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## Coping Mechanisms in Graduate School Discipline Specific Comparison

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COPING MECHANISMS IN GRADUATE SCHOOL DISCIPLINE SPECIFIC COMPARISON

by

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A thesis submitted in partial fulfillment of the requirements

for the Honors in the Major Program in Psychology

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## **ABSTRACT**

Psychological research has studied the effects of college academic demands on students' well-being through the moderating role of coping mechanisms. This study provides further insight by focusing on coping mechanisms among graduate students from different fields, including humanities, STEM, and social sciences. Participants were recruited at the University of Central Florida (n=97). They answered an online survey assessing the prevalence of academic stressors, the use of different coping mechanisms, and strain outcomes, including somatic symptoms, insomnia, and burnout. STEM students reported higher organizational constraints and higher interpersonal conflict compare to students in other fields. Arts and humanities students reported higher use of maladaptive coping mechanisms. The results provide an essential overview of stress patterns among graduate students, an understudy population on academic well-being.

*Keywords:* work stressors, coping mechanism, graduate school

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## CHAPTER ONE: INTRODUCTION

In a phone survey study, 55% of graduate students considered stress as a significant challenge, and 43% indicated their stress was more than what they could handle (Repak, 2006). Other studies related to work-life balance conflict have been conducted on college students, but few have targeted graduate students. Compared to their undergraduate counterparts, graduate students report higher academic strain (Ickes et al., 2015).

Often universities, and governmental grants fund graduate students in the program through research, contracts, tuition waivers, and stipends. Those resources are allocated to promote the successful completion of students' academic programs. If students struggle with physical or mental well-being, the chances of leaving before completing their degree are higher.

On the other side, graduate students are a crucial part of some school operations. They assist by teaching, tutoring, grading, proctoring, and serving in administrative positions. Even understanding that the education department may have studied the population of graduate students, the field of Industrial and Organizational Psychology (I-O) is a suitable field to expand on the topic. Universities are not commonly thought as a workplace, but universities are organizations, and graduate students are employees of the university and future members of the workforce. Further, (I-O) has studied the relationship between stressors, coping mechanisms, and strain in organizations. Today, occupational health is a field that can impact the educational workplace, having a research focus on employee well-being, and work-life balance can set up students to successful program completion and beyond.

It is essential to evaluate the implication of this model to further research within our institutions. In this thesis, I intend to investigate coping mechanisms that moderate stress and well-being in graduate students. The data collected in this study will lead to a more in-depth

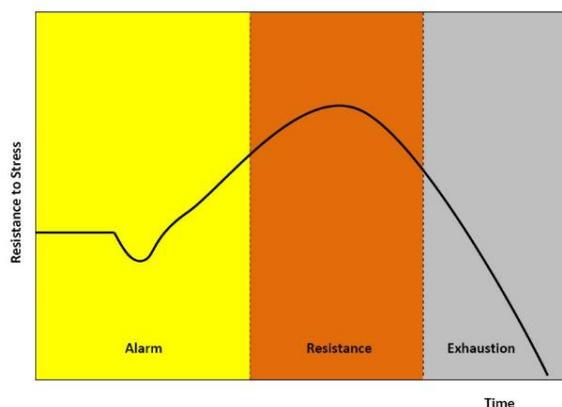
analysis of focal points. The present study also aims to understand whether students from different academic disciplines vary in the type of stressors experienced and therefore coping mechanisms they used.

## CHAPTER TWO: LITERATURE REVIEW

### Problem with the Conceptualization of Stress

Over the years, many definitions have emerged to describe stress. While stress has been associated with illness and disease (distress), it has also been associated with positive outcomes (eustress), e.g., performance improvements (H Selye, 1983). When Hans Selye introduced the distinction between stress and strain, he described stress as the "rate of wear and tear in the body" (Hans Selye, 1956). Still, the term had more challenges to be conceptualized because when talking about stress, people often refer to it in the context of the situation (e.g., students speak about pressure due to an upcoming exam) (Stangor & Walinga, 2018). Therefore, it was Selye who pointed out that stress is a "non-specific response of the body to any demands made upon it" (Hans Selye, 1973).

In its early exploration, stress was the dependent variable of the general adaptation syndrome (GAS), which consisted of three stages alarm, resistance, and exhaustion (Figure 1) (Hans Selye, 1973).



**Figure 1: General Adaptation to Stress (GAS) Model**

Source: (Stangor & Walinga, 2018). <https://opentextbc.ca/introductiontopsychology/chapter/15-2-stress-and-coping/>

The response model in Figure 1 shadows the concept of coping mechanisms at the alarm and resistance stages when the resistance to stress becomes higher. The alarm stage views coping as a physiological response (e.g., an increase of heart rate, and temperature) (Stangor & Walinga, 2018). At the resistance stage coping was understood by the actions of fight or flight generated to then accommodate the stressor. Later, resistance stage responses lead to the idea of self-regulation (Cannon, 1939).

Seeing a stressor as a stimulus is to treat it as an event that requires some type of response or adaptation (Holmes & Rahe, 1967). The adaptation moderates the ultimate effect of the stressor and the outcomes, which may include physical and psychological health. The problem with studying stress among a large population is that an event is assumed to be inherently stressful, in equal amounts, across people, and that beyond a threshold of adjustment, the illness will result. This view portrays human beings as passive recipients of their circumstances, but the conditions could be interpreted as a positive or negative experience based on cognitive and emotional factors (Rahe & Arthur, 1978).

The transactional theory of stress and coping (TTSC) presents stress as a result of a transaction between the individual and the environment (Lazarus, 1966). This definition also asserts that the complexity with the individual's cognitive, physiological, and affective parts that would include the role of perception, expectation, interpretation, coping, and more variables to the stress model. For example, personality traits like hardiness (Kobasa, 1979), locus of control (Rotter, 1966), self-efficacy (Bandura et al., 1999), self-regulation (Cannon, 1939), and optimism (Scheier & Carver, 1985) were studied as patterns leading to healthy vs. unhealthy outcomes of stressors. For the transactional model, the individual's appraisal of the circumstances, play a

crucial role (Lazarus, 1966). This model of interpretation consists of primary, secondary, and reappraisal (Lazarus & Folkman, 1984). During the primary appraisal, the individual determines the stressor as a threat. In the secondary appraisal, the individual evaluates the resources and coping strategies. Reappraisal moves continually by reshaping the perception of the stressor and the resources. Although the transactional model added complexity, it is still not possible operationalized the measure of stress; therefore, it relies on the outcome's measures (e.g., verbal and physiological measures).

Although stress is a popular term, there is no consensus in its definition of a scientific concept. It is "indefinable, immeasurable" (Cox, 1993). Instead, the empirical option is to analyze stress as a psychological state that reflects the interaction between the individual and the work environment (Cox, 1993).

#### Conceptualization of Coping Mechanism

Because individuals cannot live in a continuous state of tension, a strategy must be adopted, coping. According to Lazarus and Folkman (1984), "copying is all the cognitive and behavioral efforts to master, reduce, or tolerate demands" (p.152). Two dominant coping approaches were identified early on, avoidance and active coping (Jex et al., 2001). For example, denying the situation is an avoidance approach, while planning is an active approach. The literature on appraisal followed problem-focused and emotion-focused coping (Folkman & Lazarus, 1980). In the second stage of appraisal, the individual determines a coping strategy (Lazarus & Folkman, 1987). If the individual does not believe he or she has the capacity or resources to face the challenge, he or she is more likely to turn to emotion-focused coping (Lazarus & Folkman, 1987). Emotion-focused coping includes changing the meaning of the

situation rather than changing the situation itself. If the person assesses that he or she possesses the resources to face a threat, the individual could manage the stressor with problem-focused coping. Problem-focused coping alters or manages the source of stress. Problem-focused coping includes decision-making, direct action, and problem-solving.

### Stress Reactions

Individuals can be affected at a physiological level, affective level, or behavioral level in either short-term or long-term. Physiological responses to stress can affect the cardiovascular system with high blood pressure (Schwartz et al., 1996), high levels of cholesterol, and heightened risk of cardiovascular disease (Vrijkotte et al., 1999). The cardiac system is partially affected by hormones, e.g., cortisol (Sonnentag & Frese, 2003). The excretion of cortisol in chronic stress contributes to illnesses like coronary heart disease (Schulz et al., 1998). Stress also affects the immune system (Herbert, 1993), and may increase the odds of musculoskeletal disorders (Bongers et al., 1993).

Affective reactions, in the long run, impact the mental health and well-being through depression (Schonfeld, 1992), psychosomatic symptoms (Frese, 1985), and burnout (Leiter, 1991). Burnout is characterized by emotional exhaustion, low self-efficacy, and feelings of low personal accomplishments (Maslach & Jackson, 1981).

Stressors influence negative behavioral responses, including reduced performance in specific areas like memory capacity (Searle et al., 1999). Other behavioral effects include violence and hostility (Chen & Spector, 1992). In the workplace, it could lead to less commitment and turnover intentions.

### Variation Among Discipline Demands

The focus of the present study relied on the demanding variations of academic fields. Disciplines shared a four-part scholarship foundation: discovery, research, teaching, and serving (Boyer, 1990); however, disciplines vary in the weight and arrangement of this element (Force, 1992), as well as, their methodologies, values, mission, and objectives (Adam & Roberts, 1993).

In the case of STEM disciplines, the focus is placed on the application of problem-solving, critical thinking, analytical thinking, and reasoning to reach human wants and needs (Board, 2007; Brophy, 2008; Merrill & Daugherty, 2009). Arts and humanities include languages, literature, history, philosophy, visual, and performing arts. Scholarship in the field of art and humanities is based on creation, process, and product (Force, 1992). Disciplines tend to emphasize on the activities related to the success of their field. For STEM, it is the on experimental research, while arts and humanities emphasize creativity, new ideas, and teaching practices. The variations of demands and culture between arts and humanities, social sciences, and STEM led to the hypothesis that the experience on stressors and coping mechanisms of graduate students may differ by discipline.

Stressors in the present study included work-life balance, quantity and quality of workload, interpersonal relations at the institution, supervisor conflict, organizational constraints, and finances. To formulate a hypothesis, I explore students' discipline-specific circumstances that may affect the stressors of their environment.

Graduate students in STEM fields often spend 50 to 60 hours a week working in a laboratory (Berezow, 2018), which may limit their time with friends and family. STEM work in laboratories is often inflexible and time-consuming (Minnotte, 2019). Both men and women

consider that achieving life balance is more difficult for those in the STEM field (Tan-Wilson & Stamp, 2015).

Another stressor of academics is the workload. Workload refers to work volume, both in quantity and quality. In one study, clinical psychology graduate students reported academic coursework pressures as their top-rated stressor (68%) (Rummell, 2015). The quantitative workload refers to the amount of work. In the study by Rummell, students reported spending an average of 54 hours per week in activities related to school (Rummell, 2015); however, in other studies, students have reported 60 hours per week (Willyard, 2012). STEM students may experience higher workload stress because of the evaluation of their performance depends largely on research productivity (Porter & Umbach, 2001). In contrast with the quantitative workload, qualitative workload refers to the difficulty of the tasks. For students in arts and humanities, creative work may seem simple on the surface; however, the process, techniques, and structure of add layers of complexity to the artwork.

Dual responsibilities limit students' social and family participation (Park & Sprung, 2013). Multiple demands require the allocation of resources to different life domains, which may cause conflict and ultimately result in stress (Butler et al., 2010). A stressful work environment leads to complicated unwinding processes after work hours (Frankenhaeuser, 1981). On the Barna Research Group survey, work-life balance was among students' primary concerns; 60 % of graduate students indicated they needed more balance in their lives (Repak, 2006). Regardless of the academic discipline, students often fulfill different roles at the same time — for example, teacher, student, researcher, spouse, parent, or caregiver. (Myers et al., 2012).

According to Rummel (2015), Psychology graduate students indicated that a better connection with the faculty was their top suggestion for the graduate program (2015). Often graduate students would push to master skills even in the lack of guidance (Repak, 2006) although little research has been done in the comparison of supervisor relationships among disciplines. Since advisor support is one-factor influencing burnout and career satisfaction (Kovach Clark et al., 2009), supervisor relations could be playing a central role in the student's environment.

In addition, many students' enrollment requires relocations far from home. Although students may find meaningful interpersonal relationships with their cohorts, it also depends on the environment of the department. In STEM, gender studies have found women's burnout is influenced by interpersonal conflict (Minnotte, 2019). The STEM department environment may be very competitive, which could hinder relationships. Likewise, the dependence of equipment on STEM fields could lead to higher organizational constraints

The delay to entry into the job market can produce financial concerns during their academic years. When comparing disciplines, only 26% of STEM graduate students vs. 46% of art and humanities students have taken student loans during their graduate school enrollment (Kang, 2017). The view that STEM disciplines emphasize addressing practical human needs could lead to higher financial support (Force, 1992).

Based on the previous review of the literature, the following hypotheses are proposed:

1. It is expected for STEM students to report higher difficulty balancing work-life and study.

2. Students in STEM would report higher quantitative workload while students in arts and humanities would report higher qualitative workload.
3. No previous information was found on a discipline-specific relationship with the supervisor outside clinical psychology. The limited information may suggest a higher conflict between supervisor and student in social sciences.
4. STEM students would report higher interrelationship conflict.
5. STEM students may report higher organizational constraints.
6. Due to the number of graduate students taking loans in arts and humanities, arts, and humanities, students will report higher financial stress.

### Coping Mechanism Assessment

The main purpose of the study was to assess what type of coping mechanisms graduate students use to cope with academic demands and whether coping differs across fields. However, there is limited evidence evaluating coping mechanisms based on the academic field. Thus, the present study was largely exploratory. Using the self-report COPE inventory, I compared levels of problem-focused, emotional-focused, and maladaptive coping (classified in Table 1) (Baqtayan, 2015; Litman, 2006) across academic disciplines.

Table 1: Classification of Coping Mechanism Between Problem vs. Emotional Focused

Problem-focused	Emotional-Focused	Maladaptive
Active coping	Emotional Support	Venting
Planning	Positive Reframing	Mental Disengagement
Suppression	Acceptance	Behavioral Disengagement
Restrain	Denial	Alcohol and drug used
Instrumental Support	Religion	

### Stress Reactions Hypothesis

I expect to see that maladaptive coping leads to a negative effect on students' psychological (burnout) and physiological health (somatic symptoms, insomnia). On the contrary, problem-focused and emotional-focused coping would moderate to ease the effect of stressors on the student's well-being.

## CHAPTER THREE: METHODS

### Sample

The sample consisted of ninety-nine graduate students from the University of Central Florida enrolled in a variety of academic programs, including Chemistry, Biology, Computer Science, Engineering, Psychology, Sociology, Public Affairs, and Political Science, Writing & Literature, Theater, Management, and Economics. Thirty-five surveys were from social science, thirty-four from STEM, twenty-six from arts and humanities, and five from a business. Due to the lower number of business participants, their data was not analyzed in the present study. Thirty-five students were enrolled in a master's program, while sixty-two were in Ph.D. programs. The participants were sixty-one women and thirty-seven men. Their average age was twenty-eight, with the youngest being twenty-two and the oldest fifty ( $SD=5.34$ ). Four participants identified as Black, thirteen identified as Hispanics, seven as Asian or Pacific Islanders, seventy-seven as White, and four as multiracial. Table 2 shows the breakdown of the overall demographic per discipline.

Table 2: Sociodemographic Characteristics of Participants at Baseline

Baseline characteristics	<i>N</i>	%
Graduate Program		
Master	34	28%
Doctorate	65	54%
Year in Graduate School		
First	27	28%
Second	27	28%
Third	19	20%
Fourth	13	13%
Fifth	11	11%
Gender		
Female	59	37%
Male	35	63%
Marital Status		
Single	39	41%
Long-Term Relationship	19	20%
Cohabiting	10	11%
Married	26	27%

Divorced/Widowed	1	1%
Other	0	0%
Taking Care of Children or Elders	14	15%
Employment		
GTA	48	40%
GRA	28	23%
Tutor	4	3%
Other on Campus	7	6%
Off-Campus Part-Time	16	13%
Off-Campus Full-Time	15	12%
Internship	3	2%
Race		
American Indian or Alaskan Native	0	0%
Black/African American	4	4%
Hispanic/Latino	13	13%
Asian/Pacific Islander	7	7%
Caucasian/White	72	69%
Decline to answer	2	2%
Multi-Racial/Mixed	4	4%

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*Note.*  $N = 97$ . 3 Participants were excluded because their discipline did not match any category (academic field) ( $n = 34$  for STEM,  $n = 35$  for Social Science, and  $n = 26$  for arts and humanities). Participants were, on average, 26.1 years old ( $SD = 4.24$ ).

## Measures

### *Demands*

Due to the number of variables being measured, I limited the survey to 4 items per work-related stressor. A total of twenty-nine items were generated to assess the prevalence of stressors. The scales used to measure stressors included the Quantitative Workload Inventory (QWI) (Spector & Jex, 1998). Cognitive demands were measured with The Copenhagen Psychological Questionnaire COPSOQ (Pejtersen et al., 2010). Other scales included Interpersonal Conflict at Work Scale (ICAWS) adapted for academic settings (Spector and Jex, 1998), Organizational Constraints Scale (OCS) (Spector & Jex, 1998), and advisor relationship questions including questions such as “my advisor is an asset to my academic and professional career” and “there is a good atmosphere between my advisor and me” (Evans et al., 2018). For the work-life balance conflict, Checkscale7 was used (Dex & Bond, 2005). To measure financial demands, one item was taken from the Financial Anxiety Scale (FAS) (Burchell & Shapiro, 2012) due to its reliability, Cronbach's alpha = 0.809. The last two items came from (Norvilitis et al., 2003) because the questionnaire fitted adequately with the student population (e.g., "I worry about repaying my student loan"). Participants responded to the demand's statements using a 1-to-7 scale (1 = strongly disagree, 7= strongly agree).

### *Coping Mechanisms*

Fifty-eight items were used to evaluate the use of different coping mechanisms. The scales included the Cope Inventory (Carver et al., 2013), and the Drinking Motives Questionnaire, revised (DMQ-R), which was used to assess the use of alcoholic beverages as a coping mechanism (Cooper, 1994; Grant et al., 2007). Participants self-reported their coping

strategies using a 1-to-5 scale (1 = never, 5= very frequently). The four items from The Concise Physical Activity Questionnaire CPAQ was included to assess exercise habits (Sliter & Sliter, 2014).

### *Outcomes*

Insomnia was measured with a scale developed by Jenkins and colleagues (Jenkins et al., 1988). This scale has been used in previous, more recent studies as well (Scott & Judge, 2006)

The Physical Symptoms Inventory (PSI) with eighteen items was used to measure health outcomes associated with psychological distress scores computed by the sum of item response (Spector & Jex, 1998). Four items assess burnout using The Copenhagen Burnout Inventory (Kristensen et al., 2005).

### Procedure

Surveys were emailed to academic program department representatives, who then distributed them to potential participants through email. The study was described to participants as research designed to examine strain and coping mechanisms among graduate students considering the relation to the demands among educational disciplines. Participants in the study were asked to complete a survey answering questions regarding their experiences with different role stressors, coping mechanisms, and strain measures including, insomnia, somatic symptoms, and burnout. The study took around 20 minutes for participants to complete. Participants filled the survey online through Qualtrics.

### Data Analysis

Before addressing the research question, I took preliminary steps. Since all variables were multiple-response measures, I assessed the internal consistency using Cronbach's alpha before aggregate to an overall score.

Later, I identified outliers by checking if any response was input incorrectly in the data file, assessing the impact of outliers, assessing question misunderstandings, or lack of effort from a participant.

Next, each variable was analyzed independently using graphs, variability, and central tendency measures. To compare similarities or differences responses of stressors and coping mechanisms from students in each field data was analyzed with ANOVA, followed by Tukey HSD test to determine the specific difference between academic discipline responses. Finally, A correlation was conducted to address the relationship between health outcomes and coping mechanisms.

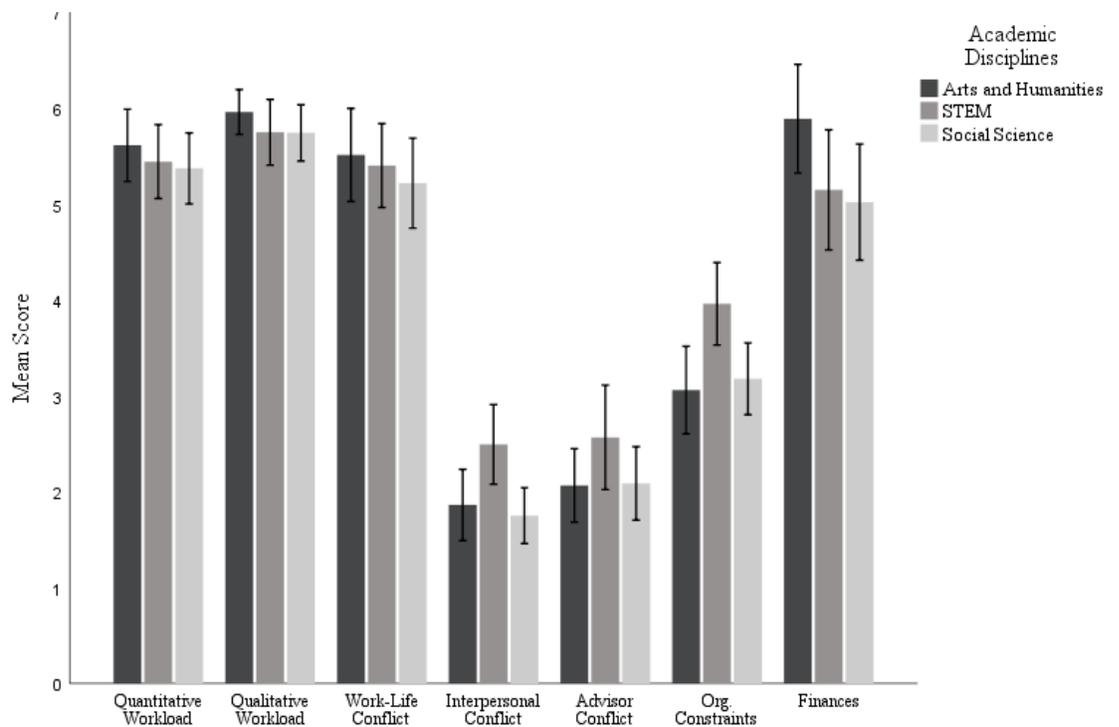
## CHAPTER FOUR: RESULTS

The main research questions were addressed by comparing three samples, students from arts and humanities, STEM, and social science. To conduct the analysis, I used one-way ANOVA followed by the post hoc test, Tukey HSD.

### Stressors

Mean responses to stressors are found in Table 2. Mean responses across fields reported qualitative workload to be the most prevalent demand in graduate school ( $M=5.76$ ,  $SD= 0.90$ ). The less frequent stressor across disciplines was interpersonal conflict ( $M=2.03$ ,  $SD= 1.05$ ). Only the responses for interpersonal conflict and organizational constraints were significantly different among disciplines.

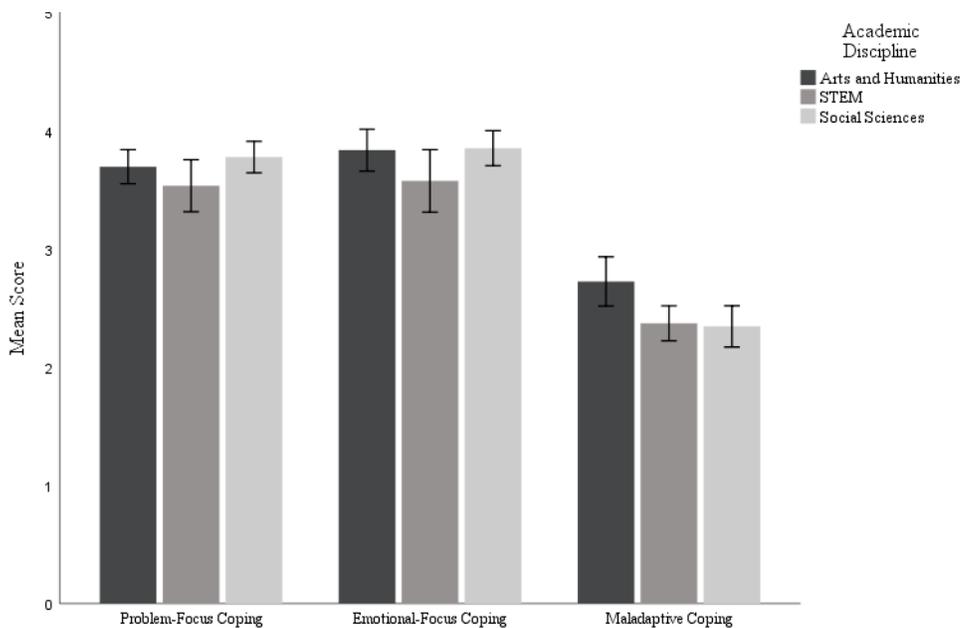
In accordance with the hypothesis, STEM students reported high interpersonal conflict ( $M=2.49$   $SD= 1.19$ ) despite the low average, the mean difference was significant among disciplines. [ $F (2, 94) = 5.371$   $p = 0.006$ ]. The results of the Tukey test indicated that STEM average response was scientifically higher than arts and humanities ( $M=1.87$ ,  $SD=0.92$ ) and social sciences ( $M=1.75$ ,  $SD=0.85$ ). In accordance with the hypothesis, STEM students reported higher experiences with organizational constraints ( $M= 3.96$ ,  $SD= 1.23$ ). The mean difference was significant among disciplines [ $F (2, 94) = 5.80$ ,  $p = 0.004$ ]. The results of the Tukey test indicated that STEM average response was significantly higher than arts and humanities ( $M=3.06$ ,  $SD=1.13$ ) and social sciences ( $M=3.18$ ,  $SD=1.09$ ).



**Figure 2: Mean Score of Stressors**  
(error bars represent 95% confidence interval).

### Coping Mechanism by Groups

Overall, students reported the use of emotional-focused coping ( $M=3.74$ ,  $SD=0.58$ ) as the highest compare to the other two coping groups. The means difference of maladaptive coping was significant [ $F(2, 94) = 5.631$ ,  $p = 0.005$ ]. The Tukey test results indicated that the average use of maladaptive coping on arts and humanities ( $M=2.72$ ,  $SD=0.54$ ) was scientifically higher to both the STEM ( $M= 2.37$ ,  $SD= 0.42$ ) and social science group ( $M=2.34$ ,  $SD=0.51$ ).



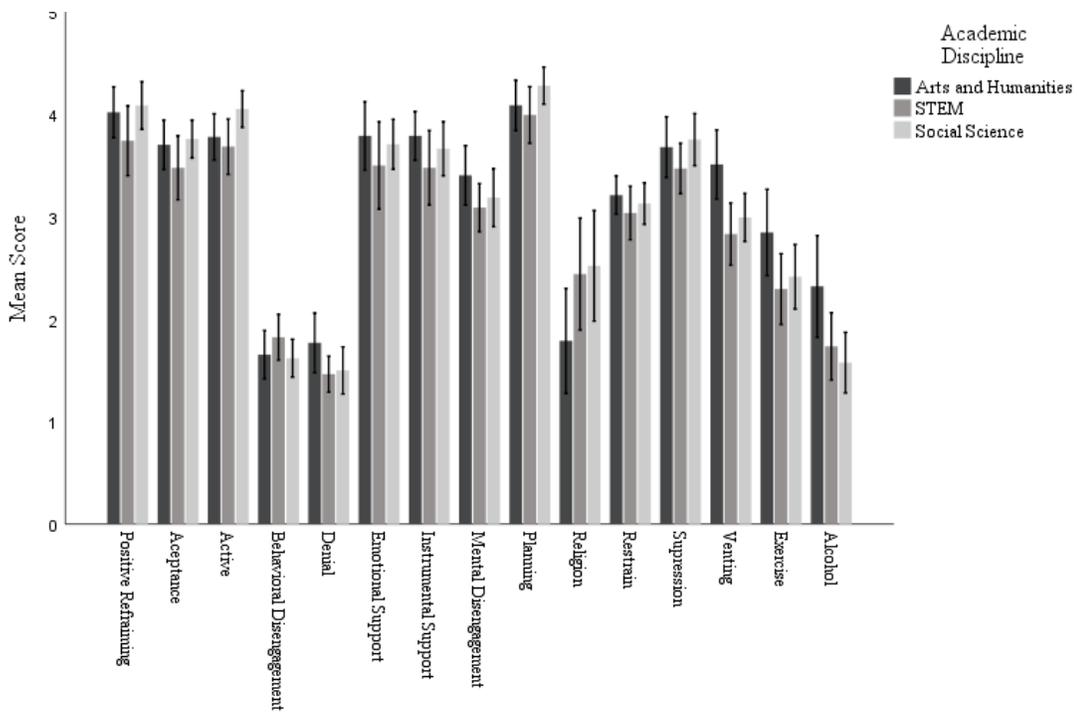
**Figure 3: Mean Score of Coping Mechanism Groups**  
(error bars represent 95% confidence interval).

### Coping Mechanisms

The main research question of the study was to assess the type of coping mechanism used by students in different fields. Through the COPE inventory, the survey measured positive reframing, acceptance, active coping, behavioral disengagement, denial, emotional support, instrumental support, mental disengagement, planning coping, religious coping, restrain, suppression, and venting; through CPAQ scale exercise habits, and DMQ-R for alcohol drinking coping. Overall, students report planning as the most prevalent strategy ( $M=4.11$ ,  $SD=0.66$ ) and denial of the lowest used mechanism ( $M=1.57$ ,  $SD=0.61$ ).

Active coping mean difference among disciplines was significant [ $F(2, 94)= 3.276$ ,  $p=0.042$ ] only between social sciences ( $M=4.05$ ,  $SD=0.52$ ) and STEM ( $M=3.68$ ,  $SD= 0.78$ ).

Arts and humanities had the highest mean response to venting ( $M=3.55$ ,  $SD= 0.84$ ), the means difference for venting was significant [ $F(2, 94) = 6.776$ ,  $p = 0.002$ ]. The results on the Tukey test indicated the mean of arts and humanities was significantly higher than the mean response of STEM ( $M= 2.83$ ,  $SD=0.87$ ) and social sciences ( $M=2.99$ ,  $SD=0.68$ ). Finally, arts and humanities indicated the highest mean response to alcohol coping ( $M=2.30$ ,  $SD=1.21$ ), [ $F(2, 94)= 4.336$ ,  $p= 0.016$ ]. The Tukey test indicated alcohol coping differs significantly between art humanities and social sciences ( $M=1.58$ ,  $SD=0.80$ ) but not between arts humanities and STEM ( $M=1.74$ ,  $SD=0.94$ ).



**Figure 4: Mean Score of Coping Mechanisms**  
(error bars represent 95% confidence interval).

Table 3: Cronbach's Alpha Reliability Coefficient for Likert-Scales

Variable	Cronbach's Alpha	Number of Items
<b>Stressors</b>		
Quantitative Workload	0.734	4
Qualitative Workload	0.726	4
Work-life Balance Conflict	0.88	5
Interpersonal Conflict	0.675	4
Conflict with Advisor	0.875	4
Organizational Constraints	0.752	4
Financial Demands	0.863	3
<b>Coping by Group</b>		
Problem-focused	0.758	5
Emotion-focused	0.336*	5
Maladaptive	0.497	4
<b>Coping Mechanism</b>		
Positive Reframing	0.848	4
Acceptance	0.649	4
Active	0.721	4
Behavioral Disengagement	0.663	3
Denial	0.707	4
Emotional Support	0.898	4
Instrumental Support	0.78	4
Mental Disengagement	0.401	4
Planning	0.834	4
Religion	0.976	4
Restrain	0.523	4
Suppression	0.623	3
Venting	0.809	4
Exercise habits	0.788	4
Alcohol Consumption Coping	0.908	5
<b>Other Alcohol Consumption</b>		
Alcohol Enhancement	0.899	5
Alcohol Social	0.919	5
Alcohol Drinking Total	0.941	15
<b>Outcomes</b>		
Somatic Symptoms	0.856	10
Insomnia	0.788	4
Burnout	0.783	4

\*Note: Reliability of emotional-focused coping was affected by religious coping and denial coping. When removing those variables from the model the reliability between emotional support, acceptance, and positive reframing was .520

Table 4: Means, Standard Deviations, and One-Way Analyses of Variance

Variables	Arts and Humanities		STEM		Social Science		Total		<i>F</i> (2,94)	<i>P</i>	$\eta^2$
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Stressors	4.29	0.65	4.39	0.82	4.05	0.66	4.22	0.76	2.059	0.133	0.042
Quantitative Workload	5.64	0.95	5.44	1.10	5.37	1.08	5.44	1.06	0.545	0.582	0.011
Qualitative Workload	5.98	0.59	5.75	0.98	5.74	0.85	5.76	0.90	0.781	0.461	0.016
Work-life Balance Conflict	5.53	1.21	5.40	1.25	5.22	1.37	5.35	1.30	0.472	0.625	0.010
Interpersonal Conflict	1.87	0.92	2.49	1.19	1.75	0.85	2.03	1.05	5.371**	0.006	0.103
Conflict with Advisor	2.03	0.97	2.57	1.56	2.09	1.11	2.26	1.28	1.816	0.168	0.037
Organizational Constraints	3.06	1.13	3.96	1.23	3.18	1.09	3.38	1.24	5.80**	0.004	0.110
Financial Demands	5.93	1.42	5.15	1.79	5.02	1.76	5.29	1.72	2.568	0.082	0.052
Coping by Group											
Problem-focused	3.69	0.37	3.53	0.63	3.77	0.39	3.66	0.49	2.231	0.113	0.045
Emotion-focused	3.83	0.46	3.57	0.76	3.85	0.43	3.74	0.58	2.444	0.092	0.049
Maladaptive	2.72	0.54	2.37	0.42	2.34	0.51	2.46	0.51	5.631*	0.005	0.107
Coping Mechanism											
Positive Reframing	3.99	0.61	3.74	0.98	4.09	0.68	3.93	0.79	1.765	0.177	0.036
Acceptance	3.69	0.58	3.48	0.89	3.76	0.54	3.63	0.69	1.490	0.231	0.031
Active	3.75	0.55	3.68	0.78	4.05	0.52	3.82	0.66	3.276*	0.042	0.065
Behavioral Disengagement	1.63	0.58	1.82	0.64	1.62	0.54	1.71	0.61	1.275	0.284	0.026
Denial	1.77	0.70	1.46	0.50	1.50	0.67	1.57	0.63	2.113	0.127	0.043
Emotional Support	3.82	0.81	3.50	1.22	3.71	0.71	3.65	0.95	0.932	0.397	0.019
Instrumental Support	3.79	0.57	3.48	1.04	3.66	0.77	3.61	0.83	1.094	0.339	0.023
Mental Disengagement	3.41	0.69	3.09	0.67	3.19	0.83	3.21	0.74	1.514	0.225	0.031
Planning	4.06	0.61	3.99	0.79	4.28	0.53	4.11	0.66	1.784	0.174	0.037
Religion	1.73	1.24	2.44	1.57	2.52	1.57	2.26	1.51	2.571	0.082	0.052
Restrain	3.18	0.47	3.04	0.75	3.13	0.59	3.09	0.62	0.424	0.656	0.009
Suppression	3.69	0.72	3.47	0.71	3.75	0.74	3.65	0.73	1.427	0.245	0.029
Venting	3.55	0.84	2.83	0.87	2.99	0.68	3.08	0.85	6.776**	0.002	0.126
Exercise habits	2.85	1.04	2.29	0.99	2.41	0.92	2.48	0.98	2.513	0.087	0.052
Alcohol Coping	2.30	1.21	1.74	0.94	1.58	0.86	1.84	1.02	4.336*	0.016	0.084
Other Alcohol Consumption											
Alcohol Enhancement	2.55	1.23	2.09	1.03	1.97	1.09	2.20	1.15	2.315	0.104	0.047
Alcohol Social	2.79	1.29	2.65	1.22	2.41	1.22	2.64	1.24	0.793	0.456	0.017
Alcohol Drinking Total	2.55	1.11	2.16	0.86	1.98	0.94	2.23	0.98	2.714	0.071	0.055
Outcomes											
Somatic Symptoms	29.35	10.37	34.15	8.79	34.34	7.20	33.32	9.01	<i>F</i> (2,94)		
Insomnia	1.88	0.91	2.16	1.05	2.15	1.03	2.14	1.05	2.984	0.056	0.061
Burnout	3.82	0.98	3.69	0.96	3.62	0.87	3.71	0.91	0.739	0.480	0.016
									0.332	0.718	0.007

\*Significant at the .05 probability level. \*\*Significant at the .01 probability level.

Table 5: Results from Post-Hoc Tukey Test

Variables	<i>P</i>	
	A&H	STEM
Interpersonal Conflict		
Arts and Humanities		
STEM	0.042*	
Social Science	0.891	0.008*
Organizational Constraints		
Arts and Humanities		
STEM	0.009*	
Social Science	0.921	0.016*
Maladaptive Coping		
Arts and Humanities		
STEM	0.015*	
Social Science	0.008*	0.973
Active Coping		
Arts and Humanities		
STEM	0.911	
Social Science	0.150	0.046*
Venting Coping		
Arts and Humanities		
STEM	0.002*	
Social Science	0.018*	0.677
Alcohol Coping		
Arts and Humanities		
STEM	0.076	
Social Science	0.015*	0.787

\*. The mean difference is significant at the 0.05 level.

## Outcomes

The outcomes hypothesis expected the results to indicate a correlation between maladaptive coping and reports of psychological and physiological health issues measures through somatic symptoms, insomnia, and burnout.

The results of the correlations (Table 6) indicated a weak negative correlation between maladaptive coping and somatic symptoms ( $r=-0.246$   $p=0.016$ ). Contrary to the hypothesis, students that reported higher use of maladaptive coping recorded fewer physical signs of distress.

However, maladaptive coping and burnout were moderately positive correlated ( $r=0.362$   $p<0.001$ ). In accordance with the hypothesis, students that reported higher use of maladaptive coping also expressed a higher burnout score.

Insomnia responses and maladaptive coping did not correlate. The only correlation with insomnia was with religious coping ( $r=0.398$ ,  $p<0.001$ ). This was a moderate positive correlation. This means that students that indicated higher religious coping also reported higher sleep difficulties.

To understand the types of maladaptive coping that correlated with the outcomes. The correlations of outcomes with each coping mechanisms were examined, as seen in Table 6. Specific coping mechanism that correlated with burnout were behavior disengagement ( $r=.208$   $p=0.04$ ), denial ( $r=.298$ ,  $p=0.003$ ), mental disengagement ( $r=.249$ ,  $p=0.015$ ), venting ( $r=.256$ ,  $p=0.0012$ ), and alcohol coping ( $r=.256$ ,  $p=0.0012$ ).

Reports of physical symptoms correlated with denial ( $r=.298$   $p=0.003$ ) instrumental support ( $r=-.240$   $p=0.019$ ), mental disengagement ( $r=.283$   $p=0.006$ ), religious coping ( $r=.259$   $p=0.011$ ), and venting ( $r=-.298$   $p=0.003$ ).

Table 6 Correlations for Survey Coping Mechanism and Outcomes

Variable	<i>M</i>	<i>SD</i>	<i>df</i>	PSI	Insomnia	Burnout
Coping by Group						
Problem-focused	3.657	0.49	95	-0.067	0.064	-0.034
Emotion-focused	3.736	0.58	95	-0.060	0.078	-0.067
Maladaptive	2.462	0.51	95	-.246*	-0.076	.362**
Coping Mechanism						
Positive Reframing	3.93	0.79	95	0.039	0.082	-0.193
Acceptance	3.63	0.69	95	-0.029	0.081	0.129
Active	3.82	0.66	95	0.060	0.033	-0.169
Behavioral Disengagement	1.71	0.61	95	0.003	0.145	.208*
Denial	1.57	0.63	95	-.348**	-0.174	.298**
Emotional Support	3.65	0.95	95	-0.122	0.016	-0.060
Instrumental Support	3.61	0.83	95	-.240*	-0.047	0.041
Mental Disengagement	3.21	0.74	95	-.283**	0.010	.249*
Planning	4.11	0.66	95	0.123	0.065	-0.161
Religion	2.26	1.51	95	.259*	.398**	-0.170
Restrain	3.09	0.62	95	-0.111	0.124	0.017
Suppression	3.65	0.73	95	-0.022	0.078	0.117
Venting	3.08	0.85	95	-.298**	-0.144	.256*
Exercise habits	2.48	0.98	93	-0.008	-0.050	-0.137
Alcohol Consumption Coping	1.84	1.02	95	-0.047	-0.124	.215*

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).

## CHAPTER SIX: DISCUSSION

### Implications

The purpose of this investigation was to provide an overview of stress, coping, and strain outcomes in graduate students. The first goal was to evaluate the stressors and coping mechanisms variations and similarities among disciplines.

Interpersonal conflict and organizational constraints in STEM were significantly higher compared to other fields. One possible explanation is that STEM students depend upon the function of lab equipment. The second possible explanation is that compared to arts humanities and social sciences, the STEM field has less emphasis on social expertise. It could be that this lack of focus on social environments limits the importance of administration and student's communication.

Interpersonal conflict was the least prevalent stressors reported among graduate students in all fields (Figure 2), even with a low average STEM scored higher compare with the other disciplines. As hypothesized in the beginning, these results may be influenced by the environment of competition between groups among STEM students. Another possible factor could be the language and cultural barriers that international students in STEM experience. Compare to other disciplines, U.S. programs in STEM tend to receive a higher percentage of international students.

As shown in Figure 1, the most common stressor in graduate school (regardless of the field) was indicated to be a qualitative workload, followed by a quantitative workload. Planning was the most frequently used coping mechanism (Figure 4). It is understandable that for a graduate-level curriculum to demand a higher-level difficulty and overall extent of work.

A practical implication of the findings may suggest that a well-structured academic program would ease qualitative and quantitative stressors by allowing students to plan ahead to accomplish high volume and difficult requirements. For example, a detailed manual may benefit students to have a greater understanding of the layers of complexity and the lastingness of each assignment. This information would guide students to organize and prioritize their time accordingly with the qualitative and quantitative workload.

On the use of grouped coping mechanisms, arts, and humanities, students reported higher use of maladaptive coping, including venting and alcohol drinking. One possible explanation is that arts and humanities participants may have been more receptive to express vulnerabilities on the rating of maladaptive coping. Another possible explanation for this finding is that the work of arts and humanities demands students to put more of their self-identity into their projects (e.g., their opinions and thoughts). If their work is not well received, this could be led the students to take the feedback personally. They may think that they are not good enough instead of thinking that their work can improve. Resulting in a response that is inclined to avoid the situation through maladaptive coping.

The second aspect of the study was to address the relationship between coping types and student's physical and psychological health. A significant correlation with insomnia was only found with religious coping. Although it was not expected, this finding supports another study that found a correlation between religious doubts and insomnia (Ellison et al., 2011). The risk of the use of maladaptive coping is that it could lead to unhealthy physical and psychological outcomes.

In these studies, the use of maladaptive coping did not indicate effects on unhealthy physical symptoms, but burnout and maladaptive coping mechanisms had a significant moderated correlation. That is to say that students using maladaptive coping may be at a higher risk of burnout. Arts and humanities graduate students may be at higher risk of burnout, and burnout leads to higher turnovers. STEM students and even social science students have been studied more frequently for burnout symptoms (Minnotte, 2019; Rummell, 2015). Still, these results suggest that higher research attention should be given to arts and humanities students.

#### Limitations

An obvious limitation of the current study is the use of one-time self-report data. In academics, students have periods of higher and lower demands; repeated measures would have allowed seeing their responses to the stressors over time. With self-reported data, participants are more likely to report considering socially acceptable responses. Another reason avoids self-report measures is the physical symptoms that for one individual are normal for another can be view as minimal or extreme. The use of non-evasive devices to measure outcomes could be a way to approach this issue.

The present study was limited to include academic performance as an outcome, which could be an essential consequence of poor mental health in graduate school. Ultimately, my sample was limited to one university. Studies on different approaches have been conducted across various universities, and this could be an opportunity to use a more representative sample of the study population.

## Conclusion

To summarize, the present study provides a big picture overview of the stressors-coping model in the graduate school population factor by academic discipline. This was accomplished by examining the reported ratings of academic stressors, coping mechanisms, and health symptoms. The findings suggest that regardless of the discipline, the most prevalent stressors (quantitative and qualitative workload) and coping mechanisms (planning and positive reframing) were similar. One of the significant differences among disciplines was the use of maladaptive coping in arts and humanities students. One possible explanation is that arts and humanities students may have been more comfortable sharing their coping experiences. Despite this, maladaptive coping and burnout were significantly correlated, which may place graduate students at risk of turnovers.

## **APPENDIX A: RECRUITMENT EMAIL**

Greetings,

My name is Sandra Montenegro. I am a current student trying to complete my thesis project. I am reaching out to you with the hope that you agree to forward a recruitment email (bellow) to the graduate students in your department. The study aims to survey graduate students in multiple departments to evaluate their stress copy mechanisms. It has received IRB approval (see attached).

I would appreciate your help,

If you have any doubts, feel free to reach out to me or my thesis chair (Dr. Steve Jex -

[steve.jex@ucf.edu](mailto:steve.jex@ucf.edu)

Sandra Montenegro  
Student  
Industrial and Organizational Psychology  
University of Central Florida

---

Greetings,

I hope you are having a great semester! My name is Sandra Montenegro, and I am conducting a study on stress among graduate students as part of my Honors in Major (HIM) program. I would like to invite you to participate in the survey

here: [http://ucf.qualtrics.com/jfe/form/SV\\_8iRMGkDJT0QAXmR](http://ucf.qualtrics.com/jfe/form/SV_8iRMGkDJT0QAXmR)

The criteria for participants to be eligible to:

- Must be 18 years old or older
- Must be a UCF Masters or Ph.D. student.

The reason this study is being conducted is because previous studies have provided some understanding of the mental health in graduate students but have not yet considered the effects of different coping mechanisms in relation to the demands among educational disciplines. The present study aims to close that gap by comparing stressors and coping mechanisms on graduate students enrolled in different programs to better understand factors of well-being.

Participants in this study would be asked to complete a survey answering questions regarding their experiences with different role stressors, coping mechanisms, physical and psychological strain symptoms. The survey should around 20 minutes to complete.

Due to the limited time that I have to complete the HIM thesis, I would appreciate it greatly if you can complete the survey by **November 15th**.

If you have any questions or concerns, you can contact me at [sandramontenegro@knights.ucf.edu](mailto:sandramontenegro@knights.ucf.edu) or Dr. Steve Jex, Principal Investigator, at [steve.jex@ucf.edu](mailto:steve.jex@ucf.edu) - Psychology Building Office 356.

Your department office is forwarding this email for me to assure you that we will not obtain your contact information.

Thank you in advance for your time,

Sandra Montenegro  
Undergraduate Student  
Industrial and Organizational Psychology  
University of Central Florida

**STRESS AMONG GRADUATE STUDENTS STUDY**

THE CRITERIA FOR PARTICIPANTS IS:  
-MUST BE 18 YEARS OLD OR OLDER  
-MUST BE A UCF MASTERS OR PH.D. STUDENT

Previous studies have provided some understanding of the mental health in graduate students but have not yet consider the effects of different coping mechanisms in relation to the demands among educational disciplines. The present compares stressors and coping mechanisms on graduate students enrolled in different programs to better understand factors of well being.

Participants in this study would be ask to complete a survey answering questions regarding their experiences with different role stressors, coping mechanisms, physical and psychological strain symptoms. The survey should around 20 minutes to complete.

ONLINE SURVEY IS LOCATE HERE >>>

If you have any questions or concerns you can contact me at [sandramontenegro@knights.ucf.edu](mailto:sandramontenegro@knights.ucf.edu) or Dr. Steve Jex, Principal Investigator, at [steve.jex@ucf.edu](mailto:steve.jex@ucf.edu) Psychology Building Office 356.

## APPENDIX B: IRB APPROVAL



UNIVERSITY OF CENTRAL FLORIDA

**Institutional Review Board**  
FWA00000351  
IRB00001138  
Office of Research  
12201 Research Parkway  
Orlando, FL 32826-3246

### EXEMPTION DETERMINATION

October 4, 2019

Dear Steve Jex:

On 10/4/2019, the IRB determined the following submission to be human subjects research that is exempt from regulation:

Type of Review:	Initial Study, Exempt Category
Title:	Stressors and Coping Mechanism of Graduate Students
Investigator:	Steve Jex
IRB ID:	STUDY00000813
Funding:	None
Grant ID:	None

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made, and there are questions about whether these changes affect the exempt status of the human research, please contact the IRB. When you have completed your research, please submit a Study Closure request so that IRB records will be accurate.

If you have any questions, please contact the UCF IRB at 407-823-2901 or [irb@ucf.edu](mailto:irb@ucf.edu). Please include your project title and IRB number in all correspondence with this office.

Sincerely,

A handwritten signature in black ink that reads "Kamille Chaparro".

Kamille Chaparro  
Designated Reviewer

## REFERENCES

- Adam, B., & Roberts, A. O. (1993). Differences among the disciplines. *New Directions for Higher Education*, 81, 23-62.
- Bandura, A., Freeman, W., & Lightsey, R. (1999). Self-efficacy: The exercise of control. In: Springer.
- Baqutayan, S. M. S. (2015). Stress and coping mechanisms: A historical overview. *Mediterranean Journal of Social Sciences*, 6(2 S1), 479-479.
- Berezow, A. (2018). Is there a mental health crisis among graduate school students? Retrieved from American Council on Science and Health website: <https://www.acsh.org/news/2018/03/07/there-mental-health-crisis-among-graduate-school-students-12672>
- Board, N. S. (2007). *A national action plan for addressing the critical needs of the u.S. Science, technology, engineering, and mathematics education system*. Washington, DC: U.S. Government Printing Office.
- Bongers, P. M., de Winter, C. R., Kompier, M. A., & Hildebrandt, V. H. (1993). Psychosocial factors at work and musculoskeletal disease. *Scandinavian journal of work, environment & health*, 297-312.
- Boyer, E. L. (1990). *Scholarship reconsidered: Priorities of the professoriate*. 3175 Princeton Pike, Lawrenceville, NJ 08648.: Princeton University Press.
- Brophy, S., Klein, S., Portsmore, M., & Rogers, C. . (2008). Advancing engineering education in p - 12 classrooms. 97, 3.
- Burchell, B., & Shapiro, G. K. (2012). Measuring financial anxiety.
- Butler, A. B., Dodge, K. D., & Faurote, E. J. (2010). College student employment and drinking: A daily study of work stressors, alcohol expectancies, and alcohol consumption. *Journal of occupational health psychology*, 15(3), 291.
- Cannon, W. B. (1939). The wisdom of the body.
- Carver, C., Scheier, M., & Weintraub, J. (2013). Cope inventory. *Measurement Instrument Database for the Social Science*.
- Chen, P. Y., & Spector, P. E. (1992). Relationships of work stressors with aggression, withdrawal, theft and substance use: An exploratory study. *Journal of occupational and organizational psychology*, 65(3), 177-184.
- Cooper, M. L. (1994). Motivations for alcohol use among adolescents: Development and validation of a four-factor model. *Psychological assessment*, 6(2), 117.
- Cox, T. (1993). *Stress research and stress management: Putting theory to work* (Vol. 61): Hse Books Sudbury.
- Dex, S., & Bond, S. (2005). Measuring work-life balance and its covariates. *Work, employment and society*, 19(3), 627-637.
- Ellison, C. G., Bradshaw, M., Storch, J., Marcum, J. P., & Hill, T. D. (2011). Religious doubts and sleep quality: Findings from a nationwide study of presbyterians# 090709revised. *Review of religious research*, 53(2), 119-136.

- Evans, T. M., Bira, L., Gastelum, J. B., Weiss, L. T., & Vanderford, N. L. (2018). Evidence for a mental health crisis in graduate education. *Nature biotechnology*, *36*(3), 282.
- Folkman, S., & Lazarus, R. S. (1980). An analysis of coping in a middle-aged community sample. *Journal of health and social behavior*, 219-239.
- Force, I. T. (1992). The work of arts faculties in higher education. *Washington, DC: Interdisciplinary Task Force*.
- Frese, M. (1985). Stress at work and psychosomatic complaints: A causal interpretation. *Journal of applied psychology*, *70*(2), 314.
- Grant, V. V., Stewart, S. H., O'Connor, R. M., Blackwell, E., & Conrod, P. J. (2007). Psychometric evaluation of the five-factor modified drinking motives questionnaire—revised in undergraduates. *Addictive behaviors*, *32*(11), 2611-2632.
- Holmes, T. H., & Rahe, R. H. (1967). The social readjustment rating scale. *Journal of psychosomatic research*.
- Ickes, M. J., Brown, J., Reeves, B., & Zephyr, P. M. D. (2015). Differences between undergraduate and graduate students in stress and coping strategies. *Californian Journal of Health Promotion*, *13*(1), 13-25.
- Jenkins, C. D., Stanton, B.-A., Niemcryk, S. J., & Rose, R. M. (1988). A scale for the estimation of sleep problems in clinical research. *Journal of clinical epidemiology*, *41*(4), 313-321.
- Jex, S. M., Bliese, P. D., Buzzell, S., & Primeau, J. (2001). The impact of self-efficacy on stressor–strain relations: Coping style as an explanatory mechanism. *Journal of applied psychology*, *86*(3), 401.
- Kang, K. (2017). *Doctorate recipients from u.S. Universities: 2017* Retrieved from: <https://nces.gov/pubs/nsf19301/data>
- Kobasa, S. C. (1979). Stressful life events, personality, and health: An inquiry into hardiness. *Journal of personality and social psychology*, *37*(1), 1.
- Kovach Clark, H., Murdock, N. L., & Koetting, K. (2009). Predicting burnout and career choice satisfaction in counseling psychology graduate students. *The Counseling Psychologist*, *37*(4), 580-606.
- Kristensen, T. S., Borritz, M., Villadsen, E., & Christensen, K. B. (2005). The copenhagen burnout inventory: A new tool for the assessment of burnout. *Work & Stress*, *19*(3), 192-207.
- Lazarus, R. S. (1966). Psychological stress and the coping process.
- Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*: Springer publishing company.
- Lazarus, R. S., & Folkman, S. (1987). Transactional theory and research on emotions and coping. *European Journal of personality*, *1*(3), 141-169.
- Leiter, M. P. (1991). Coping patterns as predictors of burnout: The function of control and escapist coping patterns. *Journal of Organizational behavior*, *12*(2), 123-144.
- Litman, J. A. (2006). The cope inventory: Dimensionality and relationships with approach-and avoidance-motives and positive and negative traits. *Personality and Individual differences*, *41*(2), 273-284.
- Maslach, C., & Jackson, S. E. (1981). The measurement of experienced burnout. *Journal of Organizational behavior*, *2*(2), 99-113.

- Merrill, C., & Daugherty, J. (2009). The future of the masters degrees: Stem.
- Minnotte, K. L., & Pedersen, D. E. (2019). Department environment and work-to-life conflict among faculty in the stem fields. *Journal of Family Issues, 40*(10), 1299-1320.
- Myers, S. B., Sweeney, A. C., Popick, V., Wesley, K., Bordfeld, A., & Fingerhut, R. (2012). Self-care practices and perceived stress levels among psychology graduate students. *Training and Education in Professional Psychology, 6*(1), 55.
- Norvilitis, J. M., Szablicki, P. B., & Wilson, S. D. (2003). Factors influencing levels of credit - card debt in college students 1. *Journal of applied social psychology, 33*(5), 935-947.
- Park, Y., & Sprung, J. M. (2013). Work-school conflict and health outcomes: Beneficial resources for working college students. *Journal of occupational health psychology, 18*(4), 384.
- Pejtersen, J. H., Kristensen, T. S., Borg, V., & Bjorner, J. B. (2010). The second version of the copenhagen psychosocial questionnaire. *Scandinavian journal of public health, 38*(3\_suppl), 8-24.
- Porter, S. R., & Umbach, P. D. (2001). Analyzing faculty workload data using multilevel modeling. *Research in higher education, 42*(2), 171-196.
- Rahe, R. H., & Arthur, R. J. (1978). Life change and illness studies: Past history and future directions. *Journal of human stress, 4*(1), 3-15.
- Repak, N. (2006). Emotional fatigue: Coping with academic pressure. *Gradresources. com*.
- Rotter, J. B. (1966). Generalized expectancies for internal versus external control of reinforcement. *Psychological monographs: General and applied, 80*(1), 1.
- Rummell, C. M. (2015). An exploratory study of psychology graduate student workload, health, and program satisfaction. *Professional Psychology: Research and Practice, 46*(6), 391.
- Scheier, M. F., & Carver, C. S. (1985). Optimism, coping, and health: Assessment and implications of generalized outcome expectancies. *Health psychology, 4*(3), 219.
- Schonfeld, I. S. (1992). A longitudinal study of occupational stressors and depressive symptoms in first-year female teachers. *Teaching and Teacher Education, 8*(2), 151-158.
- Schulz, P., Kirschbaum, C., Prübner, J., & Hellhammer, D. (1998). Increased free cortisol secretion after awakening in chronically stressed individuals due to work overload. *Stress medicine, 14*(2), 91-97.
- Schwartz, J. E., Pickering, T. G., & Landsbergis, P. A. (1996). Work-related stress and blood pressure: Current theoretical models and considerations from a behavioral medicine perspective. *Journal of occupational health psychology, 1*(3), 287.
- Scott, B. A., & Judge, T. A. (2006). Insomnia, emotions, and job satisfaction: A multilevel study. *Journal of Management, 32*(5), 622-645.
- Searle, B. J., Bright, J. E., & Bochner, S. (1999). Testing the 3-factor model of occupational stress: The impact of demands, control and social support on a mail sorting task. *Work & Stress, 13*(3), 268-279.
- Selye, H. (1956). *The stress of life*.
- Selye, H. (1973). The evolution of the stress concept: The originator of the concept traces its development from the discovery in 1936 of the alarm reaction to modern therapeutic applications of syntoxic and catatoxic hormones. *American scientist, 61*(6), 692-699.

- Selye, H. (1983). The concept of stress: Past, present, and future. *Stress research: Issues for the eighties*. New York: John Wiley, 1-20.
- Sliter, K. A., & Sliter, M. T. (2014). The concise physical activity questionnaire (cpaq): Its development, validation, and application to firefighter occupational health. *International Journal of Stress Management*, 21(3), 283.
- Sonnentag, S., & Frese, M. (2003). Stress in organizations. *Handbook of psychology*, 453-491.
- Spector, P. E., & Jex, S. M. (1998). Development of four self-report measures of job stressors and strain: Interpersonal conflict at work scale, organizational constraints scale, quantitative workload inventory, and physical symptoms inventory. *Journal of occupational health psychology*, 3(4), 356.
- Stangor, C., & Walinga, J. (2018). Introduction to psychology-1st canadian edition.
- Tan-Wilson, A., & Stamp, N. (2015). College students' views of work-life balance in stem research careers: Addressing negative preconceptions. *CBE—Life Sciences Education*, 14(3), es5.
- Vrijkotte, T. G., Van Doornen, L. J., & De Geus, E. J. (1999). Work stress and metabolic and hemostatic risk factors. *Psychosomatic medicine*, 61(6), 796-805.
- Willyard, C. (2012). Need to heal thyself. *GradPSYCH*, 10, 28-31.