

Overthinking Hurts: Rumination, Worry and Mental Health of International Students in China During Covid-19 Pandemic

Samrah Jamshaid^{1,*} Najma I Malik² Adnan A. Haider³ Kamran Jamshed³
 Saba Jamshad³

¹ Northeast Normal University, Jilin, China

² University of Sargodha, Punjab, Pakistan

³ COMSATS University Islamabad, Punjab, Pakistan

*Corresponding author. Email: jiam093@nenu.edu.cn

ABSTRACT

After the COVID-19 pandemic outbreak in China, many international students stuck there due to lockdown or quarantine. Their friends and family members got infected by the Corona virus and some died; which affected mental health by worry and ruminative thoughts. The present study was conducted to explore the impact of rumination and worry on the mental health of purposively selected 300 international students (i.e., Asia, Europe, America, and Africa) in China. Rumination, Worry, and Mental health of students were measured by the Rumination response scale, Penn State Worry Questionnaire, and Warwick Mental Wellbeing Scale respectively. The findings of the study revealed that not only rumination and worry had significant negative relationships with mental health but also were the significant predictors for mental health. Furthermore, findings revealed that females had more worries with ruminative thoughts during the COVID-19 pandemic outbreak. This study would be helpful for international students worldwide to understand the importance of mental health to fight with COVID-19. Discussion and suggestions for future researchers are also reflected upon.

Keywords: Covid-19, Mental Health, Rumination, Worry

1. INTRODUCTION

COVID-19 first outbreaks in China and at that time most of the international students were been back to their countries but many students were still there from the last 4 months. International flights were closed so they couldn't go back to see their friends and family members. During that phase, China was strictly observing the lockdown and international students were not allowed to move freely and were isolated in their dormitories. Meanwhile, some of them got infected and some died or observed loved ones losing their lives. The feeling of lost the loved one due to the Coronavirus caused vicarious trauma; moreover, spending excessive time being isolated in dormitories indulged them in generating ruminative thoughts and worries. Over thinking hurts but one have no control over his/her thought ultimately ruminative thoughts or worries negatively affected mental health. Consequently, Poor mental health weakens human immunes systems which help to fight

against COVID-19. Meanwhile, WHO suggested that sound mental health is vital to fight with COVID-19 and it can also make the immune system strong [1].

Here rumination refers to a tendency to become obsessive about the stressful problem repetitively and that one will end up feeling awful about it [2]. Worry has been considered as uncontrollable repetitive negative images, thoughts, actions, and emotions that result from the practical analysis of cognitive risk made to avoid or solve the expected threats and their consequences [3]. Mental health refers to our social, psychological, and emotional wellbeing which mainly affects how one feels, thinks, and acts. Furthermore, it is also beneficial to determine, handling our stress, make more choices, and relate with others [4].

The COVID -19 pandemic forced all nations to rush back the concept of quarantine. This virus first emerged in China city Wuhan where they placed it under lockdown or quarantine. People all over the world were

requested to isolate themselves in their homes and infected ones in hospitals [5]. WHO declared COVID-19 outbreaks a pandemic on 11th March 2020 because of a large number of increasing cases in April in the USA and Europe. This virus spread (14 June 2020) and affected almost over 7 million, forty-two thousand, and 80 hundred across the world by COVID-19 [1].

By the spread of this virus across the world, many institutes and organizations set new standards. Some institutes start their work online to make it easy to work from home and some schools also started online classes. All religious, cultures, and sports events were cancelled. Meanwhile, travel and flights were also closed. These all were the new changes for people so it had reduced their level of mental health. Consequently, mental health was reducing overall but for those whose family became the victim of COVID-19 or loved ones get ill, their mental health was more reduced. A recent study has declared that the level of mental health was not only decreasing in COVID-19 infected but also across the general world population [6]. Kaiser Family Foundation polled study reported that almost half Americans have reported that crises related to COVID-19 had harmed their mental health. Emergency hotline in April 2020 reported that almost 20,000 people have texted them, run by mental health and substance abuse administration [7].

Empirical studies have confirmed that rumination has negative impact on actual and perceived health, which is either by the associated impact of induced rumination biological constant worry, or unintentional intensification of symptoms [8]. Further it was discovered that somatic health also has a relationship with rumination [9]. Moreover, as due to COVID-19 people were facing many stressors such as illness, social distancing, bereavement, and unemployment [10] all these contributed to lowering their mental health. It was also found that problems of mental health-related with COVID-19 include the increase rates of poor mental health and psychiatric related symptoms considerations specifically more relevant to disorders of mental illness (i.e., anxiety disorders, depression, substance use disorders, and posttraumatic stress disorder) are very common in constant pain patients. These mental health issues were found to be linked with COVID-19 which could make worse pre-existing situations and ultimately impact the outcomes of pain associated treatments [11].

Similarly, studies demonstrated that worries of adolescents and children acted as a defensive thinking process, related to decreasing perception of wellbeing and anxiety. Also, it was further explored that during the adolescence phase the level of worries was more increased because of increased in thinking abilities that allowed defensive thoughts for future related negative outcomes and also was increased due to huge number of social and personal challenges [12]. A recent study also reported that suffering from worries is very common but

has a negative relationship with self-regulation, well being perception, and resilience. That study shows that when the emotional and social skills of students of Portuguese University were underdeveloped, at that time their mental health was also found to be at risk [13]. On the contrary, worries related to experiencing worse effects might harm mental health (i.e., daily related worries experiences are linked with depressive symptoms in long term for many years and in short form) [14]. Worries also found to be related to finances and health [15]. However, a recent study concluded that negative responses to any event and worries somehow are important to predict wellbeing and mental health than to experience that event itself [16].

Fear to get infected by COVID-19 increased the symptoms of poor mental health directly or indirectly by their increasing emotional response toward the situation [17]. However, issues of mental health during COVID-19 may increase prolonged- isolation, health problems, and stigma [18]. Furthermore, this pandemic COVID-19 also impacts wellbeing, psychical health, and mental health [19]. A recent study conducted in Bangladesh confirmed that the mental health of co morbid patients is more affected by the COVID-19 pandemic. Patients with chronic diseases suffer from severe mental health problems during pandemic than healthy people [20]. In the framework of COVID-19 implications of mental health may be more than before; reasons may include because of person own health decreased by uncertainty and also because of exposure to the high infected new diseases, financial consequences due to global lock down [21] that resulted in extended social distancing [22]. There are not many studies conducted to investigate rumination and worry during the COVID-19 pandemic for those whose friends and family members infected or died due to COVID-19 infection, so this study is designed to fill this research gap. The uniqueness of the present study lies in exploring these variables among international students living in China. Moreover, results of the present study will help to understand the thought processes of international students worldwide and to help them in reducing their ruminative thoughts or worries related to the corona virus in the current pandemic situation; and to let them understand the importance of mental health to fight with COVID-19. In the present study following questions ‘What is the relationship between rumination, worry and mental health of international students; does Rumination and worry will be significant predictors of mental health; whether unmarried students from different nationalities will have more ruminative thoughts as compares to married students; and is there gender differences with reference to rumination, worry and mental health among international students?’ were addressed.

2. METHOD

2.1. Research Design and Participants

A quantitative correlational research design was used for the present study with a purposive sample of 300 international students from three universities in China within the age range of 20 to 40 years. Data was collected during the months of April to June, 2020 from those students who have lost their friends, family members, and loved ones, or they get infected by COVID-19. Before the data collection sample was elucidated about study objectives and was briefed about the process of data collection. Informed consent was obtained and the ethical protocol was strictly followed to maintain the confidentiality of research. The online survey was conducted for data collection. The survey was filled by initially 367 students followed by 300 (true responses) final refined data as the data cleaning process discarded the random responses or incomplete questionnaires. Later on, final data was analyzed for results computations.

Table 1 shows the frequency and percentage of sample demographic characteristics of the study including Age, Nationality, Gender, Marital status, and socioeconomic status.

2.2. Instruments

Penn State Worry Questionnaire (PSWQ): This questionnaire was developed [23] to capture uncontrollable, general, and excessive characteristics of mental worries. This questionnaire consists of 16 items but in this study, we have used a short form with 11 items and a five-point Likert type response format (1= not at all typical of me, to 5= very typical of me). The score ranges from 16 to 80 with Cronbach’s reliability range between .91-.94 [23]. A higher score on the scale indicates a high level of worry and a lower score will indicate a low level of worry.

Ruminative Responses Scale (RRS): This self-report scale [24] measures depressed mood responses on 22 items divided into three subscales (brooding, depression, and reflection). The scale has a four-point Likert type response format range from 1= almost never to 4= almost always. The scale score range from 22 to 88 and Cronbach’s reliability was .90 [25]. A high score on this scale indicates high-level symptoms of rumination and a low score indicates lower symptoms of rumination.

Warwick- Edinburg Mental Wellbeing scale: This scale was designed to access information for mental health by including psychological functions, the dimension of cognitive evaluation, and effective aspects of emotions [26]. This scale consists of 14 items and the response format was five-point Likert range from 1= none of the time, to 5= all of the times. Cronbach’s reliability of the questionnaire was .78 [27]. A high score

on this scale indicates poor mental health and a low score indicates satisfactory mental health

Table 1. Frequency and Percentage of Demographic Variable of Study (N=300)

Sr. No	Demographic Variables		f	%
1	Age	20 -30 years	17	58.0
			4	0
		31- 40 years	12	42.0
			6	0
2	Nationality	Asia	99	33.0
				0
		Europe	45	15.0
		America	47	15.7
		Africa	55	18.3
		Other	54	18.0
3	Gender	Male	171	57.0
				0
		Female	12	43.0
			9	0
4	Marital status	Single	16	53.3
			0	0
		Married	14	46.7
5	Socio Economic Status	Low class	94	31.3
		Middle class	12	42.7
		High class	78	26.0

3. RESULTS AND DISCUSSION

To answer the research questions data was analyzed with SPSS 22nd version. Different statistical analyses were adopted to test hypotheses such as descriptive statistics, reliability coefficient, Pearson correlation, linear regression, hierarchal regression, two-way ANOVAs, and t-test.

Table 2. Mean, Standard deviation, Alpha reliabilities, and Correlation among study variables (N= 300)

Variables	M	SD	α	1	2	3	4	5	6
1 RUM	47.50	10.43	0.89	-	0.95**	0.80**	0.81**	0.59**	-0.47**
2 RDR	25.49	6.28	0.87		-	0.66**	0.65**	0.60**	-0.63**
3 BRO	11.26	2.61	0.55			-	0.55**	0.50**	-0.08**
4 REF	10.75	2.90	0.56				-	0.37**	-0.26**
5 WOR	29.67	9.50	0.91					-	-0.22**
6 MH	36.59	3.14	0.56						-

Note: RUM= rumination; RDR= rumination depression related; BRO= brooding; REF= reflection; WOR= worry; MH= mental health. **p<0.01.

The above table shows the mean, standard deviation, alpha reliabilities and Pearson correlation between all study variables. The table shows satisfactory alpha reliabilities of scales ranging from 0.55 to 0.89. Furthermore, it shows that Rumination has positive significant relationship with Worry ($r= 0.59, p < 0.01$) and negative significant relationship with mental health ($r= -0.47, p < 0.01$). Worry has negative significant relationship with mental health ($r= -0.22, p < 0.01$). Similarly, results show that sub constructs of rumination has significant relationship with all study variables.

Table 3. Multiple regression analysis for Worry and Rumination along sub-constructs predicting Mental health (N= 300)

Predictor variables	β	R ²	F
Rumination	-0.47***	0.22	85.68
Depression related	-0.63***	0.39	193.47
Brooding	-0.08	0.01	2.20
Reflection	-0.26***	0.07	22.23
Worry	-0.22***	0.05	15.71

***p< 0.001.

Multiple regression analysis results presented in table 3 shows the predictive ability of rumination along sub-constructs and worry for mental health. The R2value of 0.22 indicates that 22% variance in the dependent variable can be accounted for, by the predictor [F (1, 299) = 85.68]. These findings indicate that rumination has

been a significant predictor of mental health ($R^2 = 0.22, 0.000, \beta = -0.47$). Similarly, worry is also a significant predictor of mental health. The R2value of 0.05 indicates that 5% variance in the dependent variable can be accounted for, by the predictor [F (1, 299) =15.71]. These findings indicate that worry has been a significant predictor of mental health ($R^2 = 0.05, .000, \beta = -0.22$). Furthermore, results also found to be significant for subscales of rumination scale depression-related and reflection but not significant for brooding.

Table 4. Two Way ANOVA showing the Main and Interaction Effect of the Nationalities and Marital status on Rumination (N = 300)

Sources	SS	MS	F	Partialη ²
Nationalities	487.89	21.97	1.14	0.016
Marital status	77.59	90.78	0.72	0.002
Nationalities*Marital status	1040.22	260.06	2.43*	0.032

*P < 0.05.

Table 4 shows summary of the results of Two Way ANOVA where main effect of nationalities on rumination was found to be non-significant {F (4, 296) = 1.14, p > 0.05} and the main effect of marital status on rumination was also found to be non-significant {F (1, 299) = 0.72 p > 0.05}. However, interaction of nationalities and marital status was also found to be significant {F (5, 295) = 2.43, p < 0.05}.

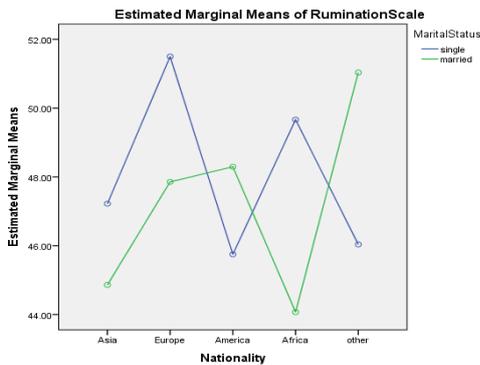


Figure 1. Graphic display of the interaction effect of nationality and marital status on rumination.

also found significant gender differences for sub-constructs of rumination.

The present study was aimed to investigate the worry and ruminative thoughts of international students in China who lost their friends, family members, and love ones or infected by the corona virus. The study also explored how rumination and worry affecting students mental health. The first research question of the current study was to explore the associations between study variables findings revealed that rumination has a positive significant relationship with Worry and a negative significant relationship with mental health (see table no. 2). Findings concluded that the level of ruminative thoughts and worry has a parallel increase among international students but their mental health level decreased. It might be a result of international students in china were stuck in pandemic and were isolated in dormitories; were restricted to go back to see their love ones who get infected or dye by the corona virus which generated ruminative thoughts in them and ultimately

Table 5. Mean, standard deviation, t-values for Gender among study variables (N =300)

Variables	Gender				t(298)	p	95% CI		Cohen's d
	male (n=171)		female (n=129)				LL	UL	
	M	SD	M	SD					
RUM	45.17	8.74	50.58	11.66	-4.59	0.000***	-7.73	-3.09	0.52
RDR	24.23	5.46	27.16	6.90	-4.10	0.000***	-4.33	-1.52	0.47
BRO	10.64	2.26	12.06	2.82	-4.83	0.000***	-1.99	-0.84	0.55
REF	10.29	2.57	11.35	3.19	-3.19	0.002***	-1.72	-0.41	0.36
WOR	27.73	9.28	32.24	9.20	-4.17	0.000***	-6.62	-2.38	0.48
MH	36.61	3.38	36.56	2.81	-0.13	0.896	-0.67	0.77	0.01

Note: RUM= rumination; RDR= rumination depression-related; BRO= brooding; REF= reflection; WOR= worry; MH= mental health.

***p<0.001

Table 5 shows means, standard deviation, and t-values for gender on rumination, worry, and mental health. Results indicates females {M = 50.58, t (298) = -4.59, p < 0.001} have more level of rumination as compared to males {M = 45.17, t (298) = -4.59, p < 0.001}. Moreover, females {M = 32.24, t (298) = -4.17, p < 0.001} also has more level of worry as compared to males {M = 27.73, t (298) = -4.17, p < 0.001}. Results

made them worried that affect their mental health badly. Further findings also indicate that worry has a negative significant relationship with mental health. These findings were also in support of empirical literature as a pprevious study results supported the current hypothesis that rumination has negative impact on actual and perceived health, which is either by the associated impact

of induced rumination, biological constant worry, or unintentional intensification of symptoms [8]. Rumination, worry, depression, and anxiety were also found to be significantly interrelated among young adults [28] and especially mental health problems in association with-COVID-19 include the increased rates of mental health disorders and psychiatric related symptoms (i.e., anxiety disorders, depression, substance use disorders, and posttraumatic stress disorder) that were most prevalent among patient suffering from COVID-19 chronic symptoms and constant pain. These mental health issues linked with COVID-19 could become worse due to multiple co-morbidities or pre-existing situations which ultimately made the worse impact on the outcomes of pain associated treatments [11].

Another research question of the present research was ‘does Rumination and worry will be significant predictors of mental health?’ Findings indicated that rumination and worry have a significant impact on mental health (see table no 3). Negative thinking repetitively caused poor mental health as Rumination and worry badly affected the mental health of international students during the COVID-19 pandemic. Empirical pieces of evidence also confirmed that rumination caused the mental illness [29]; and worries of people were found to be related to experiencing a negative effect on mental health (i.e., daily related worries experiences are linked with depressive symptoms in long term for many years; and in short form) [14]. Researches also concluded that when a person faces traumatic events and depression, he/she spends more time thinking about the outcomes and causes of that event which in results generates negative emotions. Because that over thinking is related to event reactivates; therefore these old memories related to that event ultimately affect negatively. In that state, an individual feels more helpless and failure. The effect of rumination develops emotional distress such as anxiety and depression in them too [30]. However, a recent study concluded that negative response to any event and worries somehow is important to predict wellbeing and mental health than to experience that event itself [16].

The third research question of the study was ‘unmarried students from different nationalities (Asia, Europe and Africa) will have more ruminative thoughts as compares to married students’ for which findings of the current study revealed that unmarried students from Asia, Europe, and Africa have more ruminative thoughts as compared to married students (see table no 4). It may be because married people can share their negative or positive thoughts with each other’s but unmarried cannot and ultimately felt lonely and depressive at large. The previous study found that married couple can communicate their thoughts with each other and depend on each other for social support and psychological comfort that is one of the baselines for a successful happy marriage. Moreover, they take care of the needs of one another and ignore many of their daily basis critical

remarks by consciously acknowledging the perspectives of the partner, forgiving their hurting behaviours, and avoiding the expressions of hostility, blame, and contempt. Marriage has benefits because in it you can engage with each other activities. These activities are helpful to reduce stress such as sharing memories and positive life experiences and playing together which increase the level of closeness and intimacy [31]. Another study also concluded that unmarried students have a high level of anxiety than those who were married and similar trends was found in other studies conducted in New South Wales, Western Australia [32] and United States [33].

Last research question of study was that ‘there will be gender differences for rumination, worry and mental health and findings indicates that female students were more worried, and had a high level of ruminative thoughts as compared to male students during the COVID-19 pandemic. Findings were also supported by previous studies which concluded that females have more habit to think negative repetitively, which ultimately has bad effects on their emotional and physical wellbeing [2]. Moreover, female feel more worried in intense situations as compared to males [12]. Furthermore, it is heavily debated and confirmed that factors like formal education and gender are linked with psychological negative impact [34]. A recent study conducted on population of Danish, found that psychological wellbeing was negatively affected by the COVID-19 pandemic however the level of psychological wellbeing was high in females as compared to males [35].

4. CONCLUSION

The present study aimed to explore the impact of rumination and worry on the mental health of international students (i.e., Asia, Europe, America, and Africa) in China during the COVID-19 pandemic. Findings concluded that as the level of ruminative thoughts and worry had a parallel increase in international students consequently mental health levels decreased during the COVID-19 pandemic. International students being isolated and stuck in China faced movement restrictions and were unable to go back home to live or see their loved ones who got infected or died due to the corona virus. This ultimately indulged them in over thinking, negative emotions, and ruminative thoughts consequently resulted in devastation and poor mental health. Furthermore, it was concluded that not only rumination and worries has a significant negative relationship with mental health but also were the significant negative predictors of mental health among international students during the COVID-19 pandemic. It was also evident that unmarried students from Asia, Europe, and Africa had more ruminative thoughts as compared to married students and female international

students were more worried and have high ruminative thoughts as compare to male students.

Data was collected from only three universities so results cannot be generalizable to all international students of China. Future researchers should collect data from more universities to generalize the results. Secondly, size of the sample was small and only international students were part of the study; so if the limitation of the sample will be removed then more reliable results can be found in the future. Furthermore, it was difficult to collect data online because international students were already isolated, depressed because of the COVID-19 pandemic and at times faced internet connectivity issues so they showed reluctance to take part in the online survey. Hence, future researchers are suggested to opt for a physical model of data collection for removing these kinds of hurdles.

ACKNOWLEDGMENTS

I would thank Professor Dr. Han Xue and Professor Dr. Najma I Malik to guide me in this study and to all international students in China who took part in this study.

REFERENCES

- [1] [1] WHO, "Coronavirus disease (COVID-2019) situation reports," 2020, [Online]. Available: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports/>.
- [2] B. E. Wisco, A. J. Plate, C. L. May, and A. Aldao, "A latent profile analysis of repetitive negative thinking: Distinguishing ruminators from worriers," *J. Exp. Psychopathol.*, vol. 9, no. 4, 2018, doi: 10.1177/2043808718811428.
- [3] J. Stöber and T. D. Borkovec, "Reduced concreteness of worry in generalized anxiety disorder: Findings from a therapy study," *Cognit. Ther. Res.*, vol. 26, no. 1, pp. 89–96, 2002, doi: 10.1023/A:1013845821848.
- [4] J. R. Wortzel et al., "Trends in mental health clinical research: Characterizing the ClinicalTrials.gov registry from 2007–2018," *PLoS One*, vol. 15, no. 6, pp. 1–28, 2020, doi: 10.1371/journal.pone.0233996.
- [5] K. Chatterjee and V. S. Chauhan, "Epidemics, quarantine and mental health," *Med. J. Armed Forces India*, vol. 76, no. 2, pp. 125–127, 2020, doi: 10.1016/j.mjafi.2020.03.017.
- [6] T. Bonsaksen et al., "Cross-national study of worrying, loneliness, and mental health during the COVID-19 pandemic: a comparison between individuals with and without infection in the family," *Pjms.Org.Pk*, pp. 1–17, 2020, doi: 10.21203/rs.3.rs-34850/v1.
- [7] J. Achenbach, "Coronavirus is harming the mental health of tens of millions of people in U.S., new poll finds." 2020, [Online]. Available: https://www.washingtonpost.com/health/coronavirus-is-harming-the-mental-health-of-tens-of-millions-of-people-in-us-new-poll-finds/2020/04/02/565e6744-74ee-11ea-85cb-8670579b863d_story.html.
- [8] R. A. Sansone and L. A. Sansone, "Rumination: Relationships with physical health," *Innov. Clin. Neurosci.*, vol. 9, no. 2, pp. 29–34, 2012.
- [9] B. Verkuil, J. Brosschot, W. Gebhardt, and J. Thayer, "When Worries Make You Sick: A Review of Perseverative Cognition, the Default Stress Response and Somatic Health," *J. Exp. Psychopathol.*, vol. 1, no. 1, pp. 87–118, 2010, doi: 10.5127/jep.009110.
- [10] R. J. MSc, K. Ayling, T. Chalder, A. Massey, E. Broadbent, and *Kavita Vedhara Carol Coupland, "Mental health in the UK during the COVID-19 pandemic: early observations Brief title: Mental Health in the UK and COVID-19 1," pp. 1–18, 2020.
- [11] S. P. Cohen et al., "Pain Management Best Practices from Multispecialty Organizations during the COVID-19 Pandemic and Public Health Crises," *Pain Med.*, 2020, doi: 10.1093/pm/pnaa127.
- [12] Margarida Gaspar de Matos, Tania Gaspar, Jaqueline Cruz, and Ana Matilde Neves, "New Highlights About Worries, Coping, and Well-Being During Childhood and Adolescence," *J. Psychol. Res.*, vol. 3, no. 5, 2013, doi: 10.17265/2159-5542/2013.05.002.
- [13] M. Reis and M. G. de Matos, "Worries, Mental and Emotional health difficulties of Portuguese University students," *Adv. Soc. Sci. Res. J.*, no. July, 2019, doi: 10.14738/assrj.67.6818.
- [14] A. Manuscript, "The Wear-and-Tear of Daily Stressors on Mental Health," vol. 24, no. 5, pp. 733–741, 2014, doi: 10.1177/0956797612462222.The.
- [15] P. Kinnunen, E. Laukkanen, P. Pölkki, and J. Kylmä, "Are Worries, Satisfaction with Oneself and Outlook in Secondary School Students Associated with Mental Health in Early Adulthood?," *Int. J. Ment. Health Promot.*, vol. 12, no. 2, pp. 4–10, 2010, doi: 10.1080/14623730.2010.9721808.
- [16] and F. R.-A. Luiza Nassif-Pires L,Laura De Lima Xavier, Thomas Masterson, Michalis Nikiforos,

- “Pandemic of inequality,” no. 149, p. 16, 2020, [Online]. Available: http://www.levyinstitute.org/pubs/ppb_149.pdf.
- [17] Ł. Okruszek, A. Aniszewska-Stańczuk, A. Piejka, M. Wiśniewska, and K. Żurek, “Safe but lonely? Loneliness, mental health symptoms and COVID-19,” no. April, 2020, doi: 10.31234/osf.io/9njps.
- [18] J. Torales, M. O’Higgins, J. M. Castaldelli-Maia, and A. Ventriglio, “The outbreak of COVID-19 coronavirus and its impact on global mental health,” *Int. J. Soc. Psychiatry*, vol. 66, no. 4, pp. 317–320, 2020, doi: 10.1177/0020764020915212.
- [19] A. Fiorillo and P. Gorwood, “The consequences of the COVID-19 pandemic on mental health and implications for clinical practice,” *Eur. Psychiatry*, vol. 63, no. 1, p. e32, 2020, doi: 10.1192/j.eurpsy.2020.35.
- [20] A. Sayeed, S. Kundu, E. Christopher, M. T. Hasan, R. Begum, and S. Chowdhury, “Mental health outcomes of adults with comorbidity and chronic diseases during the COVID-19 pandemic: a matched case-control study,” pp. 1–15.
- [21] S. Vandroos, M. Avendano, and I. Kawachi, “The association between economic uncertainty and suicide in the short-run,” *Soc. Sci. Med.*, vol. 220, pp. 403–410, 2019, doi: 10.1016/j.socscimed.2018.11.035.
- [22] D. L. and V. S. Sarah Mervosh, “See Which States and Cities Have Told Residents to Stay at Home.” 2020, [Online]. Available: See Which States and Cities Have Told Residents to Stay at Home.
- [23] T. J. Meyer, M. L. Miller, R. L. Metzger, and T. D. Borkovec, “Development and validation of the penn state worry questionnaire,” *Behav. Res. Ther.*, vol. 28, no. 6, pp. 487–495, 1990, doi: 10.1016/0005-7967(90)90135-6.
- [24] S. N.-H. and J. Morrow, “A Prospective Study of Depression and Posttraumatic Stress Symptoms After a Natural Disaster: The 1989 Loma Prieta Earthquake,” *J. Pers. Soc. Psychol.*, vol. 61, no. 1, pp. 115–121, 1991.
- [25] J. Grandgirard, D. Poinot, L. Krespi, J. P. Nénon, and A. M. Cortesero, “Costs of secondary parasitism in the facultative hyperparasitoid *Pachycrepoideus dubius*: Does host size matter?,” *Entomol. Exp. Appl.*, vol. 103, no. 3, pp. 239–248, 2002, doi: 10.1023/A.
- [26] R. Tennant et al., “The Warwick-Dinburgh mental well-being scale (WEMWBS): Development and UK validation,” *Health Qual. Life Outcomes*, vol. 5, pp. 1–13, 2007, doi: 10.1186/1477-7525-5-63.
- [27] S. Stewart-Brown, A. Tennant, R. Tennant, S. Platt, J. Parkinson, and S. Weich, “Internal construct validity of the Warwick-Edinburgh Mental Well-Being Scale (WEMWBS): A Rasch analysis using data from the Scottish Health Education Population Survey,” *Health Qual. Life Outcomes*, vol. 7, pp. 1–8, 2009, doi: 10.1186/1477-7525-7-15.
- [28] P. Muris, J. Roelofs, C. Meesters, and P. Boomsma, “Rumination and worry in nonclinical adolescents,” *Cognit. Ther. Res.*, vol. 28, no. 4, pp. 539–554, 2004, doi: 10.1023/B:COTR.0000045563.66060.3e.
- [29] M. Krajniak, R. Miranda, and A. Wheeler, “Rumination and Pessimistic Certainty as Mediators of the Relation Between Lifetime Suicide Attempt History and Future Suicidal Ideation,” *Arch. Suicide Res.*, vol. 17, no. 3, pp. 196–211, 2013, doi: 10.1080/13811118.2013.805638.
- [30] J. Chen, R. M. Rapee, and M. J. Abbott, “Mediators of the relationship between social anxiety and post-event rumination,” *J. Anxiety Disord.*, vol. 27, no. 1, pp. 1–8, 2013, doi: 10.1016/j.janxdis.2012.10.008.
- [31] Y. U. Girmé, N. C. Overall, and S. Faingataa, “‘Date nights’ take two: The maintenance function of shared relationship activities,” *Pers. Relatsh.*, vol. 21, no. 1, pp. 125–149, 2014, doi: 10.1111/pere.12020.
- [32] SARITA ROBINSON & JOHN LEACH, “Feeling More Tired Than Usual During Lockdown? Psychologists Explain Why.” 2020, [Online]. Available: <https://www.sciencealert.com/feeling-tired-than-usual-even-though-you-re-doing-less-here-s-why>.
- [33] A. M. L. Sheng, M. Christopher, “乳鼠心肌提取 HHS Public Access,” *Physiol. Behav.*, vol. 176, no. 1, pp. 100 – 106, 2016, doi: 10.1016/j.gde.2016.03.011.
- [34] H. Jeong et al., “Mental health status of people isolated due to Middle East Respiratory Syndrome,” *Epidemiol. Health*, vol. 38, p. e2016048, 2016, doi: 10.4178/epih.e2016048.
- [35] Public Health Scotland, “Rapid review of the impact of COVID-19 on mental health,” no. June, 2020.