



Covid stress predicts depression, anxiety and stress symptoms of Filipino respondents

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ABSTRACT

Experiencing a pandemic and being quarantined have been proven to have debilitating effects in mental health. Some of the existing studies mentioned in this research have been conducted to assess the presence of possible mental health concerns brought about by the pandemic but most of these studies focused on the earlier phase of the pandemic. The present study focuses on the reported distress of the respondents who have been through a strict quarantine since March 2020 and are now experiencing a more relaxed lockdown. The objective of this research is to determine if COVID stress predicts common mental health concerns such as stress, depression and anxiety. A survey was conducted with 421 Filipino respondents ages 15 – 65 utilizing the COVID Stress Scales (CSS) by Taylor et al. (2020) and DASS-21. Correlational analysis was utilized showing the COVID Stress is a predictor of depression, anxiety and stress symptoms. Then, comparative analyses were conducted to determine if differences of COVID stress across age groups, gender, occupation and exposure. The results show that students and unemployed respondents are highly vulnerable to COVID stress and its mental health implications. Men and women did not significantly differ in distress. Surprisingly, those who have a COVID positive family member had the lowest COVID stress and DASS scores. There were 40.7% percent who experienced moderate to severe stress, 60.3% had moderate to severe anxiety and 53.1% of the respondents had moderate to severe depression. These findings show that the pandemic stress has debilitating effects on mental health. Common mental health concerns (e.g. depression and anxiety) may be highly prevalent due to the COVID-19 pandemic.

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Introduction

The novel coronavirus disease started spreading in Wuhan, China in late December 2019. The World Health Organization (2020f) declared that it has reached the level of a pandemic as it affects several countries all over the world. To date (June 15, 2020) there are currently 7,823,289 cases worldwide and 431,541 deaths due to COVID. In the Philippines, there are 26,420 individuals who have been diagnosed with the disease so far with 18,888 active cases (Department of Health, 2020). One thousand ninety-eight has succumb to the illness while 6,252 has successfully recovered.

The continuous increase in the number of cases may affect people psychologically. Bao et al. (2020) stated that the growing number of affected places may elicit public worry. This in turn could trigger the emergence of symptoms of common mental illnesses such as anxiety, depression and posttraumatic stress disorder as observed in the Ebola outbreak back in 2014 (Shultz et al., 2015). The risk factors in developing these common mental health concerns include perceived life threat, bereavement, orphaning of children,

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lack of food and resources, stigma and discrimination. At the same time, those who are self-quarantine may experience boredom, loneliness, anger and other related negative emotions (Xiang et al., 2020). This shows that the world is not only dealing with the virus, but it is also dealing with the negative consequences brought about by this pandemic.

The World Health Organization (2020a) urged the public to adopt precautionary measures to prevent the spread of the virus. This includes regular handwashing, physical distancing, avoidance of crowded places, staying at home, seeking medical attention when experiencing fever, cough and difficulty breathing, and keeping up to date on the latest information about the disease. The findings of Wang, Pan, Wan, Tan, Xu, Ho et al. (2020) showed that the adoption of these precautionary measure had protective effects in the early stage of the pandemic resulting to lower levels of depression, anxiety and stress. These precautionary measures, however, may be perceived differently at a collective level. Abel and McQueen (2020) noted that social distancing may be perceived negatively in a collectivistic country such as the Philippines. Increased loneliness and isolation are common risk factors in the development of disorders such as depression and schizophrenia (Fiorillo and Gorwood, 2020).

Taylor et al. (2020) has coined the term “COVID Stress” and constructed the COVID Stress Scales (CSS). They emphasized that the CSS is a tool that can be utilized to quantify the amount of distress brought about by the pandemic so that proper mental health intervention can be provided to these individuals. The CSS has five facets: danger and contamination, socioeconomic concerns, xenophobia, traumatic stress symptoms and compulsive checking. The developers of the CSS have validated the scale among Canadian and American respondents which allowed them to conclude that there is such thing as COVID Stress Syndrome. The aim of the present study is to utilize the CSS among Filipino respondents to (1) determine if the structure of COVID Stress Scales remains accurate when answered by Filipino respondents and (2) to determine its relationship with demographic factors (age, sex etc.) and common mental health concerns (e.g. depression, anxiety and stress).

Correlational design was utilized to address the objectives of the research. Survey questionnaires was given across different age groups and occupations for generalizability. The two main hypotheses in this study are: (1) the 5-factor model of the CSS will be supported by the results of Confirmatory Factor Analysis (CFA) and (2) the facets of CSS will positively predict stress, anxiety and depression symptoms. Moreover, it is also hypothesized that students and unemployed participants will report higher amount of distress compared to the rest. Women are also expected to report greater amount of pandemic stress and mental health concerns. Also, people with infected family members are expected to have higher amount of distress. The literature supporting these hypotheses will be discussed in the literature review section.

This section will be followed by 4 more sections. After the introduction, the next section is Literature Review which will show the findings from related studies. The Methodology section is composed of the following subsections: Participants and Procedures, Measures, Statistical Analyses and Ethical Concerns. The Results section contains the following: Descriptive Statistics, Relationship of COVID Stress and Mental Health Symptoms, Convergent and Discriminant Validity of the CSS and Differences in COVID Stress and Mental Health Symptoms. The Discussion will elaborate the results and will show the Limitations of the Study, Recommendations and Implications. The paper will culminate with a Conclusion section.

Literature Review

During an epidemic, the number of people whose mental health is affected is greater than the number of people infected by the virus (Reardon, 2015). Fear-related behaviors may be demonstrated either at the individual or at the collective level during an epidemic similar to what happened during the Ebola outbreak (Shultz et al., 2016). How is COVID-19 affecting the mental health of affected people so far? In a study among Chinese population, Gao et al.'s (2020) results show a much higher prevalence of depression, anxiety and combination of depression and anxiety (CDA) compared to the national prevalence rates in a 2013 study (Huang et al., 2019). They added that 82% of their respondents reported frequent usage of social media. Similar findings have been reported by Mazza et al., (2020) who surveyed Italian respondents. Wang, Pan, Wan, Tan, Xu, McIntyre et al. (2020) conducted a longitudinal study (from January to March 21, 2020) which showed that there was no statistically significant difference in the reported levels of depression, anxiety and stress symptoms despite the sharp increase in the number of COVID-19 cases. There are researchers who focused on the mental well-being of healthcare workers. Singaporean and Indian healthcare workers seem to report lower levels of distress (depression, anxiety and stress) compared to the general population results from other countries (Tan et al., 2020; Chew et al., 2020).

It is important to note that this is the first pandemic wherein people utilize social media as one of the main channels in disseminating information (Bao et al., 2020). The World Health Organization (2020b) coined the term “*infodemic*” which refers to the spread of information, whether true or false, about the said virus. Torales et al. (2020) specified that people seek information during a community crisis to stay informed. It has also been observed that people have two common reactions to exaggerated media reports.

Some individuals may react with excessive fear while some others may dismiss the information, calling it absurd (Taylor, 2019 p. 73). Other than the spreading virus, fear may also be contagious.

Economic downfall also seems to affect anxiety and anxiety-related behaviors. Cao et al., (2020) discovered that the reported anxiety of college students is associated with parental income as well as place of residence. The debilitating effect of economic downfall was also observed among Japanese citizens in a letter by Shigemura et al. (2020). Fear of the unknown may result to anxiety for those with preexisting mental health concerns and even for those who are psychologically healthy (Cao et al, 2020; Yao et al., 2020). This is because mental health care may not be prioritized as the world deals with the biological effects of the pandemic (Fiorillo and Gorwood, 2020). Another factor that puts mental health at risk is the uncertainty about being infected or infecting family and friends further heighten the levels of anxiety (Fiorillo and Gorwood, 2020; Jahanshahi et al, 2020; Maunder et al., 2003; Shigemura et al., 2020). Being a COVID-19 suspect has also been linked to higher tendency to develop depression and to have lower quality of life (Nguyen et al., 2020). In other words, existing research about COVID and the past pandemics revealed that it is not only the virus or the disease that cause distress. Factors such as preexisting mental illness, *infodemic*, socioeconomic concerns, and fear contagion may also worsen the present situation. The literature also shows that uncertainty about being infected play a huge role in triggering anxiety, obsessive-compulsive symptoms and other related disorders. Rajkumar (2020) stated that the mental health implications of the pandemic may take months to become fully apparent. The factors mentioned here are also being measured by the COVID Stress Scales. Hence, it seems logical to hypothesize that CSS will predict common mental health concerns even after a few months since the initial outbreak.

Pandemic-related anxiety seem to vary depending on the degree of perceived of exposure. Filipino respondents who had direct contact with COVID positive patients reported the higher level of health anxiety (hypochondriasis) compared to those had no exposure at all (Nicomedes and Avila, 2020). Their qualitative analysis showed the different negative and positive emotions that the respondents have reported. The negative emotions include sadness, fear, worry, shock and others while cautiousness, optimism, health consciousness, and compliance were some of the positive themes. Other than that, the pandemic seemed to have triggered existential crises among Filipinos (Nicomedes et al., 2020). Both studies are yet to be published.

Hawryluck et al.'s (2004) research results showed that quarantined individuals experienced symptoms suggestive of posttraumatic stress disorder (PTSD) and depression. They recommended that future studies must not be limited to PTSD and depression. Other psychological concerns such as fear, anger, guilt and others must also be explored. This has been addressed by some of the studies about COVID-19 and mental health so far (e.g. Huang and Zhao, 2020; Tan et al.,2020; Wang, Pan, Wan, Tan, Xu, Ho et al., 2020; Wang, Pan, Wan, Tan, Xu, McIntyre et al., 2020). In the literature review of Rajkumar (2020), it was recommended that future studies assess the impact of COVID-19 stress to other vulnerable populations such as children and adolescents as some existing studies focused on the general public and health care workers.

The published studies so far are mostly about the initial psychological response (e.g Wang, Pan, Wan, Tan, Xu, Ho, 2020). Their data was gathered on February 2020, during the earlier stages of the pandemic. Distor and Nicomedes (2020), on the other hand, focused on the anxiety and coping capabilities of Filipinos during the enhanced community quarantine in their unpublished work. Psychological distress, however, may persist even after the quarantine period. Fiorillo and Gorwood (2020) emphasized that the pandemic will pass but its psychological effects on vulnerable populations may remain for a long period of time. Stress may still be observed among those who experienced public health emergencies even after the event is over (Duan and Zhu, 2020). Cheng et al. (2004), found that SARS patients report mild to moderate symptoms of psychological distress short term after discharge. Taylor (2019) emphasized that people may adapt as the pandemic unfolds which in turn make them less anxious. However, the possibility of experiencing severe and/or long-term psychological effects should not be ruled out. Hence, the present study will explore the psychological state of the respondents as quarantine measures are being eased up.

Anxiety can be both helpful and debilitating during a health crisis. Wang, Di et al. (2020) that the pandemic triggers a public panic that will result to the manifestation of physical and psychological reactions. The lack of anxiety, on the other hand, is not beneficial as well because one may fail to engage in the necessary health guidelines (Taylor, 2019 p. 55). The COVID Stress Scales (Taylor et al., 2020) was developed as a measure of COVID-related distress that can be adapted in future pandemics. To establish the replicability of the scale, the developers have administered it to two samples: Canadian and American. The present study will determine if the structure of the CSS remains accurate when (1) tested in a non-Western sample and (2) utilized months after the initial outbreak. The rationale for this is to know if the CSS remains valid and reliable in a setting wherein adaptation to pandemic stress (Taylor, 2019 p. 26) may have taken place already since the Philippines have been in lockdown since mid-March 2020. Moreover, the present study will test how it would relate to the results a psychometrically established test designed to measure common mental concerns: the DASS-21. Since the CSS measures COVID-stress, it is expected that its facets will positively predict anxiety, stress and depression scores. Previous studies have concluded that mental health concerns are on the rise during the

pandemic, but they did not utilize the CSS (e.g. Wang, Pan, Wan, Tan, Xu, Ho, 2020; Wang, Di et al., 2020). The present study will illustrate how a measure of COVID-stress can accurately predict common mental health concerns.

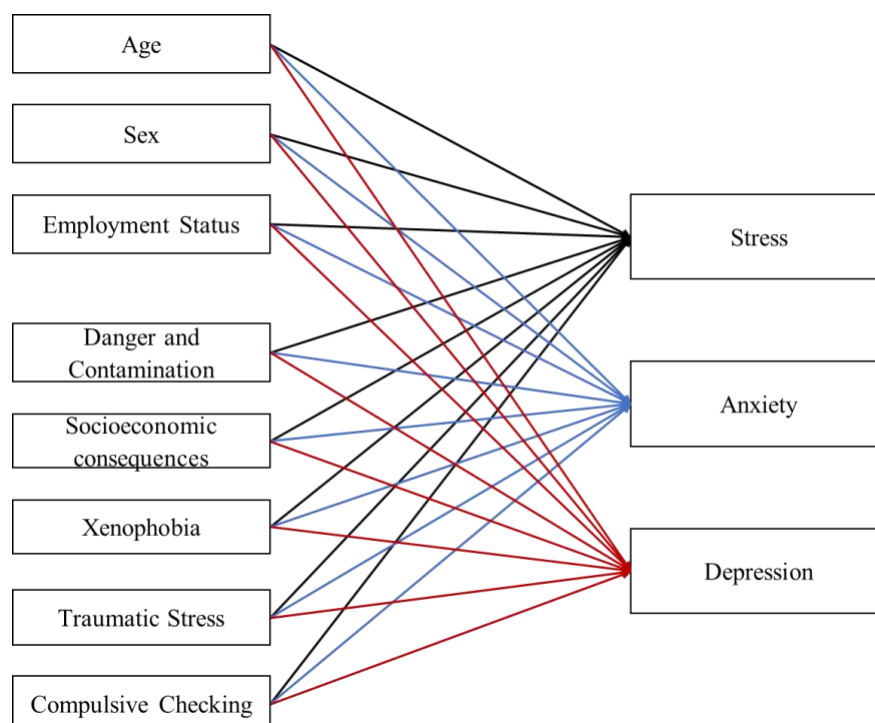


Figure 1: Conceptual Framework showing the hypothesized relationship between demographics and COVID stress facets with depression, anxiety and stress; *Note:* Black lines show the relationship of the various independent variables to depressive symptoms. Blue lines are for anxiety symptoms and red lines are for stress symptoms. It is hypothesized that all relationships will in the positive direction.

Taylor et al. (2020) proposed the people will feel a pandemic related anxiety which he called “COVID Stress”. The 2019 book of Taylor entitled *The Psychology of Pandemics: Preparing for the Next Global Outbreak of Infectious Disease* aided the authors of the scale in item development. They Taylor et al. (2020) initially theorized that COVID stress syndrome would be comprised of 6 separate domains. However, their exploratory factor analysis revealed that there are only 5 facets instead of 6 that is why danger and contamination were combined into one. However, the authors have left these 2 domains separate in the scoring in case future researchers are interested in looking at these aspects separately.

The present study will explore how the five facets of the 36-item COVID Stress Scales (CSS) developed by Taylor et al. (2020) relate to the symptoms of stress, anxiety, depression. The total of all the scores from the various subscales will reflect the level of a person’s COVID-19 Stress Syndrome. It is hypothesized that all the facets will significantly predict Depression, Anxiety and Stress in a positive direction. Gender differences in the reported COVID stress, depression, anxiety, and stress symptoms will also be explored. Liu et al.’s (2020) and Wang, Di et al.’s (2020) finding show that Chinese women are more likely to report higher symptoms of Post-traumatic stress. It is therefore hypothesized that women will report higher COVID stress. The present study will also look at other vulnerable groups. It was reported that college students are one of the vulnerable groups during this pandemic due to possible academic delays (Cao et al., 2020; Wang, Pan, Wan, Tan, Xu, McIntyre et al., 2020). Attention will also be given to unemployed respondents in relation to socioeconomic concerns mentioned earlier. Hence, it is hypothesized that students and unemployed respondents will report higher levels of COVID stress and general distress. The mental health status of employed individuals will still be observed because there is an evidence that returning to work post-lockdown may result to the emergence of mental health concerns (e.g. Tan et al., 2020). It is hypothesized that working respondents will report mild to moderate depression, anxiety and stress symptoms. Moreover, since the CSS is newly developed, it is yet to be validated in Asian samples. The present research will not just relate COVID stress to DASS scores (criterion validity), it will also establish its convergent and discriminant validity through Confirmatory Factor Analysis (CFA). Two models will be tested: (1) a 5-factor model with danger

and contamination (combined) and the rest of the subscales and (2) a 6-factor model separating danger and contamination as originally proposed by Taylor et al. (2020).

Methodology

Participants and Procedure

The link to the survey was posted in Facebook and shared by a number of Facebook users. Another way that the participants were recruited was through e-mail which was forwarded by the initial recipients to other potential respondents. Four-hundred and thirty-three respondents participated in the survey. Twelve of them were not included in the analysis because their present location is outside the Philippines which may be a factor in their reported COVID stress and mental health symptoms. There were 322 female and 91 male respondents while 8 people preferred not to disclose their biological sex. The mean age of the respondents is 25.5 with 15 being the youngest and 65 the oldest. Several demographic information such as occupation, health status of close others, and current location. There 109 students, 227 working individuals, and 36 unemployed who joined the survey (49 chose not to specify their occupation). When it comes to the health status of immediate others, 22 stated that one of their friends tested positive, 22 disclosed that one of their relatives had COVID-19, 2 people had family members with the disease, 5 said that more than one applies while the remaining 370 said that none of the categories apply to them. The largest proportion of participants came from Metro Manila ($n = 151$) followed by Central Visayas ($n = 61$). The data was gathered using online platforms to ensure that the present study follows the health and safety guidelines especially social distancing. The collection of data lasted from June 6 to 15, 2020. For one to be a participant, the researchers follow three criteria: (1) must be a Filipino, (2) current location must be inside the Philippines and (3) can understand English since the entire survey was in English. Respondents were recruited from various places and different age groups so that the results can be generalized. Since the survey is online, one potential weakness of this approach is that lower SES individuals, especially those who do not own a mobile device, were not well represented in the present study.

Measures

The COVID Stress Scales (CSS) of Taylor et al. (2020) was used to quantify the stress brought about by the pandemic. Taylor et al. (2020) establish the construct validity of the scale by correlating it with the following scales: Pre-COVID health anxiety, obsessive compulsive checking and contamination symptoms. All the five subscales significantly correlate with the three Pre-COVID scales. It utilizes a 5-point Likert scale format from 0 = not at all to 4 = extremely on questions such as "I am worried about catching the virus." The other scales also utilize a 5-point scaling system, but the meaning of the numbers slightly differ (e.g. for posttraumatic stress, 0 = never to 4 = almost always). The following are the Cronbach's alpha coefficients of the subscales: danger and contamination – $\alpha = .91$, socioeconomic concerns – $\alpha = .93$, xenophobia – $\alpha = .92$, trauma – $\alpha = .91$, compulsion – $\alpha = .82$. The results of the CFA were discussed in detail in the results section. Confirmatory Factor Analysis was conducted to determine if the 5-factor model remains accurate when the scale is utilized in another sample. This will also shed a light if the original 6-factor model of Taylor et al. (2020) was better than his final 5-factor model.

Depression Anxiety and Stress Scale (DASS-21) was used to assess the level of depression, anxiety and stress of the participants. The scores of the participants can be classified under normal, mild, moderate, severe and extremely severe level of anxiety, depression or stress. It has shown excellent internal consistency and test-retest reliability (Brown et al., 1997). It is a short version of Lovibond and Lovibond's (1995) 42-item scale. The DASS-21 had been utilized to quantify the mental health status of Chinese respondents during COVID-19 pandemic (e.g. Wang, Pan, Wan, Tan, Xu, Ho et al., 2020; Wang, Pan, Wan, Tan, Xu, McIntyre et al., 2020; Tan et al., 2020). The depression, anxiety and stress subscales had reliability coefficients of .91, .85, and .89 respectively. In this paper, the researchers used DASS-D for DASS depression scores while DASS-A for anxiety and DASS-S for stress.

Statistical Analyses

The data were downloaded from Google Forms into an MS Excel file. The demographic variables were dummy coded (e.g. 1=female, 2=male). Those who disclosed that their locations were outside the country were excluded from the analysis. Then, the totals of the subscales of the CSS and DASS were computed in the spreadsheet. Using excel functions, the number of people who fall into the normal, mild, moderate, severe and very severe categories of DASS were tallied. The data were exported to JAMOVI for the statistical analyses.

First, the means of COVID stress, and DASS-D, DASS-A and DASS-S were computed. Then, the intercorrelation of the age, the five facets of CSS and the DASS-21 facets was computed using Pearson-r. To analyze the structural validity and construct validity of the CSS, CFA was conducted using AMOS. To determine how each facet individually relate to DASS domains, hierarchical regression was utilized. The models will be subdivided into three. In model 1, the dependent variable is stress, anxiety for model

2, and depression for model 3. In all models, demographics will be inserted in the step 1 of the hierarchical regression following by the five facets of CSS in step 2. T-test and ANOVA will be used to know if COVID stress and DASS scores differ according to the different demographic classifications. Post-Hoc tests were conducted when necessary.

Ethical Concerns

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants involved in the study. Their rights as a research participant were explained to them in the informed consent section of the survey. They were asked to indicate if they are willing to participate after carefully reading the consent form.

Results

Descriptive Statistics

Table 1 shows the means and standard deviations and the intercorrelation of the scores in CSS facets, DASS-D, DASS-A and DASS-S. This data has not yet been sorted according to demographic classifications. The respondents scored highest in COVID Danger. The COVID danger subscale include items such as “I am worried that I can’t keep my family safe from the virus”. On the other hand, the respondents collectively scored lowest in the traumatic stress subscale. This suggest that Filipinos are less likely to report traumatic stress symptoms. The said subscale includes items such as “I had trouble sleeping because I worried about the virus”.

The respondents collectively scored highest in DASS – D ($M = 16.3, s = 12.1$) followed closely by DASS – S ($M = 16.1, s = 11$) and then finally DASS-A ($M = 13.2, s = 10.2$). If the averages would be interpreted, the scores on both DASS – D and DASS – A fall under the moderate severity while stress is in mild severity.

Table 1: Intercorrelation between Age, CSS Facets and DASS Domains

	1	2	3	4	5	6	7	8	9	10	11
1. Age	—										
2. Danger	-.11*	—									
3. SEC	-.24***	0.50***	—								
4. Xen.	-.09	0.49***	0.48***	—							
5. Cont.	-.07	0.60***	0.47***	0.62***	—						
6. Trauma	-.19***	0.52***	0.48***	0.43***	0.49***	—					
7. Compul.	-.19***	0.44***	0.42***	0.38***	0.40***	0.57***	—				
8. CSS Total	-.20***	0.76***	0.75***	0.76***	0.78***	0.78***	0.70***	—			
9. DASS-S	-.28***	0.39***	0.29***	0.22***	0.36***	0.63***	0.41***	0.51***	—		
10. DASS-A	-.24***	0.38***	0.31***	0.27***	0.35***	0.63***	0.43***	0.52***	0.84***	—	
11. DASS-D	-.33***	0.27***	0.25***	0.14**	0.25***	0.49***	0.27***	0.37***	0.82***	0.75***	—
<i>M</i>	25.54	18.3	14.3	12.8	15.3	8.6	13.6	82.94	16.3	13.2	16.1
<i>s</i>	8.79	4.74	6.48	6.31	5.56	6.05	5.42	26.14	12.1	10.2	11

Note. * $p < .05$, ** $p < .01$, *** $p < .001$; SEC = Socioeconomic Concerns; Xen. = Xenophobia; Cont. = Contamination; Trauma = Traumatic Stress Symptoms; Compul. = Compulsive Checking

The correlation between the age, facets of CSS and DASS domains is displayed in Table 1. It can be observed that age correlates negatively with danger ($r = -.11$), socioeconomic concerns ($r = -.24$), traumatic stress symptoms ($r = -.19$), and total CSS score ($r = -.20$). Hence, this means that as age increases, there is a tendency to experience less amount of COVID stress particularly on the 3 specific domains mentioned earlier. The results also suggest that there is a tendency to report lower amount of depression ($r = -.33$), anxiety ($r = -.24$) and stress ($r = -.28$) as age increases.

Relationship of COVID Stress and Mental Health Symptoms

Table 2: Hierarchical Regression Analysis of CSS Facets and Demographic Variables as Predictors of DASS-S (Model 1), DASS – A (Model 2) and DASS – D (Model 3)

		DASS - S		DASS - A		DASS - D	
	Variable	β	SE	β	SE	β	SE
Step 1	(Intercept)		2.217		2.07		2.39
	Age	-0.286***	0.061	-0.247***	0.057	-0.352***	0.06
	Sex	-0.019	1.084	-0.042	1.012	-0.011	1.17
	Occupation	0.042	0.595	0.028	0.555	0.098*	0.64
Step 2	(Intercept)		2.609		2.462		3.172
	Age	-0.19***	0.049	-0.143***	0.046	-0.277***	0.059
	Sex	0.012	0.849	-0.012	0.801	0.015	1.033
	Occupation	0.081*	0.467	0.073	0.44	0.123**	0.567
	Dang. and Cont.	0.194***	0.063	0.108*	0.06	0.111	0.077
	SEC	-0.058	0.08	-0.038	0.075	0.003	0.097
	Xeno.	-0.138**	0.084	-0.054	0.079	-0.135*	0.102
	Trauma.	0.552***	0.091	0.539***	0.085	0.476***	0.11
	Compul.	0.05	0.094	0.09	0.089	-0.04	0.114
	Step 1 R ²	0.08***		0.06***		0.116***	
	Step 2 R ²	0.45***		0.43***		0.329***	
	Step 1 F	11.822***		8.964***		18.278***	
	Step 2 F	42.186***		38.52***		25.302***	
	ΔR^2	0.327		0.367		0.213	

Note. * $p < .05$, ** $p < .01$, *** $p < .001$; Model 1 = DASS – S as the outcome variables, Model 2 = DASS – A as the outcome variable, Model 3 = DASS – D as the outcome variables; Dang. = Danger; Cont. Contamination; SEC = Socioeconomic Concerns; Xeno. = Xenophobia; Trauma = Traumatic Stress Symptoms; Compul. = Compulsive Checking

To further explore the relationships between the demographic variables, CSS and DASS, hierarchical regression was utilized (see Table 2). The analysis shows that model 1 step 1 is significant, $F(3,417) = 11.822, p < .001$. Hierarchical regression was utilized to determine if the addition of the CSS facets will have an incremental value in the model. The R² changed from .08 in step 1 to .45 in step 2, $\Delta R^2 = .327$. In step 1, only age is a significant predictor of stress ($\beta = -.286, p < .001$). Model 1 step 2 is also significant, $F(8,412) = 42.186, p < .001$, showing that age ($\beta = -.19, p < .001$) and xenophobia ($\beta = -.138, p < .001$) are negatively associated with DASS-S, while occupation ($\beta = .08, p < .05$), danger and contamination ($\beta = 0.194, p < .001$) and traumatic stress symptoms ($\beta = .552, p < .001$) predicted it in a positive direction. This partially confirms the hypothesis since not all the CSS facets significantly predicted DASS-S. It was also expected that xenophobia will predict stress in a positive direction, but the analysis shows the opposite.

The same analysis was applied in predicting DASS – A. Both step 1, $F(3,417) = 8.964, p < .001$, and step 2, $F(8,412) = 38.520, p < .001$ are significant in model 2 (see Table 2). The ΔR^2 is equal to .417 as the R² changed from .06 to .43. Similar to the previous analysis, age is a significant predictor of lower levels of anxiety, ($\beta = -.247, p < .001$). In step 2, age is still negatively associated with DASS - A, ($\beta = -.143, p < .001$). danger and contamination, ($\beta = .108, p < .05$) and traumatic stress symptoms ($\beta = .539, p <$

.001) positively predict anxiety. Similar to DASS-S, the hypothesis is only partially supported since not all the domains of CSS significantly predicted DASS - A.

In model 3, both step 1, $F(3,417) = 18.278, p < .001$, and step 2, $F(8,412) = 25.302, p < .001$ are significant, $\Delta R^2 = .213$. Age negatively predicts DASS - D in both step 1 ($\beta = -.352, p < .001$) and step 2 ($\beta = -.277, p < .001$). Occupation was also had an impact to DASS - D, step 1 ($\beta = .098, p < .05$) and step 2 ($\beta = .123, p < .01$). Xenophobia ($\beta = -.135, p < .05$) is negatively associated with DASS - D while traumatic stress symptoms ($\beta = .476, p < .001$) predicted the criterion in a positive direction. This results partially support the hypothesis because only 3 out of 5 CSS facets predicted depression. Similar to DASS - S, it is surprising that high xenophobia is associated with lower depressive symptoms. The details when it comes differences in CSS scores, DASS - A, DASS - S and DASS - D with respect to occupation and other demographic variables can be seen in Table 3. The relationship of DASS and CSS showed the criterion validity of the latter. The results show that some CSS facets and the total CSS score correlates decently with the established and psychometrically sound DASS - 21.

Confirmatory Factor Analysis

The validity of the CSS was tested using confirmatory factor analysis (CFA). There were two models tested: (a) a 5-factor model wherein danger and contamination subscales were combined into one factor along with the four other factors and (b) a 6-factor model in which danger subscale was separated from contamination subscale. To be able to say that the model is considered adequate fit, the comparative fit index (CFI) and Tucker-Lewis index (TLI) should be $>.90$ while $>.95$ for it to be considered good fit. Root-mean-square error of approximation (RMSEA) value of $<.08$ is considered adequate fit while $<.06$ is considered as good fit. The standardized root mean square residual (SRMR) is considered good fit if it is lower than $.80$ while acquiring a value of $.00$ is considered perfect fit (Hu and Bentler, 1999).

The chi-square values in both models were significant because of the large sample size in the study (Tanaka, 1987). Looking at the fit indexes, the 6-factor model [$\chi^2(579) = 1787.742, p < .001, CFI = .884, TLI = .874, RMSEA = .071, 90\% CI [.067, .074], SRMR = .0581$] showed better fit indexes than the 5-factor model [$\chi^2(584) = 2260.555, p < .001, CFI = .839, TLI = .827, RMSEA = .083, 90\% CI [.079, .086], SRMR = .0648$]. This means that the first model proposed by Taylor et al. (2020) was more appropriate to Filipino samples than the second, 5-factor version. The 6-factor model can be considered adequate looking at RMSEA and SRMR but it did not reach the cutoff for CFI and TLI. The item with the lowest factor loading in both models is “compulsion 6” which states “Checked social media posts concerning COVID-19”. This result is somewhat surprising since literature was able to establish the importance of social media checking in the development of anxiety. This might be suggesting that the item should be revised or deleted in future versions of the scale. When this item was omitted from the model, there were slightly better fit indexes [$\chi^2(584) = 1707.653, p < .001, CFI = .887, TLI = .876, RMSEA = .071, 90\% CI [.067, .075], SRMR = .0582$]. The researchers have decided not to omit this item yet in the present study and keep the scale as is. This is because previous studies (e.g. Gao et al., 2020) have stated that social media exposure during the pandemic plays a role in the emergence of distress. Validation with other samples will shed more light on this issue.

Convergent and Discriminant Validity of the CSS

Before analyzing the convergent validity of the CSS, the reliability using composite reliability (CR) and should be considered first. Table 3 shows that all the domains of CSS show good reliability indexes. Hair et al. (2010) proposed that the convergent validity should be examined by looking if the average variance extracted (AVE) is greater than $.50$ while the CR is greater than the corresponding AVE. It can be observed that this criterion was not met on the compulsive checking domain. On the other hand, to establish discriminant validity, the maximum shared variance (MSV) should be lower compared to the corresponding AVE (Hair et al., 2010). This has criterion have been met (see Table 3). Moreover, the square-root of AVE should be greater than the related correlation. Once again, the compulsion subscale was not able to meet the cutoff. Other than that, the 4 subscales show good discriminant validity. This might be once again due to the effect of “compulsion 6” on the psychometric properties of the test.

It was hypothesized that the 5-factor model which was considered final by Taylor et al. (2020) will yield best fit indices. The results show that this hypothesis is not supported. Their original 6-factor model showed better fit indices. However, this model fell short on some goodness of fit criteria. Specifically, the findings suggest that revisions can be employed on the compulsion item that says, “checked social media posts concerning COVID-19”. It may also help if the CSS will be translated into the local language of the respondent in the future studies. The CSS was not translated to Filipino in the present study.

Table 3: Convergent and Discriminant Validity of the COVID Stress Scales

CSS Facets	CR	AVE	MSV	Correlations					
				1	2	3	4	5	6
Danger	.87	.53	.42	<i>.73</i>					
Socioeconomic Concerns	.89	.69	.30	<i>.55</i>	<i>.83</i>				
Xenophobia	.88	.66	.38	<i>.53</i>	<i>.47</i>	<i>.81</i>			
Contamination	.88	.61	.42	<i>.65</i>	<i>.49</i>	<i>.62</i>	<i>.78</i>		
Traumatic Stress	.87	.62	.45	<i>.59</i>	<i>.53</i>	<i>.47</i>	<i>.53</i>	<i>.79</i>	
Compulsion	.75	.44	.45	<i>.53</i>	<i>.48</i>	<i>.42</i>	<i>.45</i>	<i>.67</i>	<i>.66</i>

Note. CR = composite reliability; AVE = average variance extracted; MSV = maximum shared variance; values in bold italics = square root of AVE

Differences in COVID Stress and Mental Health Symptoms

The scores in the facets of CSS and DASS have been sorted according to age group, sex, occupation and other’s health status (see Table 4). First, the reported COVID stress of the participants were compared according to sex. There were no significant differences in the reported COVID stress and DASS subscale scores when there are 3 categories used namely: (1) female, (2) male and (3) prefer not to say, $F(2,418) = 1.77, p = .171, \eta^2 = .008$. Similar results were observed when those who answered “prefer not to say” were removed from the analysis. Men and women did not significantly differ in COVID stress, $t(411) = 1.41, p = .159$. The only differences were observed was in socioeconomic concerns facets as women ($M = 14.77, s = 6.55$) scored than men ($M = 12.96, s = 5.94$) in this domain, $t(411) = 2.384, p < .05$. The complete details of this t-test can be seen in Appendix A. The hypothesis that men and women will differ in total CSS scores and DASS scores was not supported.

The reported COVID stress differ when the respondents are grouped by age, $F(5,415) = 3.925, p < .01, \eta^2 = .045$. The post-hoc test reveal that the significant difference can be found in two comparisons (see Appendices E.1 and E.2). The CSS total scores of those between ages 41-50 differ with the scores of those from (1) 15-20 and (2) 21-30. Respondents from ages 41-50 scored significantly lower ($M = 67.7, s = 24.4$) compared to adolescents ($M = 88.5, s = 29.7$) and the 21-30 group ($M = 84, s = 22.9$). This finding supports one of the hypotheses. The 15-20 group is primarily composed of students while the 21-30 group are young adults who are in the early part of their careers. Some reported being unemployed due to the lockdown. The impact of occupation status will be shown in latter analyses. Figure 2 presents these results using a bar graph.

There were also significant differences in the scores in DASS-S, $F(5,415) = 6.945, p < .001, \eta^2 = .077$, DASS-A, $F(5,415) = 424.348, p < .001, \eta^2 = .049$, and DASS-D, $F(5,415) = 8.929, p < .001, \eta^2 = .097$. Post hoc test revealed that 41-50-year-old participants are less tensed and stressed compared to coming from 15-20 and 21-30. Post hoc for DASS domains show similar results as respondents from 41-50 scored lower in DASS-D and DASS-A compared to those from 15-20 and 21-30. DASS-D Post Hoc test revealed that participants who are over 60 are less depressed than those from 15-20 and 21-30 age groups (See Figure 3). This supports the hypothesis that younger participants may experience greater amount of COVID stress which in turn led to higher scores in DASS as well. The ANOVA tables and Post-Hoc tests can be seen in detail in Appendices E.1, E.2, F.1, F.2, H.1 and H.2.

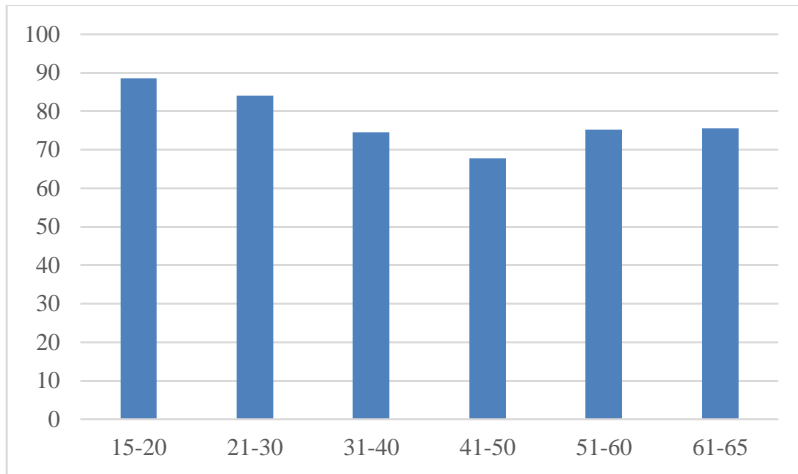


Figure 2: Bar Graph of CSS Totals Sorted According to Age Groups

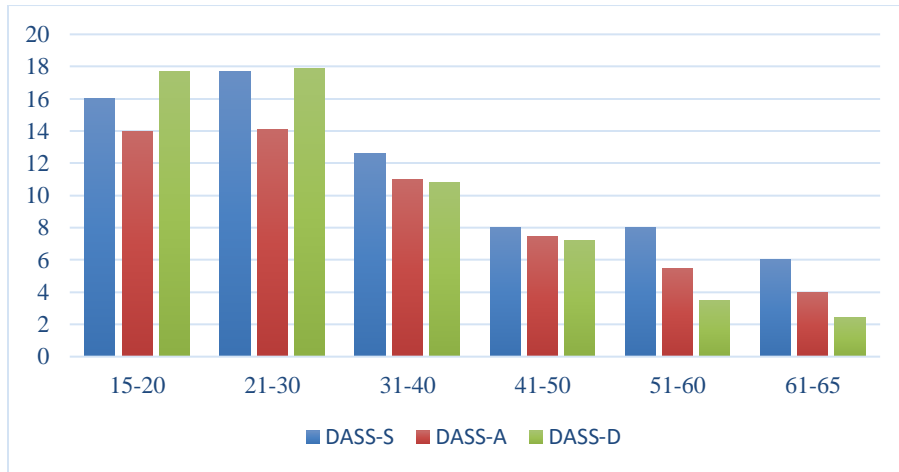


Figure 3: Bar Graph of DASS Score Sorted According to Age Groups

Table 4: Summary Table of CSS Scores and DASS Scores Sorted According Age Group, Sex, Occupation and Other's Health Status

	Danger			Socioeconomic		Xenophobia		Contamination		Trauma		Compulsion		COVID stress		DASS-S		DASS-A		DASS-D	
	N	M	s	M	s	M	s	M	s	M	s	M	s	M	s	M	s	M	s	M	s
<i>Sorted According to Age Group</i>																					
15-20	89	18.5	5.29	16.7	6.25	13.2	7	15.6	6.33	10.1	6.26	14.5	6	88.5	29.7	16	10.8	14	10.7	17.7	12.1
21-30	265	18.6	4.17	14.4	6.07	13.1	5.92	15.4	5.23	8.71	5.97	13.9	5.03	84	22.9	17.7	10.8	14.1	9.92	17.9	11.8
31-40	25	17.4	5.95	11.6	7.8	11.5	6.56	14.9	5.73	7.16	6.11	12.1	5.97	74.6	32	12.6	12.1	11	11.3	10.8	11.9
41-50	33	16.4	4.89	10.5	5.03	11.2	6.61	13.7	5.24	5.09	4.64	10.7	5.01	67.7	24.4	8	8.02	7.45	8.1	7.21	8.44
51-60	4	16.3	9.67	13.8	10.1	10.5	9.75	14.5	5.57	8.75	7.63	11.5	8.96	75.3	49	8	9.38	5.5	7.19	3.5	5.74
61-65	5	17.8	8.84	9.8	13	13.2	7.89	15.8	9.78	6.2	4.49	12.8	6.3	75.6	44.2	6	4.47	4	4	2.4	2.61
<i>Sorted According to Sex</i>																					
Female	322	18.3	4.93	14.77	6.55	12.96	6.44	15.6	5.52	8.77	6.16	13.67	5.41	84.12	26.5	16.31	11.1	13.51	10.3	16.5	12.4
Male	91	18.1	3.85	12.95	5.94	12.65	5.74	14.33	5.55	8.18	5.71	13.53	5.51	79.76	24.1	14.9	10.5	11.76	9.74	15.43	10.9
Prefer not to say	8	17.6	6.35	12.1	7.81	10	7.21	12.25	5.85	6.75	5.8	12.75	5.68	71.5	31.7	18.75	14.7	14.75	11.7	18.0	14.9

Table 4 cont.

	Danger			Socioeconomic		Xenophobia		Contamination		Trauma		Compulsion		COVID Stress		DASS-S		DASS-A		DASS-D	
	N	M	s	M	s	M	s	M	s	M	s	M	s	M	s	M	s	M	s	M	s
<i>Sorted According to Occupation</i>																					
Student	109	19	4.45	16.3	6.48	14	6.47	16	6.07	10.7	6.04	14.7	5.91	90.7	27.2	17.1	10.8	14.3	10.7	18	12
Employed	227	18.4	4.67	13.9	6.32	12.8	5.85	15.2	5.18	7.8	5.74	13.6	5.07	81.7	24.4	15.5	10.9	12.6	10.1	14.7	11.7
Unemployed	36	17.7	4.13	13.2	5.6	11.9	5.82	14.6	4.81	7.03	5.97	11	5.56	75.5	21	16.7	10.9	13.6	9.91	20.3	13.7
Unspecified	49	16.8	5.77	12.8	7.01	11.1	7.84	14.5	6.5	8.86	6.55	13.1	5.18	77.1	31.1	15.8	12.2	12.9	9.71	17.1	12
<i>Sorted According to Other's Health Status</i>																					
N/A	370	18.2	4.89	14.4	6.46	13	6.35	15.3	5.61	8.58	5.94	13.6	5.49	83.2	26.7	15.9	10.8	13	10.1	16.2	12
Friends Positive	22	19.7	3.52	14	7.27	11.5	6.4	13.6	6.16	9.64	8.19	14	5.86	82.3	27.9	18.1	11.8	15.3	10.8	17	13.5
Relatives Positive	22	18	3.27	14	6.67	12.1	5.87	15.4	4.24	9	5.68	14.4	4.57	83	17.1	17.1	12.6	13.9	10	18.6	11.9
Family Positive	2	17	4.24	8	2.83	9	5.66	13.5	4.95	0	0	9.5	4.95	57	12.7	4	5.66	5	7.07	6	8.49
More than one	5	20	3.08	11	4.3	10	4.06	16.6	4.51	7.2	4.76	13.8	2.05	78.6	8.88	16.8	16.8	14.4	16.5	15.6	16.3

Summary Table of CSS Scores and DASS Scores Sorted According Age Group, Sex, Occupation and Other's Health Status

Note. The item under other's health status ask the respondent to check which applies to them among the following: (1) None of the above, (2) one of my friends tested positive on COVID-19, (3) one of my relatives tested positive on COVID-19, (4) one of my immediate family members tested positive on COVID-19.

Significant differences were also observed when the data is sorted according to occupation, $F(3,417) = 5.318, p < .001, \eta^2 = .037$. Both Table 4 and the Post-Hoc test (see Appendix I.2) show that students report the highest amount of COVID stress ($M = 90.7, s = 27.2$). Their group scored significantly higher than the employed ($M = 81.7, s = 24.4$) and the unemployed participants ($M = 75.5, s = 21$). The hypothesis that students will be highly vulnerable to COVID stress was supported. The unemployed participants did not significantly differ from the CSS scores of employed ones which does not support the hypothesis.

There were no significant differences in anxiety and stress after the data has been sorted according to occupation. But there were significant differences in their DASS – D scores, $F(3,417) = 3.491, p < .05, \eta^2 = .024$. Although it is significant, the Post-Hoc test shows that none of the comparisons were significant. The closes to the threshold of .05 would be the comparison between students and employed (see Table 5 and Figure 4). Unemployed respondents reported the highest level of depressive symptoms ($M = 20.3, s = 13.7$). This partly supports the hypothesis that unemployed respondents will be vulnerable to the mental health implications of COVID stress. The hypothesized that people who are employed may report mild to moderate level of distress was supported.

Table 5: Post-Hoc Table Comparing DASS-D Scores According to Occupation

		Mean Difference	SE	t	p tukey
Student	Employed	3.303	1.390	2.377	0.085
	Unemployed	-2.296	2.552	-0.900	0.805
	Unspecified	0.839	2.059	0.407	0.977
Employed	Unemployed	-5.599	2.407	-2.326	0.108
	Unspecified	-2.464	1.877	-1.313	0.558
Unemployed	Unspecified	3.135	2.847	1.101	0.690

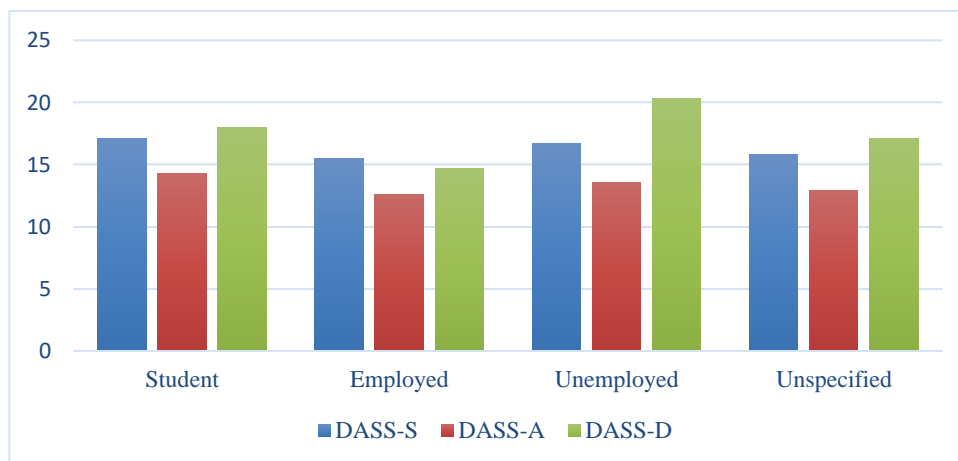


Figure 4: Bar Graph of DASS Scores Sorted according to Occupation

Lastly, the scores of the respondents in CSS and DASS were compared according to the exposure. There no significant differences in COVID stress, $F(4,416) = 0.535, p = .710, \eta^2 = .005$. It is surprising that the lowest level of COVID stress were displayed by those who have an infected family member ($M = 57, s = 12.7$). They also scored lowest on depression, anxiety and stress. Although caution must be taken in interpreting since there are only 2 respondents in this group. The highest COVID stress was reported by those who said none of the criteria applies to them, ($M = 83.2, s = 26.7$). Those with friends who tested positive on the illness had the highest scores in DASS – D, DASS – A and DASS – S. These data can be seen in detail in Table 4 as well as in figures 5 and 6.

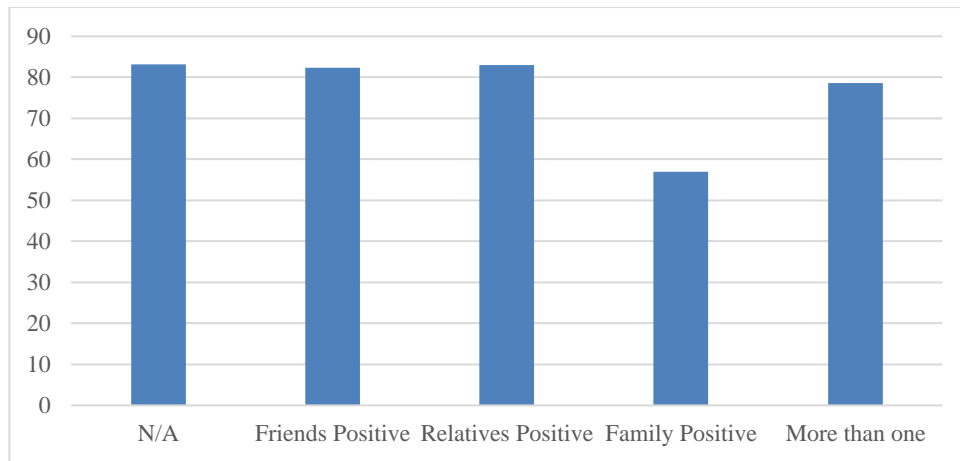


Figure 5: Bar Graph of CSS Totals Sorted According to Exposure/Other's Health Status

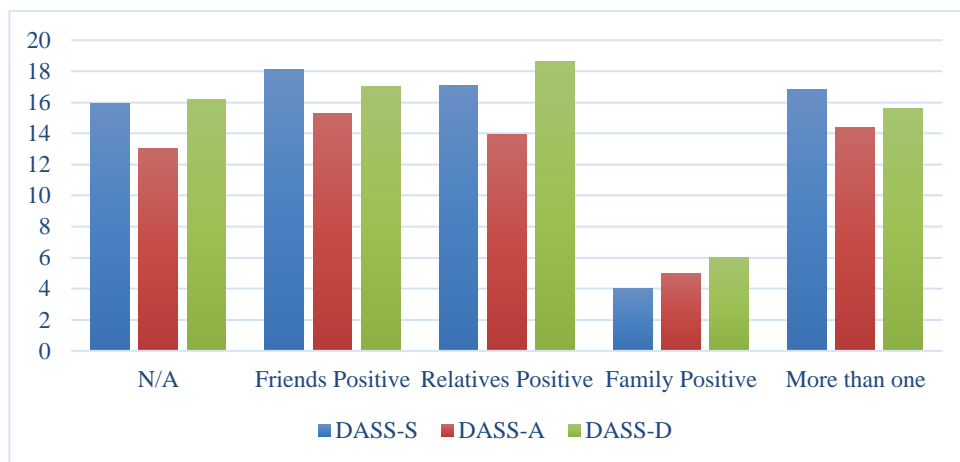


Figure 6: Bar Graph of DASS Scores Sorted According to Exposure/Other's Health Status

Discussion

The purpose of the present study is to quantify the perceived COVID stress and the mental health status of Filipinos during the MECQ, GCQ and MGCQ. The strictest form of lockdown in the Philippines is the Enhanced Community Quarantine (ECQ) followed by MECQ, then GCQ, and then finally MGQC. During the period of the data gathering, none of the regions of country were in ECQ. Hence, the present study aims to assess if mental health concerns and COVID stress persist in a more relaxed and more permissive type of lockdown where there is more opportunity to go outside and interact with others. This, in turn, may affect the number of people who are infected which may or may not affect the perceived pandemic stress and mental health of the general population.

The first key finding is that Filipinos scored lowest in CSS traumatic stress subscale. This suggests that Filipinos are less likely to experience intrusive thoughts and mental images, and difficulty sleeping due to the pandemic. However, the collective average in DASS – S falls under average (Gomez, 2016; Lovibond and Lovibond, 1995). Hence, the reported stress of the respondents may not only be due to COVID. Different stressors such as going back to work for employees and unemployment may explain this level of stress. The respondents seem to be most concerned with danger and contamination which, in turn, might explain their scores in the compulsive checking subscale. The National Capital Region had the highest mean score in CSS danger. This might be explained by the perceived risk of the respondents in the less strict version of the lockdown. In NCR, people have been allowed by the government to back to work and there are more chances of interacting with other people as malls and some public transportation services began to operate again. While this is happening, the number of new cases in the country continue to rise, reaching over 26,420 (over 18,888 active cases) on the last day of data gathering, June 15, 2020. It is noticeable in Table 1 that although Taylor and colleagues (2020) combined danger subscale with contamination subscale, their means when computed separately are not close to each other. Filipinos scored higher in CSS danger than in CSS contamination. Perhaps this result is saying that Filipinos are still afraid of contracting the virus and that they are worried about the efficacy of the healthcare system but they do not necessarily believe that they can get the virus simply from touching something in public spaces, using the ATM machine, accepting cash, or being exposed to someone

sneezing. Xenophobia has the second lowest mean among the various subscales. The lower scores in xenophobia in relation to other subscales may be explained by the collectivistic culture of the Philippines (Markus and Kitayama, 1991). Kim et al. (2016) revealed that high collectivism may act as a buffer in the relationship of perceived vulnerability and xenophobia. Caution must be taken when interpreting the results since there are findings that people can be more collectivist when there is perceived vulnerability (Fincher et al., 2008). Collectivism was not included as a variable in this study. It is possible that the lockdown (particularly staying at home with the family) and the perceived threat can make the people collectivistic even if they are not that collectivistic to begin with.

The present study also contributed in validating the test in a collectivist setting. The analyses show that there are excellent reliability coefficients and the validity is acceptable on some aspects but questionable on others. The criterion validity of the test was established by correlating the new test (CSS) with an established one which is the DASS. The results of hierarchical regression will be discussed in detail later. The analyses show that some aspects of the CSS are related with DASS domains but these relationship changes from significant to not significant from one domain to another. The issue on xenophobia subscale in a collectivistic setting is also related to this one. The convergent and discriminant validity of the CSS was explored using CFA. The CFA results show acceptable indices only on some criteria. Only compulsive checking subscale was observed to be unable to meet these criteria (or barely meeting it). This is suggestive that revisions on this subscale might improve the validity of the test particularly by looking at item no. 36 (Check social media posts concerning COVID-19).

DASS scores classifications show that 40.7% of the respondents experience moderate to extremely severe stress, 60.3% reported moderate to extremely severe anxiety while 53.1% had depression scores failing in the moderate to extremely severe category. This data shows that the three mental health concerns are highly prevalent among the respondents in the study.

The relationship of the CSS facets and the DASS domains were explored using hierarchical regression. The regression results for model 1 show that danger and contamination, xenophobia and traumatic stress symptoms were the significant predictors of DASS – S. Socioeconomic concerns and compulsive checking were not significant. Although xenophobia was significant, it was negatively associated with stress. Hence, the hypothesized relationship was only partially supported. These results suggest that it is still the fear of contracting the virus together with the unwanted thoughts associated with it are associated with tension and uneasiness among the respondents. Socioeconomic concerns did not predict DASS – S perhaps because more groceries and malls have been allowed to reopen in a relaxed lockdown. The negative relationship of xenophobia and stress suggest that the greater intention to interact with strangers or foreigners is associated with higher stress and vice versa (more xenophobia or avoidance behavior relates to lower distress). Although it was initially hypothesized that there will be a positive relationship between xenophobia and distress, the negative relationship between the two actually make sense in the context of COVID. In other words, there is a possibility that respondents are avoiding foreigners or strangers not because of xenophobia but because they consider it as a precautionary measure. Hence, those who have the intention to avoid foreigners or strangers tend to be less stressed because they think that this is a way to protect themselves from COVID. The results show, however, that collectively, the respondents' xenophobia is the second lowest among the CSS facets. Which means that Filipinos are not so concerned with avoiding foreigners. Perhaps, this is because of the collectivistic culture (Markus and Kitayama, 2004) and the hospitable attitude of Filipinos towards foreigners. In the context of COVID though, this welcoming behavior towards foreigners or strangers can lead to greater exposure which in turn might increase the chance of getting the virus. This perhaps is the reason why lower xenophobia or avoidance behavior is associated with greater stress since lower xenophobia means higher chances of engaging with strangers. Another possible issue is that xenophobia has been limited to avoidance of foreigners in Taylor et al.'s (2020) COVID Stress Scales even though it is originally defined as fear of strangers (not specifically foreigners). This might be because xenophobia is not considered desirable in a collectivistic culture. It also buffers the relationship of perceived threat and xenophobia during epidemics (Kim et al., 2016). Hence, there is a possibility that in collectivistic countries, people are more likely to interact with strangers at the expense of being exposed to the virus. Perhaps there will be a difference in result if the xenophobia subscale of CSS will also incorporate strangers who are non-foreigners. This will allow future studies to determine if this avoidance behavior (or lack of) is only displayed towards foreigners or to strangers in general. Further studies, particularly in collectivistic countries, must be conducted to validate the findings in the present research.

Similar conclusions can be seen in model 2 (DASS – A as dependent variable). Danger and contamination and traumatic stress are the significant predictors. The analyses showed that compulsive checking (e.g. checking the social media for COVID related news) is not significant predictor of DASS – S but it was almost significant in DASS – A. Perhaps this suggest that being exposed to news articles causes a sudden psychological and physical uneasiness similar to the symptoms of a panic attack. For DASS – D, danger and contamination together with traumatic stress symptoms are the significant predictors. Xenophobia was once again negatively associated with the criterion. Perhaps this is because the symptoms of traumatic stress in the CSS co-occurs with depressive symptoms (e.g. difficulty sleeping). This is similar to the findings of Hawryluck et al., (2004) who suggested that quarantined individuals were more likely to develop PTSD and depression.

One interesting finding is that higher age is correlated with lower amount of CSS danger, CSS socioeconomic concerns, CSS traumatic stress, CSS compulsive checking, DASS – S, DASS – A and DASS – D (see Table 1). These results suggest that older people are less likely to score high on the above-mentioned CSS facets as well as in DASS subscales. Simply put, younger individuals are more vulnerable to COVID stress and its mental health implications. Similarly, Nguyen et al. (2020) found that older adults had lower health related quality of life during the pandemic. Morrow-Howell et al. (2020) emphasized that older adults, particularly adults

of color, may be at a higher risk due to the debilitating impact of self-isolation and are more likely to be vulnerable especially those who have contracted the disease. During the time that the data was gathered, adults who are 60 and older are still not allowed to outside their homes due to possible health risks. Also, there are only 5 respondents from the 60 and over which may not accurately represent the mental health status of their age group. Nonetheless, it is a possibility that older adults reported less stress since Filipinos practice close family ties (living together with extended family). The presence of the family members in the household may have been a buffer from developing certain mental health concerns. This is also related to the collectivistic culture of the Filipinos explained earlier. The findings in the present study are similar to the findings among Indian (Kazmi et al., 2020) and Italian respondents (Mazza et al., 2020) who reported that younger participants had higher amount of anxiety, stress and depression while milder symptoms were displayed by those who are 41 years old and above. The uncertainty in the professional life of the younger respondents plays a role in these findings (Kazmi et al., 2020).

The findings about the impact of age on COVID stress and DASS scores were further explored using ANOVA (See Appendix E.1 and E.2). The Post-Hoc tests showed that people who are in ages 41-50 had significantly lower stress than those who are in the ages 15-20 and 21-30. This is probably because these two groups are comprised of college students and young adults who have just started in their careers. It was shown in Table 4 that students almost had a significantly higher depression scores than those who are working. This is in congruence with the findings in Iran (Jahanshahi et al., 2020), China (Huang and Zhao, 2020), and India (Kazmi et al., 2020). There is an elevated risk among younger workers since they are more likely to lose employment in contrast to older workers (Soergel, 2020). While this may be true, it was also found out that employed individuals reported mild stress, moderate anxiety and moderate depression. Hence, although there are possible risks of going back to work (see Tan et al., 2020), they are not as vulnerable as unemployed individuals.

Contrary to the hypothesis, there is no significant difference in the CSS and DASS scores of men and women. The two groups only differ in the socioeconomic concerns as women are more concerned in this aspect than men (e.g. concerned if the grocery will run out of supplies). This is not consistent with the previous findings showing that women are more vulnerable to common mental health concerns during the time of the pandemic (Liu et al., 2020; Mazza et al., 2020; Özdin and Özdin, 2020; Wang, Di et al., 2020). Perhaps, women are more concerned with the socioeconomic implications of the pandemic because they are more likely to be the traditional caregiver in the family (Walter and McGregor, 2020).

Another interesting finding is that those who have family member/s who tested positive also scored lowest in COVID stress and DASS. Furthermore, those who answered, "more than one apply" (e.g. there are positive cases from their friends and family) had the second lowest COVID stress total and DASS scores. Those who do not have an infected significant other did not statistically with those who said that they either had an infected friend or relative. Having an infected friend seem to be related to anxiety and stress scores while having an infected relative was associated with higher depression (see Table 4). In contrast, Mazza and colleagues (2020) found that anxiety is associated with having an infected relative while depression and anxiety is evident among those whose friend/s are positive. It can be inferred that people whose family members tested positive were able to adapt to the stress brought about by contracting the disease. The longer exposure to the virus, together with the long quarantine or lockdown period, may have caused people to adapt to the situation just like what Taylor (p. 26, 2019) stated. In relation to this, Taylor (p. 42, 2019) as well as Fiorillo and Gorwood (2020) stated that intolerance of uncertainty about being infected or infecting others will be a big factor in the next pandemic. Perhaps having an infected significant other somehow reduced this uncertainty by allowing the individual to understand how it feels like to actually have the virus or live with someone who is infected. To support this argument, it can be seen in Table 4 that those who said none of their significant others were infected had the highest COVID stress while those who had the highest DASS scores were those who answered that either their friend/s or relative/s was infected. In other words, having a friend or relative who is infected is associated with distress perhaps because it adds to the uncertainty. This is under the assumption that they do not live with their friends or relatives. On the other hand, having a family member who tested positive may have allowed them to understand how it feels to live with an infected individual, making them adapt to the stressor faster. Health care workers who initially experienced fear eventually became relaxed when facing COVID positive patients (Sun et al., 2020). The same phenomenon may also apply to family members. Further studies are necessary to validate these findings. It is also possible that these individuals with direct exposure experienced the positive emotions (e.g. optimism) that Nicomedes and Avila (2020) discovered in their qualitative analysis. The Broaden-and-Build Theory by Frederickson (2004) holds that the experience of positive emotions may undo the effects of negative emotions. Frederickson (2004) has theorized and proven that positive emotions can even help in cardiovascular recovery even after experiencing stress or negative emotions. This phenomenon might also explain why those who have an infected family member also had the lowest DASS scores. Perhaps future studies can quantify the amount of positive emotions caregivers or COVID survivors are experiencing to determine if it has a buffering role.

Limitations of the Study

The study had several limitations. First, the researchers made use of self-report scales administered online. The DASS manual states that it should not be a substitute to face-to-face interview or assessment with a psychologist or psychiatrist. Hence, the severity of stress, anxiety, and depression reported by the respondents can be an overestimation or underestimation. Also, the present only looked at stress, anxiety and depression as possible outcomes of COVID stress. Other related mental health concerns such as obsessive-compulsive symptoms, sleep problems, as well as drug and substance use during the pandemic were not included in the study. None

of the participants had COVID-19 while there less than 5 who were tested for the virus. This means that the present study was not able to look at the potential differences between having or not having COVID-19. Perhaps the closest that the present study was able to achieve is surveying people whose family members are infected. Moreover, cross-sectional design was utilized, and the data was only gathered once. There is no way to determine if their reported present COVID stress in a relaxed quarantine is higher or lower than their COVID stress during the strict lockdown (ECQ) because the latter was not measured. The same can be said for their DASS scores. Lastly, although the present study was able to get participants from the various regions of the country, there are regions in which there are only 5 or lower number of participants.

Recommendations

With the limitations mentioned, here are the researchers' recommendations for future studies. COVID Stress Scales should continually be used in understanding the pandemic stress of the Filipinos and its correlates. The said scale covers a lot of facets that the participants said they were able to relate to (via e-mail feedback). Future studies can look at other mental health concerns aside from anxiety, stress and depression. Moreover, their willingness to undergo mental health services offered by local institutions may also be an important variable. Also, the respondents should be asked if they had a pre-existing mental disorder to determine if COVID stress has conditional or interaction effects with mental health concerns before the pandemic. The present study also revealed that there is a complex relationship between DASS – S, DASS – A, and CSS compulsive checking. It is still puzzling why compulsive checking did not relate with stress, but it was almost significant with DASS – A. Another interesting finding that must be addressed is the low COVID stress reported by those whose family members tested positive. Perhaps future researchers can incorporate other variables or can adapt a qualitative approach in studying the caregivers of COVID-19 positive patients. Furthermore, future studies can also look at the potential buffers (e.g. resilience, health literacy etc.) in relationship of COVID stress with mental illnesses.

Implications

The present study was able to contribute to the existing studies about COVID-19 and mental health. It somehow incorporated the recommendation of Hawryluck et al. (2004) which states that studies about the impact of epidemics or health emergencies should not be limited to trauma- and stress-related symptoms. Some of the COVID and mental health studies looked at posttraumatic stress symptoms (e.g. Liu et al., 2020) while some incorporated other disorders as well (e.g. Wang et al., 2020a,b). The present study utilized DASS-21 which would allow future studies to compare it with the findings in other countries. It would be easier to compare the findings among Filipino respondents with the findings among Indians (Kazmi et a., 2020), Italians (Mazza et al., 2020) and Chinese respondents (Wang, Pan, Wan, Tan, Xu, Ho et al., 2020; Wang, Pan, Wan, Tan, Xu, McIntyre et al., 2020). This would also contribute the number of studies about the mental health of Filipinos during the pandemic. This would add to the existing findings about the implications of COVID pandemic to the mental health of Filipinos (see Distor and Nicomedes, 2020; Nicomedes and Avila, 2020; Nicomedes et al., 2020). The present study would shed a light about the mental health of Filipinos in the more relaxed version of the lockdown especially during the first 15 days of June 2020.

The findings also contributed to the psychometric properties of CSS. It showed good reliability coefficients and adequate validity indexes. In contrast to Taylor et al.'s (2020) final 5-factor structure, the CFA showed that the original 5-factor structure has better fit indexes. This shows that authors of the scale made the right move by allowing to compute for danger and contamination separately even though their CFA showed that it can be combined. The present study showed that danger and contamination went to different directions instead of combining into one factor. Future studies may consider exploring the differences between the 5-factor and 6-factor model as well. Other authors may also consider translating the questionnaire to their own language since this was not done in the present research.

Conclusions

The present study was able to quantify the COVID stress and determine how its factors relate to different mental health concerns. The main hypothesis investigated in this study is that COVID Stress predicts stress, depression and anxiety. The researchers found out that 40.7% percent experienced moderate to severe stress, 60.3% had moderate to severe anxiety and 53.1% of the respondents had moderate to severe depression. However, the survey is not a substitute to formal assessment. Hence, these numbers may be an overestimation or an under estimation. The hypothesis about the validity of the 5-factor structure of the CSS was not supported. The 6-factor model generated better fit indices, but its validity is still questionable in some aspects. For example, Xenophobia may have a different effect in a collectivistic culture. There were evidences in other research showing that it can collectivism can be a protective factor rather than an exacerbator. Translating the scale in future studies might play an important role in validating the CSS. Interestingly, older respondents felt more secured against the risk brought about by the pandemic. Perhaps this is because older respondents are more financially secured that younger ones. It will be easier for them to pay for treatment or hospitalization. Also, younger workers are more likely to be terminated than older ones since the latter are most likely to be in higher positions. There were no significant differences between the COVID stress of males and females. This is surprising since women typically report more mental health concerns than men. Perhaps the use of the questionnaire allowed male participants to report symptoms which they would not typically disclose to their friends or even to a health professional. Students and unemployed individuals are found to be highly vulnerable to COVID stress and its implications. Employed participants reported lower amount of COVID stress. It is possible that the employed participants were not required to report to work yet (work from home) which acted as a buffer against pandemic

stress. Those who reported that they have an infected family member also had lower CSS and DASS scores. Adaptation is one of the possible explanations that explains this finding. This finding must be treated as tentative until replicated. The results of this preliminary study connect COVID stress to mental health concerns. Hence, the pandemic has harmful effects in both physical and mental health.

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Appendices

Appendix A

Table A.1

T-test Results Comparing the Scores of Men and Women in the various domains of CSS and DASS

	Statistic	df	p	Cohen's d
Danger	0.414	411	0.679	0.0491
Socioeconomic Concerns	2.384	411	0.018	0.283
Xenophobia	0.406	411	0.685	0.0482
Contamination	1.939	411	0.053	0.2302
Traumatic Stress	0.822	411	0.412	0.0975
Compulsion	0.21	411	0.834	0.0249
CSS Total	1.411	411	0.159	0.1675
DASS - S	1.091	411	0.276	0.1295
DASS - A	1.454	411	0.147	0.1726
DASS - D	0.749	411	0.454	0.089

Appendix B

Table B.1

Hierarchical Regression Analysis With DASS-S as Dependent Variable

Model		Unstandardized	Standard Error	β	t	p
Step 1	(Intercept)	24.689	2.217		11.137	< .001
	Age	-0.358	0.061	-0.286	-5.891	< .001
	Sex	-0.436	1.084	-0.019	-0.402	0.688
	Occupation	0.517	0.595	0.042	0.869	0.385
Step 2	(Intercept)	6.432	2.609		2.465	0.014
	Age	-0.238	0.049	-0.19	-4.873	< .001
	Sex	0.278	0.849	0.012	0.327	0.744
	Occupation	0.997	0.467	0.081	2.136	0.033
	Danger and Contamination	0.231	0.063	0.194	3.652	< .001
	Socioeconomic Concerns	-0.098	0.08	-0.058	-1.23	0.219
	Xenophobia	-0.241	0.084	-0.138	-2.859	0.004
	Traumatic Stress Symptoms	1.004	0.091	0.552	11.09	< .001
	Compulsion	0.102	0.094	0.05	1.089	0.277

Appendix C

Table C.1: *Hierarchical Regression Analysis With DASS-A as Dependent Variable*

Model		Unstandardized	Standard Error	β	t	p
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Step 1	(Intercept)	20.913	2.07		10.104	< .001
	Age	-0.285	0.057	-0.247	-5.027	< .001
	Sex	-0.888	1.012	-0.042	-0.877	0.381
	Occupation	0.313	0.555	0.028	0.564	0.573
Step 2	(Intercept)	3.865	2.462		1.57	0.117
	Age	-0.166	0.046	-0.143	-3.6	< .001
	Sex	-0.25	0.801	-0.012	-0.312	0.755
	Occupation	0.828	0.44	0.073	1.881	0.061
	Danger and Contamination	0.119	0.06	0.108	1.992	0.047
	Socioeconomic Concerns	-0.059	0.075	-0.038	-0.785	0.433
	Xenophobia	-0.087	0.079	-0.054	-1.091	0.276
	Traumatic Stress Symptoms	0.907	0.085	0.539	10.613	< .001
	Compulsion	0.168	0.089	0.09	1.902	0.058

Appendix D

Table D.1: Hierarchical Regression Analysis With DASS-D as Dependent Variable

Model		Unstandardized	Standard Error	Standardized	t	p
Step 1	(Intercept)	26.29	2.39		11.002	< .001
	Age	-0.484	0.066	-0.352	-7.388	< .001
	Sex	-0.273	1.168	-0.011	-0.234	0.815
	Occupation	1.321	0.641	0.098	2.061	0.04
Step 2	(Intercept)	13.542	3.172		4.269	< .001
	Age	-0.381	0.059	-0.277	-6.43	< .001
	Sex	0.393	1.033	0.015	0.38	0.704
	Occupation	1.652	0.567	0.123	2.913	0.004
	Danger and Contamination	0.145	0.077	0.111	1.889	0.06
	Socioeconomic Concerns	0.005	0.097	0.003	0.05	0.96
	Xenophobia	-0.258	0.102	-0.135	-2.525	0.012
	Traumatic Stress Symptoms	0.952	0.11	0.476	8.645	< .001
	Compulsion	-0.09	0.114	-0.04	-0.786	0.432

Appendix E.1

Table E.1: One-Way ANOVA Comparing CSS total score with the participants grouped according to Age

Cases	Sum of Squares	df	Mean Square	F	p	η^2
Age Group	12954.604	5.000	2590.921	3.925	0.002	0.045
Residual	273926.912	415.000	660.065			

Note. Type III Sum of Squares

Table E.2: Games-Howell Post-Hoc Test as a Follow Up to Table E.1

		Mean Difference	SE	t	p tukey
15-20	21-30	4.498	3.442	1.307	0.781
	31-40	13.866	7.131	1.944	0.393
	41-50	20.809	5.284	3.938	0.003
	51-60	13.256	24.714	0.536	0.990
	61-65	12.906	20.031	0.644	0.980
21-30	31-40	9.368	6.553	1.429	0.709
	41-50	16.311	4.473	3.646	0.009
	51-60	8.758	24.553	0.357	0.998
	61-65	8.408	19.833	0.424	0.997
31-40	41-50	6.943	7.682	0.904	0.943
	51-60	-0.610	25.335	-0.024	1.000
	61-65	-0.960	20.793	-0.046	1.000
41-50	51-60	-7.553	24.878	-0.304	0.999
	61-65	-7.903	20.234	-0.391	0.998
51-60	61-65	-0.350	31.500	-0.011	1.000

Appendix F.1

Table F.1: ANOVA Table Comparing DASS-S Scores According to Age Group

Cases	Sum of Squares	df	Mean Square	F	p	η^2
Age Group	3926.668	5.000	785.334	6.945	< .001	0.077
Residual	46927.964	415.000	113.079			

Note. Type III Sum of Squares

Table F.2: Games-Howell Post-Hoc Test as a Follow-up to Table F.1

		Mean Difference	SE	t	p tukey
15-20	21-30	-1.713	1.327	-1.291	0.789
	31-40	3.360	2.670	1.258	0.805
	41-50	8.000	1.808	4.425	< .001
	51-60	8.000	4.829	1.657	0.618
	61-65	10.000	2.307	4.335	0.026

21-30	31-40	5.073	2.500	2.030	0.352
	41-50	9.713	1.545	6.289	< .001
	51-60	9.713	4.737	2.051	0.469
	61-65	11.713	2.107	5.560	0.018
31-40	41-50	4.640	2.785	1.666	0.561
	51-60	4.640	5.273	0.880	0.936
	61-65	6.640	3.132	2.120	0.321
41-50	51-60	0.000	4.894	0.000	1.000
	61-65	2.000	2.439	0.820	0.956
51-60	61-65	2.000	5.099	0.392	0.998

Appendix G

Table G.1: ANOVA Table Comparing DASS-A Scores According to Age Group

Cases	Sum of Squares	df	Mean Square	F	p	η^2
Age Group	2121.742	5.000	424.348	4.257	< .001	0.049
Residual	41369.222	415.000	99.685			

Note. Type III Sum of Squares

Table G.2: Games-Howell Post-Hoc Test as a Follow-up to Appendix G.1

		Mean Difference	SE	t	p tukey
15-20	21-30	-0.008	1.285	-0.006	1.000
	31-40	3.005	2.530	1.188	0.840
	41-50	6.590	1.807	3.646	0.006
	51-60	8.545	3.768	2.268	0.381
	61-65	10.045	2.117	4.746	0.013
21-30	31-40	3.013	2.344	1.286	0.790
	41-50	6.598	1.536	4.297	0.001
	51-60	8.553	3.645	2.346	0.373
	61-65	10.053	1.890	5.320	0.021
31-40	41-50	3.585	2.666	1.345	0.759
	51-60	5.540	4.247	1.304	0.775
	61-65	7.040	2.885	2.440	0.192
41-50	51-60	1.955	3.861	0.506	0.993
	61-65	3.455	2.277	1.517	0.663

51-60	61-65	1.500	4.015	0.374	0.998
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Appendix H

Table H.1: ANOVA Table Comparing DASS-D Scores According to Age Group

Cases	Sum of Squares	df	Mean Square	F	p	η^2
Age Group	1496.348	5.000	299.270	8.929	< .001	0.097
Residual	13909.224	415.000	33.516			

Note. Type III Sum of Squares

Table H.2: Games-Howell Post-Hoc Test as a Follow-up to Appendix I.1

		Mean Difference	SE	t	p tukey
15-20	21-30	-0.112	0.739	-0.152	1.000
	31-40	3.454	1.349	2.560	0.132
	41-50	5.248	0.977	5.373	< .001
	51-60	7.104	1.574	4.514	0.052
	61-65	7.654	0.869	8.813	< .001
21-30	31-40	3.566	1.240	2.875	0.074
	41-50	5.360	0.819	6.541	< .001
	51-60	7.216	1.481	4.871	0.061
	61-65	7.766	0.687	11.307	< .001
31-40	41-50	1.794	1.395	1.286	0.791
	51-60	3.650	1.863	1.960	0.435
	61-65	4.200	1.322	3.178	0.038
41-50	51-60	1.856	1.613	1.151	0.842
	61-65	2.406	0.938	2.565	0.152
51-60	61-65	0.550	1.550	0.355	0.999

Appendix I

Table I.1: ANOVA Table Comparing CSS Scores According to Occupation

Cases	Sum of Squares	df	Mean Square	F	p	η^2
Occupation	10572.072	3.000	3524.024	5.318	0.001	0.037

Residual	276309.444	417.000	662.613
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Note. Type III Sum of Squares

Table I.2: Games-Howell Post-Hoc Test as a Follow-up to Appendix I.1

		Mean Difference	SE	t	p tukey
Student	Employed	9.009	3.069	2.935	0.019
	Unemployed	15.207	4.361	3.487	0.004
	Unspecified	13.577	5.152	2.635	0.048
Employed	Unemployed	6.197	3.852	1.609	0.383
	Unspecified	4.568	4.729	0.966	0.769
Unemployed	Unspecified	-1.630	5.654	-0.288	0.992