Effects of Big Five Personality Traits on Self-Perceived Anxiety Before and During the COVID-19 Pandemic

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Abstract

Previous researchers have demonstrated correlations between openness, conscientiousness, and neuroticism with one's perceived anxiety levels. People who tend to be highly neurotic indicate greater levels of anxiety, while those who are open and conscientious tend to portray the opposite. The Big Five Personality Traits were examined in the predictive effects they had on the self-perception of anxiety prior to and during the onset of the COVID-19 pandemic. Students attending Union College were asked to report their anxiety levels from the academic year prior to COVID-19 and the year during COVID, as well as the Ten-Item Personality Inventory. Participants high in neuroticism reported having higher levels of pre-COVID anxiety, while participants high in openness reported having lower levels of pre-COVID anxiety. Furthermore, participants who were highly neurotic demonstrated greater levels of anxiety during COVID as well. Results from this study outlined an association between those who were highly neurotic and high levels of anxiety felt during the pandemic. Such findings can be implemented to develop preventive measures and treatments.

Keywords: COVID-19, anxiety, Big Five Personality traits, pandemic

Effects of Big Five Personality Traits on Self-Perceived Anxiety Before and During the COVID-

19 Pandemic

With the onset of the COVID-19 pandemic, drastic changes have caused challenges to

arise in one's social and physical well-being (Gosling, Rentfrow, & Swann, 2003). Social

distancing, isolation from loved ones, and disruptions to people's circadian rhythms are only a

few of these challenges (Karsten et al., 2012; Kotov et al., 2010; Lyon et al., 2020). Some may

not feel overly affected, while others may perceive the pandemic as being positive, utilizing it as

a time for personal growth and maturation. However, many become agitated, sad, or even angry

at the COVID-19 pandemic and its outcomes (Lyon et al., 2020; Muris et al., 2018). Although

numerous variables can be used to measure the impact of this social change, the Big Five

Personality traits (openness, conscientiousness, extraversion, agreeableness, and neuroticism),

have been repeatedly demonstrated to be correlated to levels of anxiety (Karsten et al., 2012;

Kotov et al., 2010; Lyon et al., 2020; Muris et al., 2018; Nikčević, 2021). People who are highly

neurotic tend to show worsening effects on one's mental state during turmoil circumstances,

while those who are open and conscientious typically feel the opposite and internalize less of

non-ideal external circumstances (Nikčević, 2021).

Researchers have demonstrated that the Big Five personality traits, along with the

psychological distress induced by COVID-19, are substantial predictors for trait anxiety as well

as overall depressive symptoms (Nikčević, 2021). Associations have been found between the Big

Five Personality traits and health anxiety, coronavirus anxiety, COVID-19 anxiety syndrome,

and generalized anxiety and depressive symptoms. Nikčević and colleagues (2021) conducted a

study to understand how vulnerability and protective factors, such as the Big Five personality

traits, could predict anxiety and depression in the COVID-19 pandemic. The study consisted of

U.S. participants ($N = 502$) answering a series of questionnaires: Big Five Inventory-10 (BFI-10), Whitley Index 7 (WI-7), Coronavirus Anxiety Scale (CAS), COVID-19 Anxiety Syndrome Scale (C19-ASS), and Patient Health Questionnaire Anxiety and Depression Scale (PHQ-ADS). Results demonstrated that among the Big Five personality traits, neuroticism displayed the largest association to depression and depressive symptoms. The study also revealed that people who displayed high levels of neuroticism, or affinity to negative emotions, displayed greater rates of anxiety experienced during stressful times, like the pandemic. On the other hand, those who were open, such as to new experiences and the ability to adapt, along with being extraverted had a negative relationship with COVID-19 induced anxiety (Nikčević, 2021).

Vreeke and Muris (2012) conducted a similar study to examine the relationship between Big Five personality traits, behavioral inhibition, anxiety disorder symptoms in young, non-clinical children ($n = 147$) and clinically anxious children ($n = 45$). The parents and guardians of these children were asked to complete various questionnaires: the Behavioral Inhibition Questionnaire-Short Form, the Big Five Questionnaire for Children, and the Screen for Child Anxiety Related Emotional Disorders-Revised. The results demonstrated that parents of clinically anxious children perceived their children to have higher levels of neuroticism and behavioral inhibition, as compared to parents of non-clinically anxious children. Parents of clinically anxious children also perceived their children as having lower levels of openness, conscientiousness, and extraversion as compared to those parents of non-clinical children. In both samples, neuroticism was a key indicator of predicting the onset of anxiety and the symptoms of an inhibited temperament. Additionally, when controlling for neuroticism and extraversion, shame consistently remained a significant correlate of anxiety disorders symptoms.

Altogether, these results add to the growing body of evidence indicating that high levels of shame are associated with anxiety pathology (Vreeke & Muris, 2018).

Personality traits are also said to gradual change over time. Among the Big Five personality traits, significant changes have been noted in neuroticism and extraversion. Karsten and colleagues (2012) conducted an experiment to identify the extent at which the Big Five personality traits are associated with the onset and recovery from anxiety and depressive disorders. Participants from the Netherlands Study of Depression and Anxiety (NESDA) were separated into four groups: unaffected at baseline and follow-up, occurrence, recovery, and affected at baseline and follow up. Using the NEO-five factor inventory, changes in one's personality was measured. From the most temporary of effects to permanent ones, research indicated that with time, there tended to be an increase in neuroticism while there is a decrease in extraversion. In severe cases such as depression and anxiety disorders, respondents indicated an increase in neuroticism scores, in both occurrence and recovery, while there was a decrease in extraversion. Participants with affective disorder also demonstrated greater rates of decrease for extraversion as well as conscientiousness. In addition to being having lower levels of extraversion at baseline, respondents with an occurrence became less extraverted over time compared to the unaffected group. Additionally, respondents with an occurrence of affective disorders displayed lower levels of conscientiousness than unaffected respondents at baseline and continued to become less conscientious over time (Karsten, 2012).

Previous studies suggest that the personality trait of neuroticism is positively associated with affective disorders, while extraversion and conscientious is negatively associated with such disorders. Furthermore, the effect of neuroticism is related to demotivation, which may be a facet of depression (Lyon et al., 2020). The researchers performed this study on 264 participants from

Greater Manchester in the UK and completed self-surveys for all NEO-PI-R personality facers, and generalized questionnaires for anxiety and clinical depression. Results explained that there was a positive correlation between extroversion and positive emotion, as well as between competence and conscientiousness (Lyon et al., 2020).

Branching out beyond affective disorders, newer studies have been extended to depression, anxiety, and substance use disorders. Kotov and colleagues (2010) performed a quantitative review of the correlations between the Big Five personality model and depressive, anxiety, and substance use disorders within the adult population. This meta-analysis included 175 studies from 1980 to 2007. The association between psychological disorders and extraversion were negative, such that people higher in extraversion tended to suffer from fewer psychological disorders. Based on these analyses, it exemplified a positive relationship between neuroticism and clinical disorders, while there was a negative association between conscientious and these symptoms. The personality trait from the Big Five personality model exhibited the largest association to affective disorders, such as dysthymia and social phobia (Kotov, 2010). Furthermore, studies have explored the relationship between self-conscious emotions, the internalization of what occurs in the external environment, and anxiety disorders symptoms.

The Current Study

A thorough review of the literature suggests that the Big Five Personality traits have been primarily associated with general anxiety levels and affective disorders, such as anxiety and depression (Karsten et al., 2012; Kotov et al., 2010; Lyon et al., 2020; Muris et al., 2018; Nikčević, 2021). However, examination of the predictive effects of the Big Five Personality Traits on the self-perception of anxiety prior to and during the onset of the COVID-19 pandemic is scarce. This study aims to investigate whether the Big Five Personality traits could be utilized

to establish associations to one's anxiety levels pre-COVID-19 to during the COVID-19 pandemic. For the purposes of this study, the Big Five Personality Traits are measured by the Ten-Item Personality Inventory (TIPI; Gosling, Rentfrow, & Swann, 2003). Due to the fact that individuals attending college and university are susceptible to a multitude of events that cause physical and emotional stress, examining the effects of socially charged occurrences is necessary in order to attain and maintain a healthy quality of life. With the onset of the COVID-19 pandemic yielding drastic challenges to one's social and physical well-being, it is especially significant to investigate the associations between this global event and the Big Five Personality traits (Nikčević, 2021).

Hypotheses

For my first hypothesis, I predict that there will be significant associations between neuroticism, openness, and extraversion on one's anxiety and anxiety symptoms. Specifically, people who are highly neurotic will have greater levels of anxiety prior to the year of COVID-19 and during the academic year of COVID-19. For my second hypothesis, I also predict that those high in neuroticism will show higher increases in anxiety from pre-COVID-19 to during the COVID-19 pandemic. On the other hand, I hypothesize that those who are open and extraverted will show the opposite relationships. That is, people who display greater levels of openness and extraversion will have lower anxiety levels both before and during COVID-19, and have either no worsening, or even improvement, in one's anxiety levels from the academic year prior to during the academic year of the COVID-19 pandemic.

Method

Participants

Students attending Union College (66 women, 66 men, M_{age} = 19.0, age range: 17-21 years old) chose to participate in this survey. Out of the many classes held there, three classes were randomly chosen, with the approval of the respective professors as well as the voluntary participation from the students. Participants submitted their email addresses, and an anonymous raffle was conducted to compensate one student from each class $20. All participants were told that the survey was anonymous and were asked to answer as truthfully and accurately as possible.

Materials and Procedure

Anxiety and the Big Five Personality Trait Ratings

The Ten Item Personality Inventory (TIPI) is a self-report inventory that measured the Big Five personality traits: openness, conscientiousness, extroversion, agreeableness, and neuroticism (Gosling et al., 2003). The Big Five traits were judged on a 7-point Likert scale (1 = Disagree strongly, 2 = Disagree moderately, 3 = Disagree a little, 4 = Neither agree nor disagree, 5 = Agree a little, 6 = Agree moderately, 7 = Agree strongly). Anxiety was judged on a 4-point Likert scale (1 = never or very rarely, 2 = sometimes, 3 = often, and 4 = very often or always).

The State Trait Anxiety Inventory (STAI) was adapted to measure the difference in self-perceived anxiety levels from before to during the COVID-19 pandemic (Spielberger et al., 1983). Anxiety was judged on a 4-point Likert scale (1 = never or very rarely, 2 = sometimes, 3 = often, and 4 = very often or always). The STAI was measured twice, once assessing the anxiety felt during the academic year prior to COVID-19, and once assessing the anxiety felt during the COVID year. Due to time constraints of the survey being administered in classrooms, 10 out of the 20 questions from the State-Trait Anxiety Inventory (STAI) were omitted from the survey (6,7,10,11, 13-18). For example, such statements that were included were: *I felt more*

nervous and anxious than usual, I felt afraid for no reason at all, I got upset easily or felt

panicky, I felt like I was falling apart and going to pieces, I felt that everything was alright and

nothing bad would happen, I felt weak and got tired easily, I felt calm and could sit still easily, I

had fainting spells or felt like it, I fell asleep easily and got a good night's rest, and *I had*

nightmares.

Results

Preliminary Analysis

Cronbach's alpha, α, measures the internal consistency, or reliability, or a particular

measure. A Cronbach's alpha of > 0.70 determines the right to combine certain variables in some

way to represent a particular factor. That is, to say that all the variables are assessing the same

basic construct. Furthermore, the calculation of the variable, "worse," were structured in the

sense that higher numbers indicated that they felt worse during COVID, a value of "0" meant

there was no change from pre to during COVID, and negative numbers meant that there was a

decrease in one's anxiety levels.

Primary Analyses

Analyses focused on the correlation between the Big Five Personality Traits and the self-

perceived levels of anxiety among university students prior to COVID, during COVID, as well

as the overall difference of anxiety levels from prior to during the COVID-19 pandemic. The

questions measuring anxiety prior to COVID (α = 0.79) and those measuring anxiety during

COVID (α = 0.83), can be combined to represent a single factor, since α > 0.70.

First, the Big Five traits were explored to determine if they were associated with the

participants' perceptions of their stress becoming worse during the pandemic. Upon conducting

Pearson's r correlations, none of the correlations reached statistical significance, though the

association between neuroticism and stress-worsening was marginal ($r = .16$, $p = .07$), highly neurotic individuals perceived their stress to have marginally worsened from before to during the pandemic (see Table 1).

Next, I tested how Big Five traits predicted pre-COVID anxiety. Several correlations reached statistical significance. People who were neurotic felt greater levels of anxiety prior to COVID ($r = .60$, $p < .001$; shown in Table 2). On the other hand, people who were open displayed lower levels of anxiety prior to COVID-19 ($r = -.24$, $p = .005$, Table 2).

Then, I tested how the Big Five Personality traits predicted anxiety levels during the academic year of the COVID-19 pandemic. As shown in Table 3, there were no statistically significant correlations.

Secondary Analyses

Upon conducting secondary analyses, gender was assessed to determine if it would moderate any of the primary analyses. Several results emerged. First, among women, there was an association between agreeableness and worsening of anxiety ($r = -.02$, $p = .85$), such that women who were higher in agreeableness tended to experience more extreme anxiety during the pandemic. Among men, there was a correlation between neuroticism and worsening of anxiety ($r = .31$, $p = .01$), such that men who were neurotic displayed improvements in their anxiety levels. On the other hand, those who were extraverted did the opposite, such that men who were extraverted had an improvement to one's anxiety levels from pre to during COVID-19 ($r = -.24$, $p = .05$; see Table 4). During the COVID-19 year, women and men who were neurotic further demonstrated greater levels of anxiety (see Table 5).

It is important to also note that while it was not found as significant, men who were extraverted indicated improvements in their self-perceived anxiety. It may also be important to

note that while it is not significant, men who were extraverted indicated improvements in their

self-perceived anxiety. The correlation between the participants 'presence on campus during

COVID versus not demonstrates that within the students who were not on campus, those who

were agreeable and conscientious, displayed slight worsening in their anxiety levels (refer to

Table 6). Participants that were on campus during the COVID-19 pandemic did not demonstrate

any statistically significant changes in their anxiety from prior to during COVID. However,

when looking specifically at the anxiety levels of the academic year before COVID as well as the

academic year during, there is more to be said. For example, within the year before COVID-19,

students who were not on campus and noted to be neurotic, had a great increase to their anxiety

levels, while those who were open showed a slight improvement (refer to Table 7). Within the

sample of students that were on campus when the COVID-19 pandemic hit, those who were

neurotic exemplified increases to their anxiety levels as well.

Discussion

The association between personality traits and the onset of anxiety contributes to one's

personal and social life but may also be utilized to predict preventive methods and treatments for

people in uncertain circumstances. This study aimed to investigate whether the Big Five

personality traits, openness, conscientiousness, extraversion, agreeableness, and neuroticism

could be used to draw associations to one's anxiety levels pre to during the COVID-19 pandemic.

The second hypothesis was somewhat supported as the association between neuroticism and the

perception of one's worsening of anxiety was of marginal statistical significance. In general,

college students felt slightly more anxious during the year of COVID-19 as compared to the year

before it. Furthermore, people who displayed greater levels of neuroticism displayed associations

to their trait anxiety and stress experienced during the COVID-19 pandemic. However, there was

not much of a significant correlation between openness and extraversion on COVID-19 induced anxiety, as previously hypothesized.

Limitations

Perhaps the most notable limitation of our research is that the participants were all part of a single school, Union College. This sample population is quite narrow and may not encapsulate the general feelings of the overall population. A larger issue is that anxiety was not assessed before and during COVID. It was assessed after COVID-19, asking people to recreate how anxious they thought they felt both before and during. That is, this study which relied on people estimating how anxiety they had felt in the academic year leading up to COVID-19 and the academic year of COVID itself. Moreover, people are generally not effective at gauging and estimating their past emotions (Nikčević, 2021).

Future Directions & Implications

An interesting aspect for future research would be to focus on how the relationship between neuroticism and anxiety levels can be delved into further. For example, a follow-up study can be done on investigating the associations between neuroticism and on state or trait anxiety. This can provide more information as to whether this correlation only exists through particular stressful circumstances, or if it is largely based on one's intrinsic characteristics. Furthermore, to address the limitation stated above, an experiment can be done to induce a feeling of stress among the participants, which would allow them to note their symptoms of anxiety at that very moment, rather than making a guess about stressful events that have occurred in the past.

The results of the study can be utilized to establish further preventive measures and treatments for people in future turmoil circumstances. Like in the COVID-19 pandemic, such

resources may be beneficial to one's physical, emotional, and mental state and well-being. Furthermore, this study provides additional research on the association between neuroticism, or the affinity for negative emotions, on state-dependent feelings such as anxiety. While previous research has focused on the relationship between the Big Five personality traits and affective disorders and depression; this study provides further research to answer that hypothesis.

Conclusion

There are numerous studies supporting the correlation between neuroticism and affective disorders, such as anxiety and depression. My research contributed to this line of work as it provided further evidence to support this hypothesis. There was a negative association found between people who were highly neurotic and the worsening of one's anxiety. Our findings suggest that further research needs to be done regarding the preventive measures and treatments that can be implemented to promote and maintain one's physical and mental health.

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Appendix

Table 1

Big Five Personality Traits and Perception of Worsening Anxiety pre-COVID-19

		Worsening Anxiety
Agreeableness	Pearson's r	.13
	p-value	.13
	N	132
Conscientiousness	Pearson's r	.07
	p-value	.44
	N	133
Extraversion	Pearson's r	.03
	p-value	.74
	N	133
Neuroticism	Pearson's r	.16
	p-value	.07
	N	133
Openness	Pearson's r	.13
	p-value	.13
	N	133

Note. The correlation between the Big Five Personality Traits and the perception of worsening anxiety prior to COVID-19 among college university students.

Table 2

Big Five Personality Traits and Perceived Anxiety Pre-COVID-19

		Anxiety Pre-COVID-19
Agreeableness	Pearson's r	-.14
	p-value	.10
	N	132
Conscientiousness	Pearson's r	-.07
	p-value	.41
	N	133
Extraversion	Pearson's r	-.08
	p-value	.36
	N	133
Neuroticism	Pearson's r	.60**
	p-value	.00
	N	133
Openness	Pearson's r	-.24**
	p-value	.005
	N	133

Note. ** indicates the correlation is significant at the 0.01 level (2-tailed).

Table 3

Big Five Personality Traits and Perceived Anxiety During COVID-19

		Anxiety During COVID-19
Agreeableness	Pearson's r	.01
	p-value	.92
	N	132
Conscientiousness	Pearson's r	.01
	p-value	.95
	N	133
Extraversion	Pearson's r	-.04
	p-value	.68
	N	133
Neuroticism	Pearson's r	.62**
	p-value	.00
	N	133
Openness	Pearson's r	-.07
	p-value	.44
	N	133

Note. ** indicates the correlation is significant at the 0.01 level (2-tailed).

Table 4

Big Five Personality Traits and Perception of Worsening Anxiety Based on Gender

		Worsening Anxiety	
		Male	Female
Agreeableness	Pearson's r	.03	.27*
	p-value	.85	.03
	N	65	64
Conscientiousness	Pearson's r	.19	-.07
	p-value	.14	.61
	N	65	65
Extraversion	Pearson's r	-.24*	.23
	p-value	.05	.06
	N	65	65
Neuroticism	Pearson's r	.31*	-.02
	p-value	.01	.85
	N	65	65
Openness	Pearson's r	.11	.17
	p-value	.39	.17
	N	65	65

Note. * indicates the correlation is significant at the 0.05 level (2-tailed).

Table 5

Big Five Personality Traits and Perceived Anxiety During COVID-19 Based on Gender

		Anxiety During COVID-19	
		Male	Female
Agreeableness	Pearson's r	-.05	.08
	p-value	.69	.51
	N	65	64
Conscientiousness	Pearson's r	-.03	-.13
	p-value	.84	.32
	N	65	65
Extraversion	Pearson's r	-.24	.15
	p-value	.05	.24
	N	65	65
Neuroticism	Pearson's r	.64**	.50**
	p-value	.00	.00
	N	65	65
Openness	Pearson's r	-.10	-.01
	p-value	.42	.94
	N	65	65

Note. ** indicates the correlation is significant at the 0.01 level (2-tailed).

Table 6

Big Five Personality Traits and the Perception of Worsening Anxiety Based on Attendance at Union

College or Not

		Worsening Anxiety	
		Not at Union	At Union
Agreeableness	Pearson's r	.24*	.04
	p-value	.02	.82
	N	92	37
Conscientiousness	Pearson's r	.25*	-.16
	p-value	.02	.35
	N	93	37
Extraversion	Pearson's r	.07	-.06
	p-value	.48	.74
	N	93	37
Neuroticism	Pearson's r	.10	.29
	p-value	.34	.08
	N	93	37
Openness	Pearson's r	.11	.22
	p-value	.28	.20
	N	93	37

Note. * indicates the correlation is significant at the 0.05 level (2-tailed).

Table 7

Big Five Personality Traits and Perceived Anxiety Pre-COVID-19 Based on Attendance at

Union College

		Anxiety Pre-COVID-19	
		Not at Union	At Union
Agreeableness	Pearson's r	-.18	-.09
	p-value	.08	.60
	N	92	37
Conscientiousness	Pearson's r	-.13	.01
	p-value	.22	.97
	N	93	37
Extraversion	Pearson's r	-.03	-.20
	p-value	.76	.23
	N	93	37
Neuroticism	Pearson's r	.59**	.61**
	p-value	.00	.00
	N	93	37
Openness	Pearson's r	-.22*	-.32
	p-value	.04	.06
	N	93	37

Note. ** indicates the correlation is significant at the 0.01 level (2-tailed).
* indicates the correlation is significant at the 0.05 level (2-tailed).

Table 8

Big Five Personality Traits and Perceived Anxiety During COVID-19 Based on Attendance at

Union College

		Anxiety During COVID-19	
		Not at Union	At Union
Agreeableness	Pearson's r	.07	-.01
	p-value	.52	.93
	N	92	37
Conscientiousness	Pearson's r	.12	-.15
	p-value	.25	.38
	N	93	37
Extraversion	Pearson's r	.04	-.17
	p-value	.71	.32
	N	93	37
Neuroticism	Pearson's r	.61**	.63**
	p-value	.00	.00
	N	93	37
Openness	Pearson's r	-.08	.02
	p-value	.43	.89
	N	93	37

Note. ** indicates the correlation is significant at the 0.01 level (2-tailed).

Figure 1

Perception of Worsening Anxiety Among Union College Students
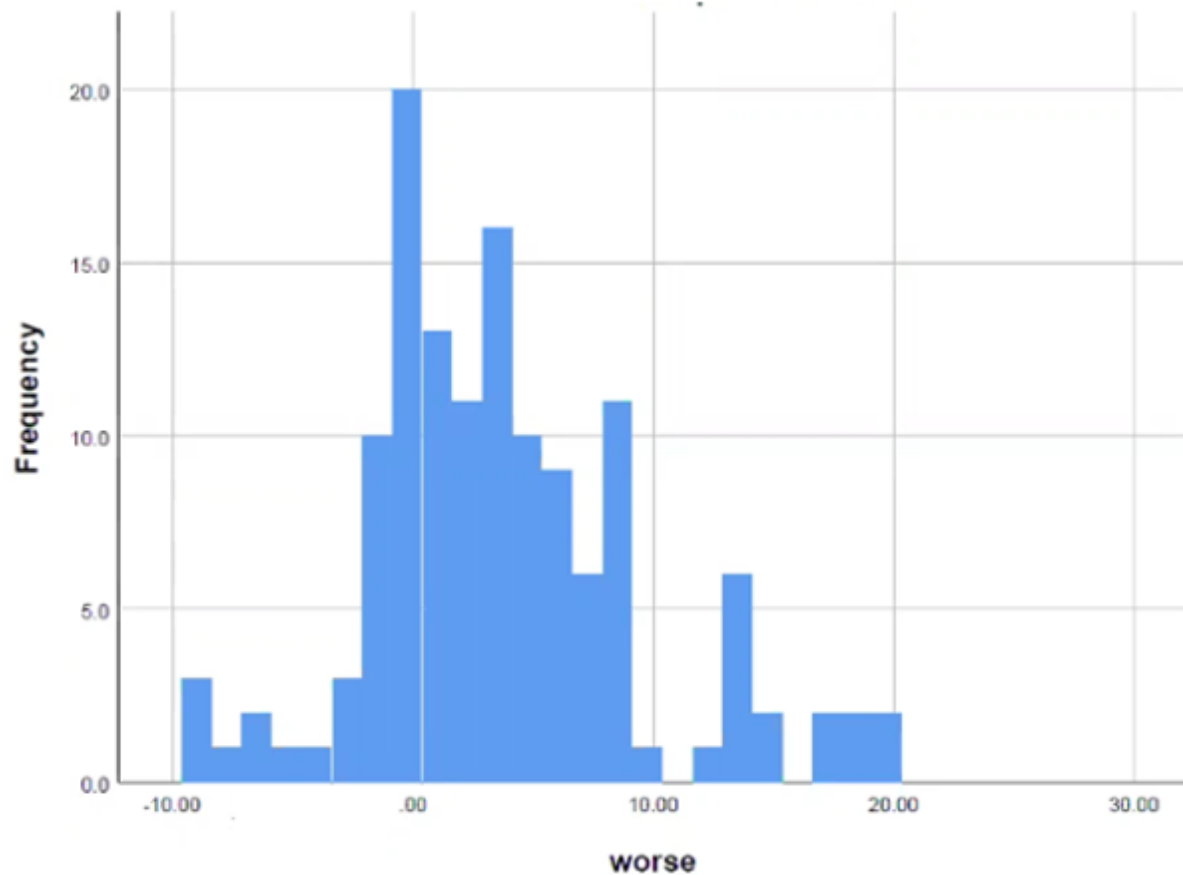
Note. The number of participants representing the extent to which their anxiety worsened from pre-COVID-19 to during the onset of the COVID-19 pandemic. The mean average of worsening anxiety (M = 3.69) indicates that in general, college students felt slightly more anxious during the year of COVID-19 as compared to the year before it.