



## Mediating Role of Rumination in the Relationship of Worry and Unhealthy Eating Behaviors among University Student

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### ABSTRACT

Students' success primarily lies in the proper functioning of health behaviors, enhancing their cognitive skills during higher-level studies. However, the links between worry and health behaviors such as dietary habits are not entirely understood, particularly during student life when overthinking increases. The present study examines the relationship between worry and unhealthy eating behaviors among university students and the mediating role of rumination. For this purpose, a sample of 200 (100 male and 100 female) university students is taken in the study. The responses were recorded on a booklet consisting of the Penn State Worry Questionnaire (PSWQ, 16 items), Ruminative Responses Scale (RRS; Short version, 10 items), and Dutch Eating Behaviors Scale (DEBQ, 33 items). Findings indicated that worry and unhealthy eating behaviors (viz., dietary restrained, emotional and external eating) positively correlated and rumination mediated the relationship of worry with emotional and external eating. Moreover, female students scored significantly higher on rumination than male students. The study can help design interventions and plan strategies for university students' health, growth, and development as a large proportion of the sample reported a significant impact of worry on unhealthy eating behaviors.

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### 1. Introduction

University life is usually challenging and demanding for students. Life in university is challenging because of shift in a young adult's personal and professional domains. Students have to deal with innovative, overwhelming and unpredictable contexts. They need to cope with numerous stressors such as academic requirements along with future plans, financial challenges, change in eating styles, sleep habits and new socialization (Ahern & Norris, 2011; Hurst, Baranik, & Daniel, 2013). It is a time when young adults experience changes in personal and professional domains, which can highly influence their health behaviors and functioning. Many students face adjustment problems and emotional disturbances due to academic concerns, relationship concerns or other personal traits. Those who are prone towards excessive worry can have negative health outcomes which may disturb their normal functioning and healthy development (Bottesi, Martignon, Cerea, & Ghisi, 2018). Health behaviors such as healthy dietary and sleep habits are equally important for everyone, but for university students, unhealthy eating behaviors and sleep patterns may directly affect their performance in academics by having a profound effect on their level of energy, activity level, concentration, problem solving skills and pattern of thinking by hindering performance because of worrying and rumination (Locke, 2015).

Worry is a high proportion of negative thoughts, which means that people who score high on worry do have a negative thinking pattern and they become afraid thinking a lot about adverse events that can happen (Hirsch, Perman, Hayes, Eagleson, & Mathews, 2015). The individual continuously feels unhappy and frightened because of problems and unpleasant things that may happen. A study conducted on students reported that students do face difficulties related to mental and behavioral health concerns, where symptoms related to worry and eating patterns were obvious (Zvolensky et al., 2019). Dietary patterns are well recognized determinants of individual are functioning through specific styles and cues towards eating (Grimm & Steinle, 2011).

Worry is a domain-specific concept, it is vital to measure worry specifically for University students along with its probable outcomes (Fam, Murugan, & Yap, 2020). Although, worry is the dominant feature of generalized anxiety disorder but it is found to be frequently associated with depressive rumination, and rumination refers to dwell repetitively over one more negative issues that are perceived as difficult to control (Ehring & Watkins, 2008). Worry has strong association with health related behaviors specifically eating habits and in many cases it makes individuals vulnerable towards eating disorders (Sala & Levinson, 2016).

Both worry and rumination often found with high co morbidity leading to unproductive and repetitive thoughts that serve to intensify and maintain negative affect but have distinctiveness based on which both concepts can be differentiated (Segerstrom, Tsao, Alden, & Craske, 2000). High ruminators, often use eating as a strategy to emotionally regulate and deal with negative outcomes caused by repetitive negative thinking, and the strategy then becomes a habit, particularly in stressful situations (Berg et al., 2016).

Distracting one's self from negative thoughts can be helpful in reducing worry and predicting positive coping strategies (Ahmad, Hashmi, Shehzadi, & Nawaz, 2021; Fresco, Frankel, Mennin, Turk, & Heimberg, 2002). The Emotional Cascade Model states that emotional and behavioral dysregulation of individuals are fundamentally correlated and worry, along with rumination may expose individuals towards poor health outcomes (Majeed & Gillani, 2017; Selby, Anestis, Bender, & Joiner Jr, 2009).

Eating in response towards negative emotions i.e., emotional eating, external eating that is eating when exposed to external stimuli such as smell and sight of the food and dietary eating styles: eating less than desired to lose or maintain weight, are three main dietary patterns studied in the literature related to hunger and satiety (Van Strien, Frijters, Bergers, & Defares, 1986; Van Strien & Oosterveld, 2008). Psychosomatic theory (Bruch, 1973), internal-external theory (Rodin, 1981), and constrained eating theory (Herman & Polivy, 1980) derived all three eating patterns. All theories highlighted inadequate exercises of food intake styles to initiate or terminate hunger states and respond to the food intake linked with external or emotional states.

Health behaviors are associated with worrying more, and worry plays a vital role in increasing blood pressure, cardiovascular diseases, diabetes, sleep patterns, eating behaviors, daily activities, decreased immunity and depression and worry can affect an individual's corresponding behaviors which affect health (Gillani, Shafiq, & Ahmad, 2019; Hao, Shah, Nawazb, Barkat, & Souhail, 2020), i.e. eating behaviors (Ahmed, Al-Radhwan, Al-Azmi, & Al-Bejan, 2014). The quantity and type of food eaten also varies under such situations. The intake of unhealthy, junk or snack type food (i.e. sweets, chips, pasteries, etc.) is found to be more common among students having difficulties and high-level worry at University and on contrary, intake of healthy food (i.e. vegetables and healthy home-made meals) tended to decrease among students facing problems (Serlachius, Hamer, & Wardle, 2007; Zellner et al., 2006). Different eating styles are adopted by different individuals under stressful circumstances as a result of worrying. Theory of Planned Behavior (TPB) proposed by Ajzen (1985) helps to understand relationship between worry and outcomes predicting the role of attitudes, subjective norms, perceived behavioral control, and especially, intentions in predicting an individual behavior (Pickett et al., 2012). Talking about worry, it is a form of anxiety and individual automatically responds in a worried manner whenever faced with even minor issues (Sassaroli et al., 2005). Worry has associations with disordered eating that

further place impact on mental health so it is important to understand these predictors for mental well-being and overall success of students (Sala & Levinson, 2016).

University students are high risk population in terms of being affected by worry and leading towards physical and psychological issues (Sweeny & Dooley, 2017). Worry can be due to different reasons like being in the university life, exposed to various physical and psychological changes that happen at a particular stage or can be due to adjustment and adaptation issues (Zvolensky et al., 2019). Some students face problems in keeping balance between their personal, professional and academic activities (Bhatti & Nawaz, 2020). Students are exposed to worry in one way or another. Prevalence of eating behaviors among students is higher as reported in literature (Romito, Cedolin, Bastiani, & Saurel-Cubizolles, 2019). Eating behaviors have long been considered a problem linked with women and few studies have examined this aspect through the sample consisting men (MacLean et al., 2015). The current study aimed to explore the impact of worry on eating behaviors of both male and female university students. Rumination has a unique effect in understanding the relationship between worry and eating problems but is still considered as relatively new construct and much data is not available (Wang & Borders, 2018). The study aimed at exploring the mediating role of rumination in worry and unhealthy eating behaviors.

The Objectives of the Study are to assess the relationship between worry, rumination and eating unhealthy (dietary restrained eating, emotional eating and external eating) among University students and to assess gender differences in terms of worry, rumination and unhealthy eating behaviors. The Hypotheses of the Study are as follows;

- H1: Worry positively correlates with rumination and unhealthy eating behaviors (viz., dietary restrained, emotional and external eating) among university students.
- H2: Rumination positively correlates with unhealthy eating behaviors (viz., dietary restrained, emotional and external eating) among university students.
- H3: Rumination plays a mediating role in relationship between worry and unhealthy eating behaviors (viz., dietary restrained, emotional and external eating) among University students.
- H4: Female university students score higher on worry, rumination. Unhealthy eating behaviors (viz., dietary restrained, emotional and external eating) than male university students

## **2. Method**

An online quantitative survey was designed to collect the data.

### **2.1 Sample**

A sample of 200 (100 male and 100 female) university students were approached and participated the study from Government College University (GCU) Lahore and Bahauddin Zakariya University (BZU), Multan through conveniently approached purposive sampling. The age of participants ranged from 18-37 years ( $M=22.35$ ,  $SD=2.79$ ) and they were from the different degree programs (i.e. B.S, M.Sc., M.Phil. and onwards). Inclusion criteria for the sample were that participants should be at least of 18 years and must be proficient in English. G-power sample size calculator estimated that sample taken was sufficient to conduct the study.

### **2.2 Measures**

#### **2.2.1 Basic Demographic Sheet**

It was designed to collect data related to basic demographic variables of the participants (i.e., age, gender, education level, family, income).

#### **2.2.2 The Penn State Worry Questionnaire (PSWQ); (Meyer, Miller, Metzger, & Borkovec, 1990)**

It is an inventory based on 16-items. The responses are rated on a Likert-scale ranging from 1-5 where, (1=*not at all typical of me* to 5=*very typical of me*). Item 1, 3, 8, 11 are reversely coded. The alpha co-efficient of scale is .86 for the present study.

### 2.2.3 The Ruminative Responses Scale (RRS); (Treyner, Gonzalez, & Nolen-Hoeksema, 2003)

It is a 10-item scale. It measures the tendency of an individual to ruminate when in a sad or depressed mood. This scale comprises two subscales that are brooding (5 items) and reflection (5 items). Responses rated on a 4-point scale where, (1 = *almost never* to 4 = *almost always*). The internal consistency of this measure is found to be .81. There are no previous studies conducted in Pakistan applying RRS- short version. Participants responded to these questions on a Likert-type scale using four response categories indicating (1 for *almost never*, 2 for *sometimes*, 3 for *often* and 4 for *almost always*). Computed score of all items was total score of the participant. The alpha co-efficient of the scale is .89 for the present study.

### 2.2.4 Dutch Eating Behavior Scale (DEBQ); (Van Strien et al., 1986)

A self-report instrument based on 33- items assesses three types of eating behaviors that are dietary restraint (items 1 to 10), emotional eating (items 11 to 23, 13 items) and external eating (items 24 to 33, 10 items). Items are responded on a 5-point scale anchored by '*never*' and '*very often*'. Item number 21 is reversely scored. The alpha co-efficient of the scale is .89 for the present study.

## 2.3 Procedure

Research proposal was approved from Advance Studies and Research Board (AS&RB) of Government College University (GCU) Lahore as a PhD thesis. Permission was taken from relevant authorities of Bahauddin Zakariya University (BZU) Multan and GCU Lahore, from where the participants were approached. Secondly, the participants were carefully informed about the procedure and purpose of the study. Further, they were assured about confidentiality that the data collected would be used for study purpose only. After all the participants agreed to participate and gave informed consent, online survey was conducted by providing the participants with a set of research questionnaires. The data were collected online via Google form and respondents were asked for their honest responses. Instructions were provided in written form. Research ethics like confidentiality and permission to withdraw were followed throughout the data collection. It took approximately about three weeks for approaching University students online and gathering the data.

## 3. Results

The data were analyzed using SPSS-21 (Statistical Package for Social Sciences). The major findings are given below:

**Table 1: Pearson's Product Moment Correlation among Worry, Rumination and Eating Behaviors (Dietary, Emotional and External Eating N=200)**

Variables	1	2	3	4	5
<b>1. Worry</b>	-	.41**	.26**	.23*	.29**
<b>2. Rumination</b>		-	.26*	.37**	.27**
<b>3. Dietary Eating</b>			-	.66**	.61**
<b>4. Emotional Eating</b>				-	.62**
<b>5. External Eating</b>					-

Note. \*p<.05\*\*p<.01

Table 1 shows the correlation among study variables. Results reveal that worry has significant positive relationship with rumination and eating behaviors such as dietary, emotional and external eating. Findings also show that rumination has positive significant relationship with all sub-scales of unhealthy eating behaviors.

Table 2 shows the mediation by rumination in explaining relationship between worry and eating habits sub-scales. Worry has direct significant effect on eating behaviors and the indirect effect through rumination is most significant on emotional and external eating, as beta values worry not only decreased but became non-significant in both behaviors when we entered mediator in the analysis.

**Table 2: Mediation effect of Rumination in Relationship between Worry and Unhealthy Eating Behaviors**

Predictors	Model 1		Model 2		Dietary Eating 95% CI	
	B	B	ΔR <sup>2</sup>	ΔF	LL	UL
<b>Constant</b>	13.67**	4.45			-8.26	17.18
<b>Worry</b>	.15*	.16*			-.08	1.06
<b>Rumination</b>		.60**			.14	1.06
<b>R<sup>2</sup></b>	.08	.24	.16			
<b>F</b>	3.49	6.07		2.58		
<b>Emotional Eating</b>						
<b>Constant</b>	10.72**	20.66**			7.06	34.26
<b>Worry</b>	.21**	.12			-.16	.41
<b>Rumination</b>		.36**			-.15	.88
<b>R<sup>2</sup></b>	.15	.09	.06			
<b>F</b>	7.52	2.26		5.26		
<b>External Eating</b>						
<b>Constant</b>	9.36**	24.77**			15.33	34.20
<b>Worry</b>	.24**	.09			-.11	.59
<b>Rumination</b>		.23**			-.10	.30
<b>R<sup>2</sup></b>	.17	.06	.11			
<b>F</b>	13.08	2.29		10.79		

Note. CI=Confidence Interval, LL=Lower Limit, UL=Upper Limit, \*\*p<.01, \*p<.05.

**Table 3: Gender Differences on Study Variables (N=220)**

Variables	Men (n=100)		Women (n=120)		t(220)	P	95%CI		Cohen's d
	M	SD	M	SD			LL	UL	
	<b>Worry</b>	49.09	4.76	45.81			6.73	1.55	
<b>Rumination</b>	23.00	3.22	20.32	4.24	2.77	.00**	.76	4.58	0.71
<b>Dietary Eating</b>	24.50	4.30	24.65	5.46	-.10	.91	-3.02	2.71	0.03
<b>Emotional Eating</b>	33.70	6.86	34.56	6.02	-.42	.67	-4.90	3.17	0.13
<b>External Eating</b>	29.91	4.86	28.43	5.72	1.16	.24	-1.01	3.98	0.27

Note. LL=Lower Limit, UL=Upper Limit, \*\*p<.01, \*p<.05.

Table 3 reveals gender differences on variables under study. The findings indicate significant gender difference on rumination. Female students ( $M=23.00$ ,  $SD=3.22$ ) scored higher on rumination as compared to male students ( $M=20.32$ ,  $SD=4.24$ ). No significant gender difference was found for other variables.

#### 4. Discussion

The study aimed at exploring the relationship between worry, eating habits and rumination. First two assumptions stated that there was a relationship between worry and eating habits (dietary restrained, emotional and external eating), worry and rumination and, rumination and dietary habits (dietary, emotional and external eating). Findings of the study showed positive relationship between worry and unhealthy eating behaviors including dietary restrained eating, emotional eating and external eating (see Table 1). Higher worry leading to unhealthy eating patterns had also been reported earlier in the findings of the study conducted on a sample of University students where eating habits were also affected by worry eating was adapted as a defense mechanism to deal with worry (Tavolacci et al., 2015). The findings of current study are consistent with literature indicating that worry and rumination correlate with each other and effect dietary eating styles among university students. University students adapt unhealthy eating patterns to cope with their worry. Life at university is challenging for many students therefore, worry is prominently found among many students. Findings of a study conducted by Swinbourne and Touyz (2007) revealed that students at University worried more due to the transition in their personal and professional life. Students are found to be at high risk for having worry due to various social and physical changes happening in their lives since long (Zebb & Beck, 1998). Therefore, findings of the current study revealing significant

relationship between worry and maladaptive eating behaviors are consistent with the literature. Worry also showed significant correlation with rumination (see Table 1). Rumination mediated the relationship between worry and eating behaviors (see Table 2). Results are in line with a study conducted by Topper, Emmelkamp, Watkins, and Ehring (2017) that rumination had high co morbidity with worry causing diverse effects on individual's health.

Worrisome thoughts along with ruminative ones tend to produce outcomes that may worsen eating habits which, later have prolonged effects on individuals' health. Rumination plays a significant role in explaining worry and literature supports that ruminative thinking increases worry (McLaughlin, Mennin, & Farach, 2007). The findings revealed that rumination mediated the relationship between worry and unhealthy eating behaviors (emotional and external eating). Restraint theory has suggested that chronic attempts of self-denial to food found to be linked with emotional and external eating whereas, unhealthy eating behaviors are also found among individuals as a coping mechanism to deal with their problems (Adams, Chambers, & Lawrence, 2019). Results also showed gender difference on rumination as female students scored higher on rumination than male students (see Table 3). Results are consistent with Cimsir (2019) that women were higher in scores on rumination measure as compared to men. Calmes and Roberts (2008) concluded in a study that women showed more repetitive negative thoughts that adversely affected their health behaviors as compared to men. Eating behaviors when investigated between men and women revealed higher ratio of the later, reporting unhealthy eating habits (Ebrahim Essa, Abo-Elyazeed, & Abdelaty Hassan, 2020). Gender differences on rumination are more obvious in our culture as we have a male dominant society, where females are considered fragile and homely figure (Nawaz, Afzal, & Shehzadi, 2013). Aslam and Kamal (2013) conducted a study and it was concluded in it that mental distress and intrusive rumination were higher among women as compared to men. However, gender differences among other variables were less likely observed.

## 5. Conclusion

Findings indicate strong correlation among study variables. Worry among students related to negative outcomes such as unhealthy eating behaviors, which may affect their health directly or indirectly. Rumination mediated the relationship between worry and unhealthy eating behaviors. Therefore, it can be concluded that individuals who feel excessive worry and ruminate, it leads to emotional and external eating behaviors.

It was important to understand and identify University students reporting higher levels of worry, rumination and eating psychopathology so that in future, supportive and affective interventions can help improve their mental and physical health. The findings of study were helpful in understanding stress related outcomes such as worry and rumination among University students. Strategies and interventions can be designed to affectively deal with students' stress and promote positive health outcomes as the sample chosen (University students) is highly valuable for the prosperity and success of any country.

Sample was taken from two universities of Punjab province; therefore, diverse sample should be approached for better generalizability of findings in future. As excessive worry needs to be managed, intervention-based studies can also be designed for improving University student's health behaviors. Future research needs to address the question of whether worry and rumination in population with eating psychopathology are "state" variables, likely to dissipate on recovery or "trait" characteristics of individuals with unhealthy eating behaviors that may act as part of a wider vulnerability to developing the illness. Study is correlational in nature, so we cannot predict causality, so it is suggested to conduct longitudinal and qualitative surveys to understand the study variables in more detail and predict causality.

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