial stress.[16] Already at risk for prematurely terminating their undergraduate studies, low-income and first-generation students must also face the challenges of working in order to afford college. We found that the risks associated with financial strain (i.e., moderation) was demonstrated with both students' perceptions of their financial situation and with their family's socio-economic status, a more objective measure of a student's financial background comprised of a composite of parental annual income and educational attainment. This finding is consistent with previous research that suggested that work hours mediated the association between parental educational

attainment and students' risk for attrition.[16] In this light, our findings ultimately highlight more opportunities to support students who are at the greatest risk of dropping out of college. Student support services appropriately target at-risk students' academic problems,[33] but negative influences on academic performance, such as sleep problems, work hours, and mental health, must be considered when developing effective support strategies.

Despite the large sample size from socio-economically diverse undergraduate institutions, several limitations in the current study must be acknowledged. First, the cross-sectional results preclude any examination of their directionality. Given the bidirectional nature of the associations between sleep and depression,[30] future studies should examine these associations longitudinally to better ascertain the direction of effects. Second, all measures are self-report, increasing the potential for response-bias. Future studies should augment self-report surveys with additional methods (i.e., daily sleep diaries, actigraphy) to more thoroughly test the presented models. Third, we employed a convenience sampling method. Although a common technique, this method prevents us from knowing our true survey response rate. As a result, we are unsure of the degree to which potential subjects might have selected themselves out of our study, and the results of our study should be viewed in that light. Along these same lines, our sampling efforts resulted in a sample that was predominately Caucasian, female, and primarily from psychology classes in colleges in Upstate New York. Accordingly, the findings may only generalize to a similar population. Future studies should therefore seek more diverse college populations to fully establish the generalizability of the current findings. Finally, it is important to note that the current study did not distinguish between off campus jobs (which would be less likely to directly relate to students' areas of study and would require additional logistics) and on campus jobs (which might offer training opportunities in their fields of study and which might be

logistically more convenient). Future studies should therefore explore whether the moderated mediation model examined might differ for students with on-campus vs. off-campus employment.

Despite these limitations, the current study highlights both a process (i.e., mediation) and a group that is particularly at risk for the development of mental health problems (i.e., moderation emerging within financially strained students). Our mediation model expands the links between college students' sleep problems and their mental health to include the potential impact of the amount of work hours during their undergraduate studies. At first glance, neither employment nor sleep are likely targets for intervention in order to support students' mental well-being. Compounding the potential risk increased work hours poses to students' mental health, it is those students most likely to work during college (i.e., low-income and first-generation students) who are at greatest risk of being affected. By highlighting the potential processes through which students become more prone to developing depression, we hope that colleges can expand their notions of student support to include both the work-study balance and students' sleep habits. We recognize that working one's way through college has become the norm, so it is essential for colleges to equip students with effective strategies to help them mitigate the potential costs of employment during their undergraduate studies.

Declaration of interest: None.

Data availability: Data from the current study are available from the corresponding upon request.

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Table 1. *Descriptives and Bivariate Correlations of Modeled Variables.*

Measures		Females (*n* = 624)		Males (*n* = 167)			Bivariate Correlations						
Mediation Model	Range	*M*	*SD*	*M*	*SD*	*t*-value	1	2	3	4	5	6	7
1. Work hours	0 - 52	7.0	8.3	7.7	9.2	-.99	-	**.13**	.02	**-.18**	**-.22**	**.30**	-.05
2. Sleep disturbance	0 - 18	6.7	3.2	5.9	3.0	2.69***	.00	-	**.59**	**-.10**	**-.11**	.00	.03
3. Depressive symptoms (PHQ-9)	0 - 26	7.8	5.5	6.2	5.1	3.23***	.06	**.69**	-	**-.10**	**-.12**	**-.08**	.00
Moderator Variables													
4. Perceived financial situation	0 - 3	2.4	0.6	2.3	0.6	1.54	**-.16**	-.03	**-.16**	-	**.53**	-.04	.01
5. Family SES	-1.9 - 1.8	0.01	0.9	0.03	0.8	-.20	-.08	-.04	-.12	**.52**	-	-.01	-.05
Control Variables													
6. Class year	1 - 5	2.6	1.1	2.4	1.1	1.75	**.21**	.00	**-.18**	.02	.11	-	**-.12**
7. First-generation (no=0; yes=1)		21%		23%		0.38[a]	-.13	-.12	-.08	.04	-.13	**-.24**	-

Note.   Values for males are below the diagonal, and values for females are above the diagonals. All **bolded** correlations are significant at the *p* < .05 level.

*** *p* < .001

[a] Pearson chi-square value.

Table 2. *Results from Mediation Model of Work Hours on Depressive Symptoms*.

Portion of the Model						Bootstrapped 95% CI		
Types of Variables/Effects		*B*	*SE*	*t*	*p*			R^2
Variables						LL	UL	
Predicting Mediator: Sleep Disturbance								.02
	Intercept	0.00	0.04	0.05	0.96	-0.07	0.07	
Main Predictor								
	Work Hours	**.11**	**.04**	**2.87**	**.00**	**.03**	**.18**	
Controls								
	Gender (female = 0; male = 1)	**-.10**	**.04**	**-2.91**	**.00**	**-.17**	**-.03**	
	Year	-.03	.04	-.79	.43	-.10	.04	
	First-generation (no = 0; yes = 1)	.03	.04	.86	.39	-.04	.10	
Predicting Outcome: Depressive Symptoms (PHQ-7)								.31
	Intercept	.00	.03	-.10	.92	-.06	.06	
Main Predictors								
	Work Hours	-.01	.03	-.47	.64	-.08	.05	
	Sleep Disturbance	**.54**	**.03**	**17.89**	**.00**	**.48**	**.60**	
Controls								
	Gender (male = 0, female = 1)	-.04	.03	-1.40	.16	-.10	.02	
	Year	**-.10**	**.03**	**-3.14**	**.00**	**-.16**	**-.04**	
	First-generation (no = 0; yes = 1)	.05	.03	1.78	.08	-.01	.11	
Direct Path								
Work Hours ➔ Depressive Symptoms		-.01	.03	-.47	.64	-.08	.05	
Indirect Path								
Work Hours ➔ Sleep Disturbance ➔ Depressive Symptoms		**.06**	**.02**	---	---	**.02**	**.10**	

NOTE: **Bolded** values are significant at *p* < .05. This mediation model was tested using model 4 of the PROCESS subroutine for SPSS. Bootstrapped 95% CI = 95% Confidence Interval derived from 10,000 bootstrapped models; LL and UL = Lower and upper limits.

Table 3. *Results of the Direct and Indirect Paths in the Moderated Mediation Models*.

	B	*SE*	*t*	*p*	Bootstrapped 95% CI LL	UL
Family Socio-economic Status (SES) as Moderator						
Moderated Direct Path: Work Hours ➔ Depressive Symptoms						
Below Average Levels of SES (-1SD; i.e., higher financial strain)	-.05	.04	-1.18	.24	-.12	.03
Average Levels of SES	-.01	.03	-.42	.68	-.08	.05
Above Average Levels of SES (+1 SD; i.e., lower financial strain)	.02	.05	.37	.71	-.08	.11
Moderated-Mediation: Work Hours ➔ Sleep Disturbance ➔ Depressive Symptoms						
Below Average Levels of SES (-1SD; higher financial strain)	**.06**	**.03**	---	---	**.01**	**.11**
Average Levels of SES	.04	.03	---	---	.00	.10
Above Average Levels of SES (+1 SD; lower financial strain)	.03	.04	---	---	-.04	.11
Perceived Family Financial Situation as Moderator						
Moderated Direct Path: Work Hours ➔ Depressive Symptoms						
Below Average Family Financial Situation (-1SD; higher financial strain)	-.05	.04	-1.27	.21	-.12	.03
Average Family Financial Situation	-.02	.03	-.61	.54	-.08	.04
Above Average Family Financial Situation (+1 SD; lower financial strain)	.01	.05	.18	.86	-.09	.11
Moderated-Mediation: Work Hours ➔ Sleep Disturbance ➔ Depressive Symptoms						
Below Average Family Financial Situation (-1SD; higher financial strain)	**.08**	**.03**	---	---	**.02**	**.14**
Average Family Financial Situation	.04	.02	---	---	.00	.09
Above Average Family Financial Situation (+1 SD; lower financial strain)	.01	.03	---	---	-.05	.08

NOTE: **Bolded** values are significant at $p < .05$. This moderated mediation model was tested using model 59 of the PROCESS subroutine for SPSS. Bootstrapped 95% CI = 95% Confidence Interval derived from 10,000 bootstrapped models; LL and UL = Lower and upper limits.

Figure 1. *Conceptual Model of Mediation (Solid Lines) and Moderators of Mediation (Dotted Lines)*
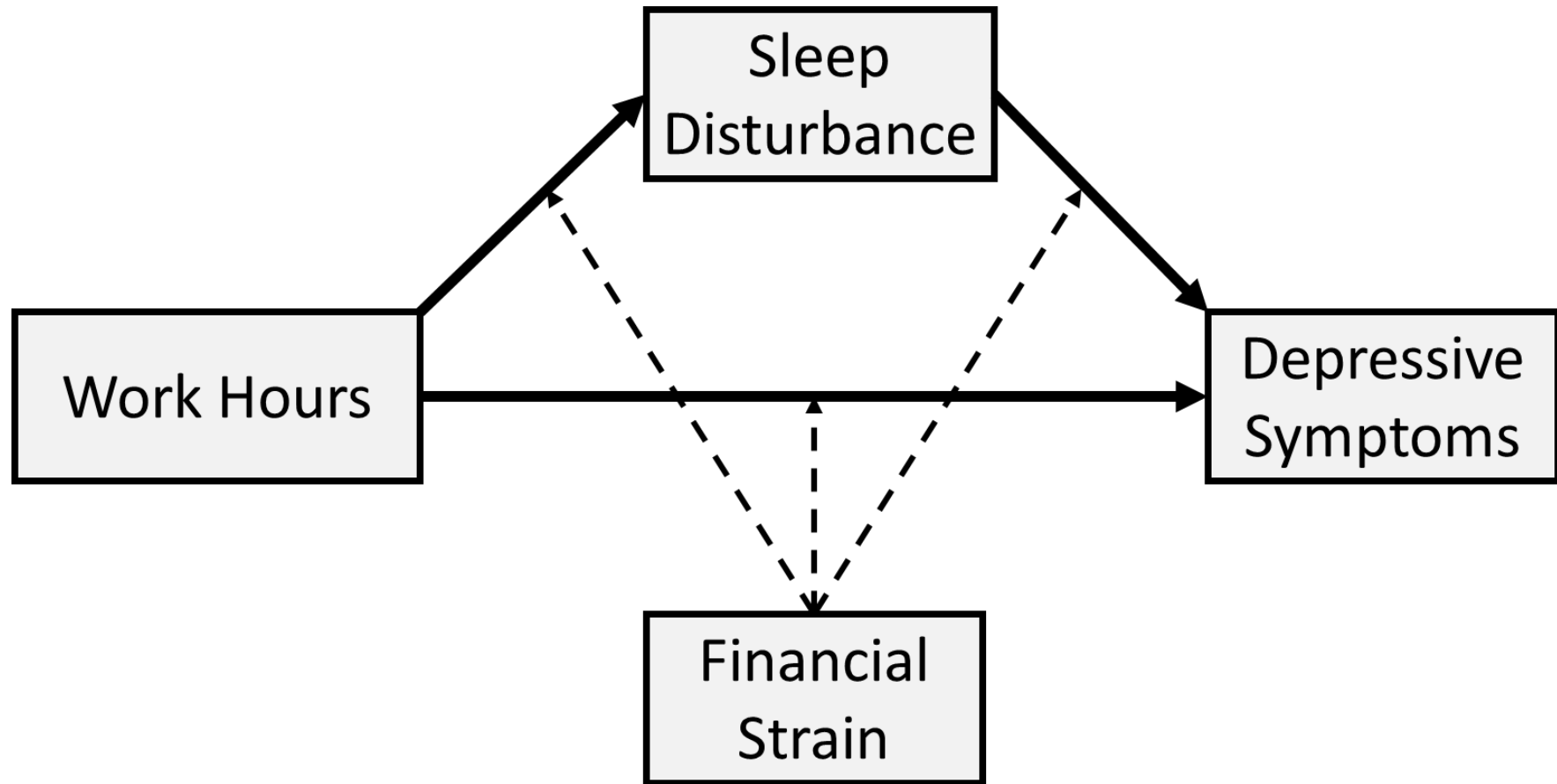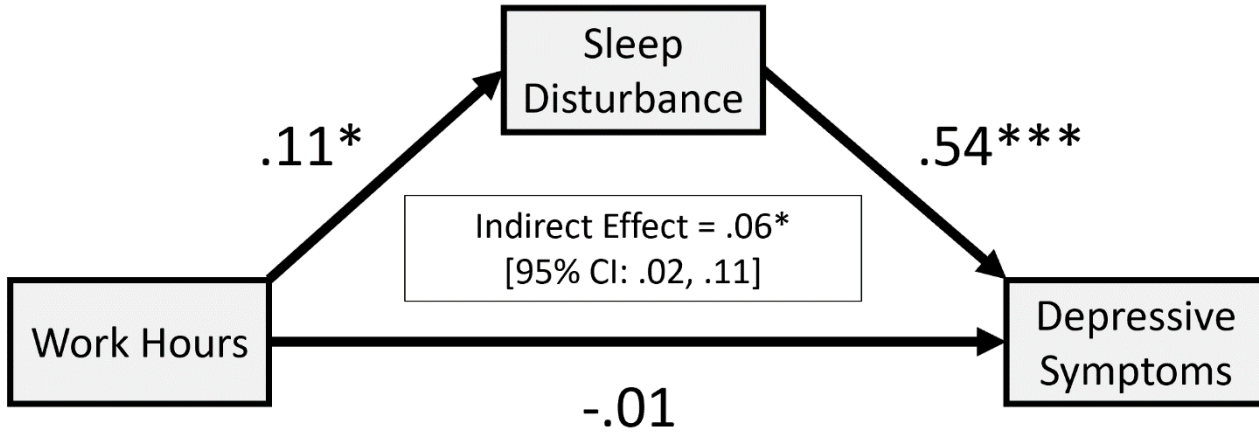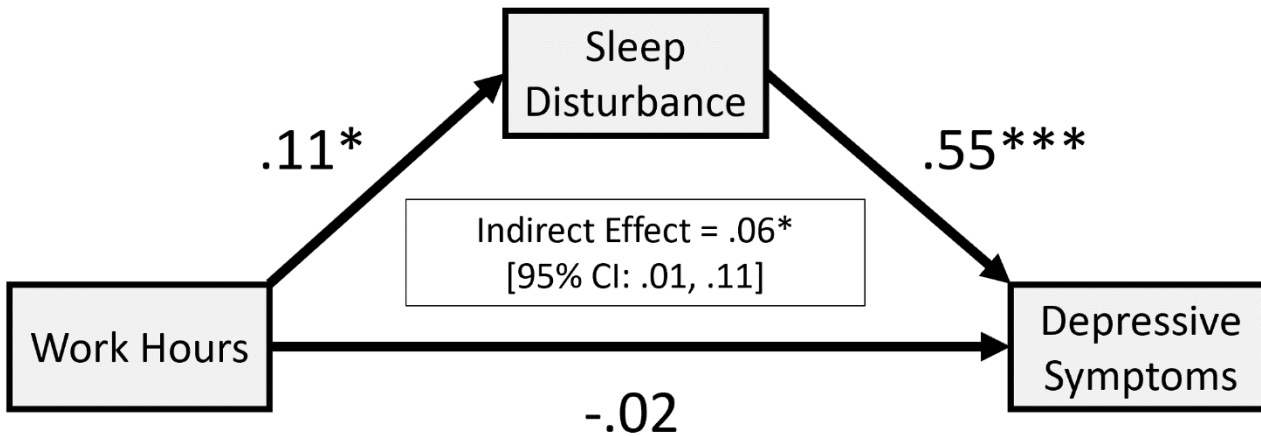
Figure 2. *Results of the Mediation (A) and Moderated-Mediation (B & C) Models. Note: The indirect effect for the mediation model is based on results from PROCESS Macro (Model 4), and the effect for the moderated-mediation models are from PROCESS Macro (Model 59).* $* p < .05. *** p < .001.$

A. Mediation Model

Sleep Disturbance

.11*

.54***

Indirect Effect = .06*
[95% CI: .02, .11]

Work Hours

Depressive Symptoms

-.01

B. Moderated-Mediation: Below Average Family SES (-1 SD)

Sleep Disturbance

.11*

.55***

Indirect Effect = .06*
[95% CI: .01, .11]

Work Hours

Depressive Symptoms

-.02

C. Moderated-Mediation: Above Average Family SES (+1 SD)

Sleep Disturbance

.06

.52***

Indirect Effect = .03
[95% CI: -.04, .11]

Work Hours

Depressive Symptoms

-.02