Factors Predicting Loneliness During the COVID-19 Pandemic

Öztürk, Cemre

Factors Predicting Loneliness During the COVID-19 Pandemic

Cemre Öztürk - s2871890

Clinical Psychology Masters Program

Institute of Psychology, Universiteit Leiden

Supervisor: Dr. Annegret Krause-Utz

Date: August 23, 2021

Abstract

Objective: Loneliness has become an increasingly common phenomenon due to lockdowns put in place to minimize spread of COVID-19. The current body of literature suggests the relationship between loneliness and various Big-5 personality dimensions, except openness to experience. The current study aimed to fill this gap by investigating if there is a predictive effect of 1) openness to experience and 2) tolerance to uncertainty on loneliness during COVID-19 pandemic. It also aimed to investigate if this relation is influenced by gender.

Methods: Responses from 349 participants were collected in anonymous online surveys at the Central Institute of Mental Health in Mannheim and at Leiden University. The survey was posted at online platforms and distributed amongst social media and the University Research Systems. Openness was assessed with the 10-Item Big Five Inventory (BFI10). Loneliness was measured with UCLA loneliness scale (ULS8). Intolerance of uncertainty was assessed with the Intolerance of Uncertainty Scale (UI18).

Results: The results showed that higher BFI10 scores predicted higher ULS8 scores (loneliness) (B = .066, SE= .031, p =.036, 95% CI= [.004, .128]). Similarly, higher UI18 scores (intolerance of uncertainty) predicted higher scores on ULS8 (loneliness) (B = .298 , SE= .036, p =<.001, 95% CI= [.228, .369]). There was no significant effect of gender on loneliness.

Conclusions: Our results show the importance of the personality trait openness and intolerance of uncertainty in predicting loneliness during the COVID-19 pandemic. Further investigation is is important to study this relationship using longitudinal designs and accounting for other personality characteristics.

Keywords: Loneliness; Openness to Experience; Big-Five; Intolerance of Uncertainty; COVID-19; Pandemics.

1. Introduction

COVID-19 ’is a highly infectious disease, which caused a pandemic in late 2019. To reduce its spread, various governments took measures including social isolation, social distancing and lockdown across the globe. The pandemic still continues to impact individuals socially, financially and psychologically. One of the most common psychological effect of COVID-19 measures is a feeling of loneliness (Killgore et al., 2020). Loneliness is becoming an important public health concern (Wickens et al., 2021) but it is still not entirely understood which factors contribute to loneliness during the pandemic.

Loneliness is mostly experienced as an unpleasant feeling, which stems from a mismatch between an individual’s desired social connectedness and the availability of social relationships (Peplau & Perlman, 1982). Chronic feelings of loneliness can have serious negative consequences such as depressive symptoms (Cacioppo et al., 2006), suicidal ideation (Stravynski, 2001) and even increased mortality (Holt-Lunstad et al., 2015). Lonely people are also shown to have a higher risk for coronary heart disease (Valtorta et al., 2016) and dementia (Holwerda et al., 2014).

The psychological impact of loneliness is experienced more by some individuals than by others, depending on their personality. One well-established model to describe personality is the five–factor model (FFM; McCrae & Costa, 2008). The model encompasses the traits extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience (McCrae & Costa, 2008). Several studies have shown the relationship between FFM dimensions and loneliness. A study found that trait neuroticism is one of the most reliable factors for predicting loneliness, since neuroticism is largely genetic in nature (Abdellaoui et al., 2018). Another study provided further support for loneliness being affected by personality; loneliness has shown to have a strong positive correlation with neuroticism and a strong negative correlation with extroversion scores (Buecker et al., 2020). A longitudinal study found that loneliness is a stable factor in a person’s life and it affects neuroticism, extroversion and conscientiousness scores over time (Schermer et al., 2019). In general, trait introversion and neuroticism seem to have the strongest relation with loneliness, but there is not much evidence on other personality domains such as conscientiousness or openness to experience.

Openness to experience is one of the FFM dimensions, which has several aspects such as imagination, aesthetic sensitivity, exploratory behaviour, sensation seeking and preference for variety in experiences (Costa & McCrae, 1992). Yet, openness to experience is the least researched aspect of the FFM in relation to loneliness. One reason could be that openness is constructed more as an intrapsychic trait rather than an interpersonal one (McCrae, 1996), therefore some researchers have questioned if it has any effect on socialization behaviour at all (Buecker et al., 2020). However, openness may still be related to interpersonal relationships, through aspects such as exploratory behaviour and preference for variety. For example, socialization is a form of exploratory behaviour (Roberti, 2004), it is one of the ways to actively seek out new and varied experiences. Therefore, open people are more likely to socialize and feel less lonely. Moreover, open people are more likely to be extroverts rather than introverts (Aluja & Garcia, 2003), which makes them less likely to be lonely. A study also suggested that openness is a socially desirable characteristic in many cultures, and socially desirable traits have predicted a decrease in loneliness (Mund and Neyer, 2016).

Another factor mediating the relationship between openness and loneliness is awareness. It is suggested that open people have higher levels of mindfulness and awareness (Spinhoven et al., 2017), therefore they can be more alert or aware of feelings of loneliness. Feelings of loneliness have also been associated with an increased frequency of imaginative thinking – i.e., formation of new ideas, images, or concepts in one's mind (Zabelina, in press). Loneliness has also been associated with daydreaming – a construct closely related to imagination (Poerio et al., 2015; Poerio et al., 2016). There are few studies indicating a small but significant correlation between openness and loneliness (Teppers et al., 2013) (Schermer & Martin, 2019), but currently there is no conclusive evidence on which aspects of openness are related to loneliness.

Investigating predictors of loneliness has become increasingly important due to lockdowns put in place to minimize spread of COVID-19 (Killgore et al., 2020). Additionally, intolerance of uncertainty in relation to loneliness predicted mental health during the COVID-19 pandemics (Lábadi et al., 2021). Intolerance of uncertainty also predicted fears of viral contamination (Fedorenko et al., 2021), which may increase social isolation. We therefore

assume that intolerance of uncertainty and openness contributes to loneliness during the COVID-19 pandemics.

In terms of gender differences in loneliness, studies before the COVID-19 pandemic show inconsistent results. Some studies showed that men have a higher risk to experience loneliness (Fujimori et al., 2017) (van den Broke, 2017) while other studies showing a greater risk for women (Luhmann and Hawkley, 2016). On the contrary, post-pandemic studies showed that women are found to have higher levels of loneliness (Bu et al., 2020), but this relation seems to gets weaken with increasing age (Wickens et al., 2021). There is also a study showing no relation between gender and loneliness (Groarke et al., 2020).

Currently, there are no studies examining the interaction between loneliness, openness and gender. As mentioned earlier, loneliness can have negative effects on both mental and physical health. Therefore knowing more about underlying factors of loneliness could help to develop strategies to improve prevention and intervention.

Given the inconsistencies and gaps in the current literature, the primary aim of this study was to examine whether there was a predictive effect of 1) openness to experience and 2) tolerance to uncertainty on loneliness during COVID-19 pandemic. A second aim was to investigate if this relation is influenced by gender.

2. Methods

2.1.Participants

A total of 349 participants from the universities of Mannheim, Germany, and Leiden, Netherlands, were included in the study. Table 1 shows the demographic variables (age, gender and education level) of the sample. There were 308 female (%88.3), 41 male (%11.7) and 1 inter-gender (% .3) participants. All participants were over age of 18 years, with the minimum of age 18 and maximum of age 50 (*M(age)*=18.1, *SD*=1.84).

All participants have sufficient English proficiency. Participants were nationals of 29 different countries: The Netherlands, Germany, France, Spain, Turkey, Hungary, Finland, Romania, Nigeria, Greece, Israel, Russia, Kazakhstan, Croatian, USA, UK, Slovenia, Bulgaria,

Luxembourg, Ecuador, Poland, South Africa, Czech Republic, Italy, India, Turks, Austria, China, Morocco, Indonesia.

Table 1

Demographic variables of the completer sample

Variable	N	%
Gender		
Female	308	88.3
Male	41	11.7
Inter	1	0.3
Age		
18-25	305	87.4
25-42	5	1.5
42-54	1	0.3
Missing	19	5.4
Education		
Without Graduation	6	1.6
Havo	2	0.6
Vwo	60	17.2
Mbo	2	0.6
Hbo	1	0.3
University	172	49.3
Other	20	5.7
Missing	86	24.6

2.2. Materials

Loneliness

Loneliness was measured by the revised version of the University of California Los Angeles Loneliness Scale (UCLA-R; Russell, Peplau, & Cutrona, 1980). The original version consists of 20 items, the revised short version consists of 8 questions that are evaluated on a 5-point Likert scale (from 'Strongly disagree' to 'Strongly agree'). Higher scores indicate higher levels of openness to experience. The mean of the 8 items were taken as the total score. The Cronbach's Alpha for the scale was α= .96.

Openness to Experience

To measure openness to experience, the 10-Item Big Five Inventory (BFI-10; Rammstedt & John, 2007) was used. The inventory consists of 10 questions that are evaluated on a 5-point Likert scale (from 'Strongly disagree' to 'Strongly agree'). The Openness to Experience Scale, which includes items related to active imagination and preference for artistic hobbies, among others, were used. Higher scores indicate higher levels of openness to experience. The mean of 10 items were taken as the total score. The Cronbach's Alpha for the openness to experience was α=.78

Intolerance of Uncertainty

Intolerance of Uncertainty Scale (IUS; Freeston, Rheaume, Letarte, Dugas & Ladouceur, 1994) was used to measure tolerance of uncertainty. The scale consists of 18 items and evaluated on 5-point Likert scale (from 'not at all characteristic of me' to 'entirely characteristic of me'). Higher scores indicate higher levels of intolerance of uncertainty. The mean of 18 items were taken to calculate the total score. The Cronbach's Alpha for the scale was α= .88.

2.4. Statistical Analysis

Data was analyzed using IBM SPSS Statistics 28.0, with a priori α-value of $p \leq .05$, two-tailed. In analysis, the mean score for openness to experience is coded as 'BFI10', the mean score for intolerance of uncertainty as 'UI18' and the mean score for loneliness as 'ULS8'. Gender variable was defined as binary (1=female, 0=male) variable.

To test the hypothesis that higher levels of openness and tolerance for uncertainty are related to lower levels of loneliness, a multiple regression analysis was performed. Predictors (independent variables) were BFI10 scores (openness) and UI18 sum scores (intolerance for

uncertainty) and gender. Dependent variable was the mean ULS8 scores (loneliness). Men and women are compared in the scores of openness and intolerance for uncertainty using t-tests for independent samples.

2.3 Procedure

Data was collected at Leiden University and at the Central Institute of Mental Health in Germany. The larger research project is exploring chronic feelings of loneliness by identifying determinants of loneliness. The study was approved by a Medical Ethics Committee and Leiden University Psychology Ethics Committee (2020-07-06-A.D. Krause-V3-2449, expires 9 July 2021).

The data were collected in anonymous online surveys at both sites. The survey was posted at online platforms and distributed amongst social media and via the University Research Systems of Leiden and Mannheim. All participants were presented information about the study, such as the general aim of the study, data storage and analysis (confidentiality), their rights as participants (withdrawal, not answering certain questions, privacy) and contact information. All participants were asked to give their informed consent before starting the questionnaire. All participants filled out the same questionnaire in the same order. Questions were about participants' demographics, personality measures, mental health, life conditions during COVID-19, opinions on COVID-19 regulations. In this context, the above-mentioned scales were presented. Completing questionnaires lasted about 20 minutes and participants got a confirmation after finishing the questionnaire.

3. Results

3.1. Characteristics of the sample

All 349 participants answered questions on openness, loneliness, intolerance of uncertainty and gender. Table 2 illustrates the results of the descriptive analysis.

Table 2

Distributions of UI18, ULS8, BFI10 and gender in the full sample (n=349)

Variable	N	Mean ± SD	Minimum	Maximum
UI18	349	2.6 ± .76	1.06	5
ULS8	349	2.5 ± .55	1.38	4
BFI10	349	3.5 ± .86	1	5
Gender	349	.88 ± .32	0	1

Note: UI18= Intolerance for Uncertainty, ULS8= Loneliness, BFI10= openness to experiences, Gender= (1=female, 0=male).

Table 3 shows means ± standard deviations of scores and results of t-tests for gender. Females had higher scores on intolerance of uncertainty (UI18; *M*=2.7, *SD*=.77) than males (*M*=2.4, *SD*=.66). The results of the independent t-test showed that this gender difference was statistically significant (t(347)= 2.01, p= .045). Females also had higher scores on openness (BFI10; *M*=3.5, *SD*=.86) than males (*M*=3.4, *SD*=.90). However, independent t-test showed that this difference was not statistically significant t(347)= .787, p= .432.

Table 3

Distribution of UI18 and BFI10 scores among females and males.

Variable	Female (n=308)	Male (n=41)	t-tests (t(df), p)
UI18	2.7±.77	2.4±.66	t(347)= 2.01, p= .045
BFI10	3.5±.86	3.4±.90	t(347)= .787, p= .432

Note: UI18= Intolerance for Uncertainty,, BFI10= openness to experiences.

Table 4 shows Pearson correlations of the variables of interest. Intolerance of uncertainty (UI18 scores) were positively correlated with loneliness (ULS8 scores) (r= .41, p = <.001). Intolerance of uncertainty were also positively correlated with gender (female) (r= .11, p = .045). This

correlation was weaker than the correlation between UI18 and ULS8 scores, but it was still statistically significant.

Table 4

Pearson Correlation Among Gender, ULS8, UI18, BFI10.

		UI18	*BFI10*	*ULS8*
	gender	Intolerance to Uncertainty	openness	Loneliness
gender	.			
UI18	.11*	.		
BFI10	.04	-.01	.	
ULS8	.02	.41**	.09	.

* . Correlation is significant at the 0.05 level (2-tailed).
** . Correlation is significant at the 0.01 level (2-tailed).

3.2. Main Analysis

A multiple regression analysis was run to predict loneliness from gender, openness to experience and intolerance to uncertainty.

Results showed that variables openness (BFI10) and intolerance to uncertainty (UI18) statistically significantly predicted loneliness, F(3,345) = 24.392, $p < .001$ $R^2 = .175$, adjusted $R^2 = .168$.

Table 6 summarizes the results of the linear regression analysis. The results showed that higher BFI10 (openness) scores predicted higher ULS8 scores (loneliness) (B = .066, SE= .031, p =.036, 95% CI= [.004, .128]). Similarly, higher UI18 scores (intolerance of uncertainty) predicted higher scores on ULS8 (loneliness) (B = .298 , SE= .036, p =<.001, 95% CI= [.228, . 369]). There was no significant effect of gender found on loneliness (*B*= -.051, *SE=.085, p*= . 547, 95% CI= [-.218, .116]). To summarize, higher levels of openness to experience and intolerance of uncertainty predicted more loneliness during the COVID-19 pandemic, regardless of gender.

Table 5

Predictors	*B*	*SE*	*p*	CI (95%)
BFI10	.066	.031	.036	[.004, .128]
UI18	.298	.036	<.001	[.228, 369]
Gender	-.051	.085	.547	[-.218, .116]

Results of the multiple regression analysis predicting loneliness.

Note: UI18= Intolerance for Uncertainty, BFI10= openness to experiences, Gender= (1=female, 0=male).

Discussion

The current study aimed to examine if there was a predictive effect of 1) openness to experience and 2) intolerance of uncertainty on loneliness during COVID-19 pandemic. It also aimed to investigate if this relation is influenced by gender. The results of our analysis showed that participants who had higher scores on openness to experience and intolerance of uncertainty had also higher scores for loneliness. There were no significant differences in gender, regarding loneliness. Results further showed a positive correlation between intolerance to uncertainty and loneliness.

Openness to Experience

Existing studies show inconsistent findings regarding the relationship between openness and loneliness, and there is no conclusive body of evidence on the topic. Some indirect causal relationships can be proposed between openness and loneliness, such as through exploratory behaviour and sensation seeking (Zuckerman, 1984). Open people would be more likely to seek social interactions, therefore openness can be expected to predict lower levels of loneliness (Buecker et al., 2020). Moreover, open people are more likely to be extroverts rather than introverts (Aluja & Garcia, 2003), which makes them less likely to be lonely. However, our findings suggest the contrary. We found that open people are more likely to be lonely. These results are not line with the related studies on the topic.

One reason for that can be the measurement scales used in our study. Our scale BFI10 was a brief version of big Five Personality Inventory and had 2 items directly in relation to

openness; 1) *Has a few artistic interests* 2) *Has an active imagination*. It can be the case that the scale has a special focus on artistic interest and active imagination and not covering other aspects of loneliness equally. Other studies which indicated different findings used different scales. For example, one study (Vanhalst et al., 2012) used the Quick Big Five Questionnaire which includes 6 items in relation to openness. Another study (Schutter et al., 2019) used NEO -FFI (Neo Five Factor Inventory), consists of 60 items in total and have 12 items related to loneliness. More aspects of openness are being covered with more items, so this may be one of the reasons why our findings are inconsistent with previous literature.

All other previous studies used the same measure for loneliness (UCLA-R).

Intolerance of Uncertainty

Regarding intolerance of uncertainty, results show that it is a predictor of loneliness during the COVID-19 pandemic. Again, there are not many studies investigating the relation between intolerance of uncertainty and loneliness. Majority of the studies on the topic are focusing on it's relation to psychopathology. Intolerance of uncertainty has been associated with inflexible thinking, anxiety disorders and higher levels of neuroticism (Berenbaum et al., 2008). It was also associated with anxiety and depression (Gentes, & Ruscio, 2011).

Our results showed that people who are higher in intolerance of uncertainty are more likely to be lonely. These results are in line with the previous literature; intolerance of uncertainty has been shown to have a predictor of social anxiety (Carleton et. al., 2010), it motivates social comparison (Butzer & Kuiper, 2006) and it is associated with fear of negative social evaluation (Whiting et. al., 2013). All of these factors can decrease people's social engagement and explain higher levels of loneliness.

Intolerance of uncertainty can be a tricky concept because it is also strongly (negatively) associated with trait openness (Jach & Smilllie, 2019). Open people are shown to have a better ability to tolerate uncertainty (Fergus & Rowatt, 2014). This is expectable since trait openness has aspects such as variety seeking, which requires people to handle uncertain settings and situations. It is also suggested that some level of intolerance to uncertainty is inherent in trait openness. Openness is suggested to have two main aspects: approach-motivated behaviour (curiosity) and avoidance-motivated behaviour (intolerance of uncertainty) (Jach & Smilllie,

2021). These two types of behaviour attitudes are uncomplimentary by nature, but their conflict is necessary for trait openness. However, we didn't find any significant correlation between scores of openness and intolerance of uncertainty. Our results have very close mean and SD in scores of intolerance of uncertainty and openness, but the relation was not significant. In that sense, results of the study are not in line with the previous literature on the topic. A potential explanation for this inconsistency can be that the relation between openness and intolerance of uncertainty varies by other variable -such as intelligence. Openness is shown to have a positive correlation with intelligence (DeYoung et al., 2014). It is possible that previous observed relations between openness and intolerance of uncertainty were caused primarily by intelligence.

Coming to gender differences, women were found to be higher in intolerance of uncertainty. This finding is also complementary to previous studies, which found women to be less tolerant of uncertainty and higher in other anxiety related thought-patterns (Buhr & Dugas, 2006) (Weisberg and DeYoung, 2011).

We found that both openness and intolerance of uncertainty positively predict loneliness, which is largely in line with previous literature. Future studies should investigate if there is also an indirect pathway of openness through intolerance of uncertainty on loneliness.

Limitations and Further Research

One of the major limitations of this study is the questionable representativeness of the sample. Our participants were mostly university students, aged between 18 and 25. There were not many participants older than 25, therefore our sample may not be representing all age groups. Further studies can be done on different age groups, mostly with older adults. This can be especially important because there is one study found that correlation between openness and loneliness is increasing with age ((Wrzus et al., 2016). To understand the relationship between openness and loneliness, it can be important investigate whether this relation is different in other age groups or if the relation changes with time. Further studies on different age groups, as well as longitudinal studies is needed to understand the relationship between openness and loneliness. Similarly, majority of the participants in our sample were women. Therefore, our sample may not be representative of the full spectrum of gender. Another limitation of the study is that it realties on self-reported data. Participants filled out the survey by themselves and it is not clear if they

they gave biased information. They can give wrong information for variety of reasons, such as not focusing enough, not having enough insight to answer some questions, lying, avoiding to answer etc. Moreover, participants filled out the survey in uncontrolled conditions so we cannot assume the possible effect of the environment of their answers, which can be restricting for external validity.

Another limitation for the study may be the possible relationship between variables openness and intolerance of uncertainty. Intolerance of uncertainty is a tricky concept because it can also be a part or function of trait openness. As discussed above, openness has many aspects and one of them is preference for variety, which is directly related to tolerance of uncertainty. We measured all of the variables separately in our analysis, but there might also be indirect effects; for example of intolerance of uncertainty through openness on loneliness, or of intolerance of uncertainty through openness on loneliness. Future studies should use path analytical models (moderation and mediation analyses) to better understand this interplay.

Conclusion

The current study measured the predictors of loneliness during the COVID-19 pandemic. We examined the relations between loneliness and possible predictors: openness to experiences, intolerance of uncertainty, gender. In multiple regression analysis, the strongest association was found between loneliness and intolerance of uncertainty. To a lesser extent, openness was positively related to loneliness. Gender did not seem to have a predictive role for loneliness. We also found that intolerance of uncertainty is positively related to openness and gender (female).

Regarding openness, investigating it's relation with loneliness was important because openness-related behaviours can be very helpful in treatment settings. Since there is very few information on the topic, it can also help to develop coping strategies for people who are high in openness. Similarly, intolerance uncertainty-related behaviours also need to be identified and treated accordingly in treatment settings. Future research focusing on other personality dimensions and different sample groups will be helpful in identifying, protecting and treating risky individuals/populations.

5. References

Aluja, A., Garcıa, O., & Garcıa, L. F. (2003). Relationships among extraversion, openness to experience, and sensation seeking. *Personality and Individual Differences*, *35*(3), 671-680.

Bekhet, A. K., Zauszniewski, J. A., & Nakhla, W. E. (2008, October). Loneliness: a concept analysis. In *Nursing Forum* (Vol. 43, No. 4, pp. 207-213). Malden, USA: Blackwell Publishing Inc.

Berenbaum, H., Bredemeier, K., & Thompson, R. J. (2008). Intolerance of uncertainty: Exploring its dimensionality and associations with need for cognitive closure, psychopathology, and personality. *Journal of anxiety disorders*, *22*(1), 117-125.

Bu, F., Steptoe, A., & Fancourt, D. (2020). Who is lonely in lockdown? Cross-cohort analyses of predictors of loneliness before and during the COVID-19 pandemic. *Public Health*, *186*, 31-34.

Buecker, S., Maes, M., Denissen, J. J., Luhmann, M., & Laceulle, O. M. (2020). Loneliness and the Big Five Personality Traits: A Meta–Analysis. *European Journal of Personality*, *34*(1), 8-28.

Buhr, K., & Dugas, M. J. (2006). Investigating the construct validity of intolerance of uncertainty and its unique relationship with worry. *Journal of anxiety disorders*, *20*(2), 222-236.

Butzer, B., & Kuiper, N. A. (2006). Relationships between the frequency of social comparisons and self-concept clarity, intolerance of uncertainty, anxiety, and depression. *Personality and Individual Differences, 41*(1), 167–176.

Cacioppo, J. T., Hughes, M. E., Waite, L. J., Hawkley, L. C., & Thisted, R. A. (2006). Loneliness as a specific risk factor for depressive symptoms: cross-sectional and longitudinal analyses. *Psychology and aging*, *21*(1), 140.

Chamorro-Premuzic, T. (2016). *Personality and individual differences*. John Wiley & Sons. DeYoung, C. G. (2015). Openness/intellect: A dimension of personality reflecting cognitive exploration.

Costa, P. T., & McCrae, R. R. (1992). Normal personality assessment in clinical practice: The NEO Personality Inventory. *Psychological assessment*, *4*(1), 5.

DeYoung, C. G., Quilty, L. C., Peterson, J. B., & Gray, J. R. (2014). Openness to experience, intellect, and cognitive ability. *Journal of personality assessment*, *96*(1), 46-52.

Fedorenko, E. J., Kibbey, M. M., Contrada, R. J., & Farris, S. G. (2021). Psychosocial predictors of virus and social distancing fears in undergraduate students living in a US COVID-19 "hotspot". Cognitive behaviour therapy, 1–17

Fergus, T. A., & Rowatt, W. C. (2014). Intolerance of uncertainty and personality: Experiential permeability is associated with difficulties tolerating uncertainty. *Personality and Individual Differences*, *58*, 128-131.

Fujimori, A., Hayashi, H., Fujiwara, Y., & Matsusaka, T. (2017). Influences of attachment style, family functions and gender differences on loneliness in japanese university students. *Psychology*, *8*(4), 654-662.

Gentes, E. L., & Ruscio, A. M. (2011). A meta-analysis of the relation of intolerance of uncertainty to symptoms of generalized anxiety disorder, major depressive disorder, and obsessive–compulsive disorder. *Clinical psychology review*, *31*(6), 923-933.

Groarke, J. M., Berry, E., Graham-Wisener, L., McKenna-Plumley, P. E., McGlinchey, E., & Armour, C. (2020). Loneliness in the UK during the COVID-19 pandemic: Cross-sectional results from the COVID-19 Psychological Wellbeing Study. *PloS one*, *15*(9), e0239698.

Holwerda, T. J., Deeg, D. J., Beekman, A. T., van Tilburg, T. G., Stek, M. L., Jonker, C., & Schoevers, R. A. (2014). Feelings of loneliness, but not social isolation, predict dementia onset: results from the Amsterdam Study of the Elderly (AMSTEL). *Journal of Neurology, Neurosurgery & Psychiatry*, *85*(2), 135-142.

Jach, H. K., & Smillie, L. D. (2019). To fear or fly to the unknown: Tolerance for ambiguity and Big Five personality traits. *Journal of Research in Personality*, *79*, 67-78.

Jach, H. K., & Smillie, L. D. (2021). Testing the information−seeking theory of openness/ intellect. *European Journal of Personality*, *35*(1), 103-119.

Killgore, W. D., Cloonan, S. A., Taylor, E. C., & Dailey, N. S. (2020). Loneliness: A signature mental health concern in the era of COVID-19. *Psychiatry research*, *290*, 113117.

Lábadi, B., Arató, N., Budai, T., Inhóf, O., Stecina, D. T., Sík, A., & Zsidó, A. N. (2021). Psychological well-being and coping strategies of elderly people during the COVID-19 pandemic in Hungary. Aging & mental health, 1–8. Advance online publication.

Luhmann, M., & Hawkley, L. C. (2016). Age differences in loneliness from late adolescence to oldest old age. *Developmental psychology*, *52*(6), 943.

McCrae, R. R., & Costa Jr, P. T. (1997). Conceptions and correlates of openness to experience. In *Handbook of personality psychology* (pp. 825-847). Academic Press. McCrae, R. R., & Sutin, A. R. (2009). Openness to experience.

McCrae, R. R. (1996). Social consequences of experiential openness. *Psychological bulletin*, *120*(3), 323. Mund, M., & Neyer, F. J. (2019). Loneliness effects on personality. *International Journal of Behavioral Development*, *43*(2), 136-146.

Roberti, J. W. (2004). A review of behavioral and biological correlates of sensation seeking. *Journal of research in personality*, *38*(3), 256-279.

Schermer, J. A., & Martin, N. G. (2019). A behavior genetic analysis of personality and loneliness. *Journal of Research in Personality*, *78*, 133-137.

Schutter, N., Koorevaar, L., Holwerda, T. J., Stek, M. L., Dekker, J., & Comijs, H. C. (2020). 'Big Five'personality characteristics are associated with loneliness but not with social network size in older adults, irrespective of depression. *International psychogeriatrics*, *32*(1), 53-63.

Stravynski, A., & Boyer, R. (2001). Loneliness in relation to suicide ideation and parasuicide: A population-wide study. *Suicide and life-threatening behavior*, *31*(1), 32-40.

Teppers, E., Klimstra, T. A., Damme, C. V., Luyckx, K., Vanhalst, J., & Goossens, L. (2013). Personality traits, loneliness, and attitudes toward aloneness in adolescence. *Journal of Social and Personal Relationships*, *30*(8), 1045-1063.

Valtorta, N. K., Kanaan, M., Gilbody, S., Ronzi, S., & Hanratty, B. (2016). Loneliness and social isolation as risk factors for coronary heart disease and stroke: systematic review and meta-analysis of longitudinal observational studies. *Heart*, *102*(13), 1009-1016.

van den Broek, T. (2017). Gender differences in the correlates of loneliness among Japanese persons aged 50–70. *Australasian journal on ageing*, *36*(3), 234-237.

Weisberg, Y. J., DeYoung, C. G., & Hirsh, J. B. (2011). Gender differences in personality across the ten aspects of the Big Five. *Frontiers in psychology*, *2*, 178.

Wickens, C. M., McDonald, A. J., Elton-Marshall, T., Wells, S., Nigatu, Y. T., Jankowicz, D., & Hamilton, H. A. (2021). Loneliness in the COVID-19 pandemic: associations with age, gender and their interaction. *Journal of Psychiatric Research*, *136*, 103-108.

Whiting, S. E., Jenkins, W. S., May, A. C., Rudy, B. M., Davis III, T. E., & Reuther, E. T. (2014). The role of intolerance of uncertainty in social anxiety subtypes. *Journal of Clinical Psychology*, *70*(3), 260-272.

Wrzus, C., Wagner, G. G., & Riediger, M. (2016). Personality-situation transactions from adolescence to old age. *Journal of Personality and Social Psychology, 110*(5), 782–799.

Zuckerman, M. (1984). Sensation seeking: A comparative approach to a human trait. *Behavioral and brain sciences*, *7*(3), 413-434.