



Psychological distress and state boredom during the COVID-19 outbreak in China: the role of meaning in life and media use

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ABSTRACT

Background: Epidemics are associated with increased burden of psychological distress. However, the role of boredom on mental health during epidemic periods has seldom been explored.

Objective: This study attempted to examine the effect of state boredom on psychological outcomes, and the role of media use and meaning in life among the indirectly exposed Chinese adults in the initial phase of the COVID-19 outbreak.

Method: An online survey was administered to 917 Chinese adults on 28 January 2020 (1 week after the official declaration of person-to-person transmission of the coronavirus). Self-report questionnaires were used to assess state boredom, anxiety, depression, stress, media use and meaning in life. Moderated mediation analysis was conducted.

Results: Our results indicated that the effect of state boredom on anxiety and stress, but not depression, were mediated by media use and that sense of meaning in life modified this association. Meaning in life served as a risk factor, rather than a protective factor for the negative psychological outcomes when people experienced boredom. The association between boredom and media use was significant for high but not low meaning in life individuals.

Conclusion: These findings demonstrated that boredom and media use were associated with an increased burden or psychological distress in the sample. It is important to pay attention to the possible negative impact of boredom and media use during COVID-19, and find more ways to cope with boredom, especially those with high presence of meaning in life.

Malestar psicológico y estado de aburrimiento durante el brote covid-19 en China: el papel del significado en la vida y el uso de los medios

Antecedentes: Las epidemias están asociadas con aumento de la carga de malestar psicológico. Sin embargo, el papel del aburrimiento en la salud mental durante periodos de epidemia ha sido rara vez explorado.

Objetivo: Este estudio intentó examinar el efecto del estado de aburrimiento en las consecuencias psicológicas y el papel del uso de los medios y significado en la vida entre los adultos chinos indirectamente expuestos en la fase inicial del brote de COVID-19.

Método: Se administró una encuesta online a 917 adultos chinos el 28 de Enero del 2020 (una semana después de la declaración oficial de la transmisión del coronavirus persona a persona). Se usaron cuestionarios de auto-reporte para evaluar el estado de aburrimiento, ansiedad, depresión, estrés, uso de medios y significado en la vida. Se realizó un análisis de mediación moderado.

Resultados: Nuestros resultados indicaron que el efecto del estado de aburrimiento sobre la ansiedad y el estrés, pero no depresión, estuvieron mediados por el uso de los medios y que el sentido de significado en la vida modificó esta asociación. El significado en la vida sirvió como factor de riesgo, más que como un factor protector para las consecuencias psicológicas negativas cuando la gente experimentó aburrimiento. La asociación entre aburrimiento y uso de los medios fue significativa para el significado alto pero no bajo en la vida en los individuos.

Conclusiones: Estos hallazgos demostraron que, en la muestra, el aburrimiento y el uso de los medios estuvieron asociados con un aumento de la carga o malestar psicológico. Es importante poner atención acerca del posible impacto negativo del aburrimiento y el uso de los medios durante el COVID-19, y encontrar más formas de lidiar con el aburrimiento, especialmente aquellos con presencia alta de significado en la vida.

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关键词

无聊; 媒体使用; 心理健康; 生命意义感; 灾难; COVID-19

HIGHLIGHTS

- State boredom during the outbreak was associated with psychological distress.
- Disaster-related media use mediated the relationship between state boredom and stress and anxiety.
- Meaning in life served as a risk factor for the negative psychological outcomes when people experienced boredom.

中国新冠肺炎疫情期间心理负担和状态无聊的关系：生命意义感和媒体使用的作用

背景： 流行病与增加的心理负担有关。但是，少有研究探讨无聊在流行病爆发期间对心理健康的作用。

目的： 本研究试图探讨在COVID-19爆发初期，非直接暴露于疾病的中国成年人的状态无聊对心理结果的影响，以及媒体使用和生命意义感在其中的作用。

方法： 本研究于2020年1月28日（即官方宣布冠状病毒人传人之后一周）对917名中国成年人进行了在线调查。使用自我报告量表评估状态无聊，焦虑，抑郁，压力，媒体使用和生命意义感。进行了中介调节分析。

结果： 状态无聊对焦虑和压力的影响（而非抑郁）是由媒体使用中介的，并且生命意义感起了调节作用。当人们感到无聊时，生命意义感是产生负面心理结果的危险因素，而不是保护因素。无聊与媒体使用的显著关联仅体现在生命意义感高的个体中。

结论： 在当前样本中，无聊和媒体使用与增加的心理负担有关。需要关注在COVID-19疫情期间无聊和媒体使用可能带来的负面影响，并找到更多应对无聊的方法，尤其是那些具有高生命意义感的个体。

1. Introduction

Epidemic outbreaks are potentially traumatic events that may result in a wide range of mental and physical health consequences (Yuval Neria, Nandi, & Galea, 2008; Xiang et al., 2020). Recently, the COVID-19 outbreak threatened the health and well-being of people globally.

A substantial amount of research have been done to understand the psychological effects of disasters, including epidemic outbreaks (Xiang et al., 2020). According to a global systematic review, anxiety, depression, posttraumatic stress disorder (PTSD), and non-specific psychological distress were often observed as psychological outcomes of disaster (Norris, Friedman, & Watson, 2002). These negative outcomes may persist for a long time after the event, causing further burden to individuals and the society (Davidson & McFarlane, 2006); thus, it is critical to understand the risk factors for these outcomes.

Risk factors for negative psychological outcomes can be classified as pre-disaster, peri-disaster, and post-disaster factors (Goldmann & Galea, 2014). The main peri-disaster risk factor is the degree of the exposure to the event, with greater or more intense exposure consistently predicts higher risk of mental health problems (McFarlane & Williams, 2012; Neria et al., 2008). However, some people experience negative psychological effects who are not directly exposed to the traumatic event, which may be attributable to the exposure to mass trauma through the media (Y. Neria & Sullivan, 2011). Indeed, previous research found a positive association between media use and negative psychological outcomes such as anxiety, depression, and PTSD in the disaster context (Ahern et al., 2002; Bodas, Siman-Tov, Peleg, & Solomon, 2015).

Longitudinal studies suggested greater media exposure to the trauma was associated with increased subsequent stress symptoms (Holman, Garfin, Lubens, & Silver, 2020), and predicted probable PTSD at the 6-month follow-up (Yeung et al., 2018). It is plausible

that disaster-related media exposure may be a precursor of psychological distress in the disaster.

Few studies have examined factors that might influence media use behaviour within the disaster context. During the COVID-19 outbreak in China, home quarantine was applied to prevent transmission. A recent review study suggested quarantine, reduced social and physical contact with others were frequently shown to cause boredom (Brooks et al., 2020). According to a national survey on 2,135 participants during the outbreak in China, boredom was the most reported emotion experienced, followed by anxiety and worry (Luan, 2020).

State boredom is defined as the aversive state of being unable to engage in a satisfying activity (Eastwood, Frischen, Fenske, & Smilek, 2012). There is evidence that boredom is related to negative affect (Raffaelli, Mills, & Christoff, 2018), obsessive-compulsive symptom, somatization (Sommers & Vodanovich, 2000), anxiety, depression, and stress (Lee & Zelman, 2019). In addition, previous experimental research showed higher boredom correlates with higher need for information and higher exploration behaviours (Geana, Wilson, Daw, & Cohen, 2016), which was a common motive for media use (McQuail, 2000). Moreover, boredom was also a common trigger of intensive internet use (Aboujaoude, 2010) and a predictor of pathological use of social networking sites (Zhou & Leung, 2012), which may contain a variety of news related to the disaster.

In the current outbreak, the quarantine and the invisible disease threat may result in perception of boredom and inadequate information. People could engage in media use to relieve boredom, resulting in higher negative psychological consequences. Therefore, media use may play a mediating role between boredom and psychological distress.

However, the link between boredom and adverse outcomes may subject to boredom coping (Nett, Goetz, & Hall, 2011). We presumed that a sense of meaning in life could moderate boredom coping.

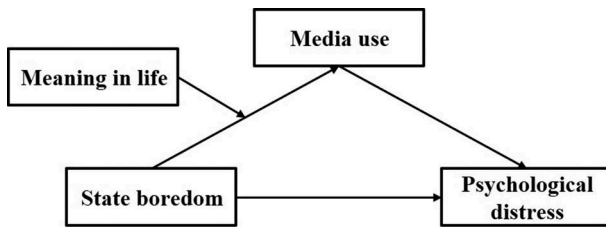


Figure 1. Conceptual model.

Meaning in life is defined as a generally stable sense of purpose in life and an accompanying sense of fulfilment (Baumeister, 1991), and a contributor to psychological health (Brassai, Piko, & Steger, 2011; Zika & Chamberlain, 1992). In the disaster context, meaning in life can help people cope well and predict satisfaction with life (Drescher et al., 2012), and contributes to post-disaster resilience (Park, 2016). However, the role of meaning in life in disaster boredom has rarely been studied. On one hand, meaning in life prevents internet addiction (Zhang et al., 2015) which may relate to social media use. On the other hand, meaning in life was associated with feelings of control (Martela & Steger, 2016), which may relate to using media for information about the ongoing threats. As such, meaning in life might affect how people cope with boredom, and whether they would stave off boredom through media use.

Few studies in the literature have examined relationships among state boredom, media use and psychological distress concurrently, especially in a disaster context, and the effect of meaning in life on these relationships. Therefore, we aimed to examine the moderated mediating effects of meaning in life on media use and its associations with state boredom and psychological distress during the COVID-19 epidemic. We hypothesized that media use would mediate the relationship between boredom and psychological distress, and the mediating effects would differ in terms of meaning in life (see Figure 1).

2. Methods

2.1. Participants and procedure

A total of 917 participants ($M = 28.6$ years, $SD = 9.5$) took part in the current study. Of these, 613 (66.8%) were females. The participants covered 30 provinces and autonomous regions in China. Neither the participants nor anyone they knew reported being infected with COVID-19.

The person-to-person transmission of the COVID-19 was first disclosed to the public by the National Health Commission on January 20, and self-quarantine was suggested. The current internet-based study was conducted 1 week after this declaration, on January 28. We recruited the participants via WeChat,

a popular social media platform in China. Firstly, the questionnaire link was shared by several teachers and students from Tianjin Normal University. Then, Chinese adults who saw the link were encouraged to participate in the study and share the link to more people. The study purpose was disclosed and the consent to participate was provided. The ethics committee of Tianjin Normal University approved the study.

2.2. Measures

2.2.1. State boredom

Three items scored on 1–7 were used to measure state boredom during the outbreak. The time frame adopted was ‘during the last week’. The three items were ‘I often find myself at loose ends, not knowing what to do’; ‘Many things I have to do are repetitive and monotonous’; and ‘Much of the time I just sit around doing nothing’. A sum score was calculated, with higher score indicating higher state boredom. The unidimensionality was supported by exploratory factor analysis. The Cronbach’ α was 0.86.

2.2.2. Media use

Five questions were used to assess the media use behaviour in the outbreak following previous research (Hall et al., 2019). Respondents indicated the number of total hours in the last week that they were exposed to coverage of the disease outbreak via television, radio, newspapers; online news sites; or via pictures, videos; and news, or text updates on social media. The five items were summed to create a media use score.

2.2.3. Meaning in life

Four items adapted from the Meaning in Life Questionnaire (MLQ) (Steger, Frazier, Oishi, & Kaler, 2006) were used to fit the disaster context. The four items were ‘in the face of the severe outbreak, I still understand my life’s meaning’; ‘whether or not the outbreak occurs, I am always looking to find my life’s purpose’; ‘even though the outbreak occurs, I still have a good sense of what makes my life meaningful’; and ‘I am seeking a purpose or mission for my life’. The sum score of the four items was used. Items are answered on a 7-point scale, 1 to 7. The unidimensionality was supported by exploratory factor analysis. Cronbach’ α was 0.85.

2.2.4. Psychological distress

The 21-item Depression Anxiety Stress Scale (DASS-21) (Lovibond & Lovibond, 1995) was used to measure depression, anxiety, and stress symptoms. This scale has three 7-item subscales for depression, anxiety and stress. Items were scored on a 4-point scale, 0 to 3. Each subscale score ranges from 0 to 21. The time frame was ‘during the last week’. The

Cronbach's alpha for each subscale was as follows: depression, 0.77; anxiety, 0.79; stress, 0.76.

2.3. Analytic strategy

According to Muller, Judd, and Yzerbyt (2005), when the mediation between the independent variable and the dependent variable varied with different levels of the moderator variable, the moderated mediating effect would occur. Based on the previous research, meaning in life was likely to impact boredom coping, so we test the first-stage moderated mediation effect, which means the moderator (e.g. meaning in life) moderated the association between the independent variable (e.g. state boredom) and the mediator (e.g. media use behaviour).

We used the R (version 3.6.0) lavaan package to do the descriptive and moderated mediation analyses. First, descriptive statistics and correlation analysis were conducted. Then, first-stage moderation model (Edwards & Lambert, 2007) was conducted to test the moderated mediation effect. When the effect was significant, we examined the significance of each of these two slopes (Aiken, West, & Reno, 1991), which represented the mediating effect between state boredom and psychological distress was different at two levels of the sense of meaning in life.

3. Results

3.1. Descriptive analyses

Table 1 presents means, standard deviations, and Pearson correlations of the variables for all the

participants. Participants experienced higher depression, anxiety and stress compared with previous Chinese samples in non-disaster settings, and reported 20.49 hours of disaster-related media use in the past week. State boredom had significantly positive correlations with media use, depression, anxiety, and stress, and had significantly negative correlation with meaning in life. In addition, meaning in life negatively correlated with state boredom, depression, anxiety, and stress.

3.2. Moderated mediation effect analysis

Three models containing three psychological distress variables (depression, anxiety, and stress) were established, respectively. For model 1, we ran a moderated mediation model on stress which included the mediator of media use and interaction term between boredom and meaning in life (see Figure 2(a)). The results showed that boredom had a direct effect on stress ($\beta = 0.21, p < 0.01, 95\% \text{ CI } [0.15, 0.27]$), and an indirect impact through the mediating role of media use. The interaction term between boredom and meaning in life could significantly predict media use ($\beta = 0.45, p < 0.01, 95\% \text{ CI } [0.12, 0.79]$), which suggests that meaning in life moderated the relationship between boredom and media use. Therefore, meaning in life was a first-stage moderator of media use mediating the relationship between boredom and stress.

The same procedure was used to test the effect on anxiety and depression. With regard to anxiety, model 2 showed that boredom both directly ($\beta = 0.24, p < 0.01, 95\% \text{ CI } [0.18, 0.30]$) and indirectly impact anxiety through media use, and the interaction term between

Table 1. Descriptive statistics and correlation matrix.

	BO	DEP	ANX	STR	ML	MU
Boredom (BO)	1					
Depression (DEP)	0.273 ***	1				
Anxiety (ANX)	0.240 ***	0.693 ***	1			
Stress (STR)	0.216 ***	0.730 ***	0.782 ***	1		
Meaning in life (ML)	-0.105 **	-0.301 ***	-0.227 ***	-0.177 ***	1	
Media use (MU)	0.075 *	0.049	0.086 **	0.123 ***	0.004	1
Mean	11.715	10.773	11.070	12.318	21.434	20.493
SD	5.477	3.272	3.015	3.451	4.394	13.639

** $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

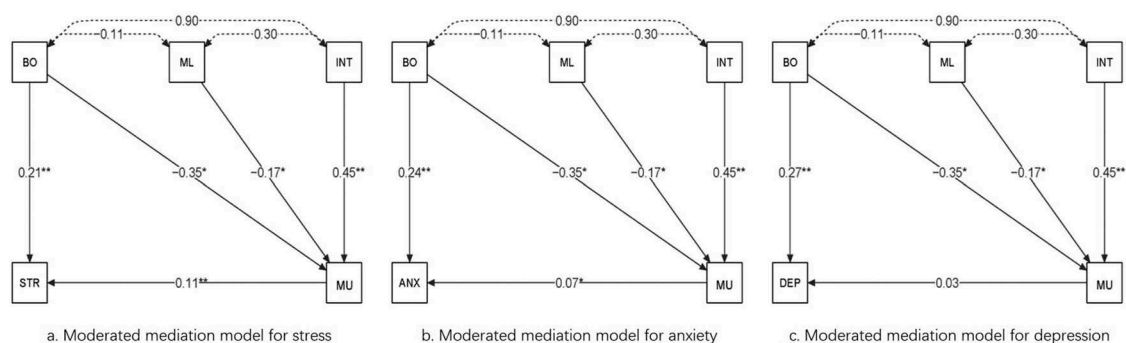


Figure 2. First-stage moderation model for three mental health variables.

boredom and meaning in life could significantly predict media use ($\beta = 0.45, p < 0.01, 95\% \text{ CI } [0.12, 0.79]$), suggesting a moderated mediation effect on anxiety (see Figure 2(b)). However, as for depression, boredom could only directly affect depression ($\beta = 0.27, p < 0.01, 95\% \text{ CI } [0.21, 0.33]$), not through media use ($\beta = 0.03, p > 0.05, 95\% \text{ CI } [-0.03, 0.09]$). Therefore, the moderated mediation was not established for depression (see Figure 2(c)).

Table 2 presents the sizes of direct effects and moderated effects of the two moderated mediation models for stress and anxiety. The moderated effects of two models for stress and anxiety explained 19.23% and 11.11% of the variance, respectively, which also supported that meaning in life was the moderator. Meaning in life took effect together with boredom and then predicted media use which mediated the relationship between boredom and stress/anxiety.

To explore the influencing mechanism between meaning in life and boredom, we further conducted a simple slope analysis (see Figure 3). The test revealed that the association between boredom and media use was significant for participants with high levels of meaning in life ($\beta = 0.23, p < 0.01$), while this association became non-significant for participants with low meaning in life ($\beta = -0.075, p > 0.05$). This result shows that the mediating effect of media use between boredom and stress and anxiety increases with the increase of meaning in life.

4. Discussion

This study aimed to examine whether state boredom was a risk factor for depression, anxiety, and

Table 2. Direct effects and moderated effects of model 1 and model 2.

Effects	β	Proportion
BO→STR	0.21	80.77%
INT→MU→STR	0.05	19.23%
BO→ANX	0.24	88.89%
INT→MU→ANX	0.03	11.11%

BO = boredom, MU = media use, STR = stress, ANX = anxiety, INT = interaction term.

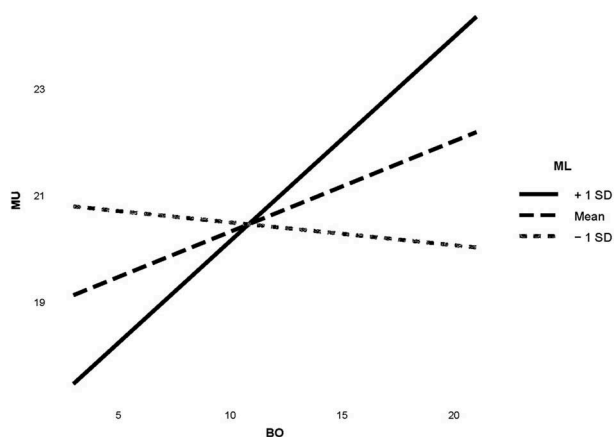


Figure 3. Moderated effect of the meaning in life between boredom and media use.

stress, the mediating effect of media use, and whether meaning in life provided a buffer or risk for the negative psychological outcomes in adult Chinese population indirectly exposed to the COVID-19 outbreak. Our findings indicated that the effect of state boredom on anxiety and stress, but not depression, were mediated by media use and meaning in life was a first-stage moderator. Moreover, meaning in life served as a risk factor, rather than a protective factor for the negative outcomes when people experienced boredom. As the positive effect of boredom on media use was only significant in the high meaning in life group.

Studies have rarely examined the negative effect of state boredom in the disaster. This construct is especially relevant during an epidemic outbreak, where quarantine and social distancing reduce the range of possible activities (Brooks et al., 2020). Our study suggested that greater state boredom was associated with higher level of depression, anxiety, and stress during the outbreak, which is consistent with previous study suggesting boredom proneness to be a predictor of depression, anxiety and stress (Lee & Zelman, 2019). Our study extends the previous research by revealing the negative effect of state boredom even in the disaster context such as the COVID-19 pandemic which put people's life at risk.

Moreover, our study investigated the underlying mechanism of state boredom on negative psychological outcomes by identifying media use as a mediator. Besides having a direct impact on anxiety and stress, state boredom could affect them through the mediating role of media use. Previous researches revealed similar results. For instance, increased viewing of televised traumatic content was associated with anxiety in the war (Bodas et al., 2015). Repeatedly engaging with trauma-related media content may prolong acute stress experiences (Holman, Garfin, & Silver, 2014). However, the current study showed media use was not a mediator between boredom and depression in the outbreak. In fact, previous results on the association between media use and depression in the disaster were inconsistent, most studies found positive association between disaster television viewing and depression (Pfefferbaum et al., 2014), whereas results also suggested reading newspaper coverage of the September 11 attacks was not associated with depression (Huddy, Feldman, Lahav, & Taber, 2003). We suspect this nonsignificant association may be due to the relatively short interval between the outbreak and the survey. During the early phase of the epidemic, stress and anxiety are expected as people orient towards taking action to defend against the threat and the uncertainty of the epidemic. Future studies should further explore the relationship between media use and depression in different phases of the outbreak.

Our results suggested that when individuals experienced boredom, high meaning in life would intensify their media use behaviours, leaving them more vulnerable to the negative psychological impact. According to the theoretical literature of the three facets of meaning, coherence, purpose, and significance were distinct dimensions of meaning in life (Martela & Steger, 2016). The coherence facet is to make sense of the experiences in life (Reker & Wong, 1988). Purpose is some future-oriented aims and goals that give direction to life; and significance is about evaluating something to find out the positive or negative value (Martela & Steger, 2016). All the facets of meaning are tied up with the reflective thinking of human beings. Thus, faced with tremendous uncertainty in the outbreak, people with high meaning in life may have a higher need to understand and evaluate the situation, causing more media use behaviour.

The model of the present study holds important practical implications for reducing psychological distress in crisis. For individuals in self-quarantine, it is necessary to cope with boredom in various ways and reduce disaster-related media exposure, especially among those with high sense of meaning in life. Policy makers should consider how to regulate quarantine and media coverage, and provide practical advice for the public, helping contribute to their mental health.

4.1. Limitations

This study has several limitations. First, the cross-sectional design of the study could not establish causal relationships between state boredom, media use, and psychological distress. The relationship between media use and psychological distress can be bidirectional (Thompson, Jones, Holman, & Silver, 2019). Furthermore, the self-report measure may be subject to response bias. More research that includes longitudinal study designs and experimental comparisons are needed to expand our understanding of how boredom and meaning in life interact with media use and their influence on psychological distress. In addition, we only explored the mediating role of media use in the association between boredom and psychological distress. Other factors need to be investigated, especially to depression, as our study suggested media use was not a mediator between boredom and depression. Last, this study is conducted in China, whether the results can be generalized to countries from different cultures is uncertain.

5. Conclusion

In conclusion, our study showed that state boredom was a risk factor for anxiety, depression, and stress of the indirectly exposed Chinese adults in the COVID-

19 outbreak. Media use mediated and might help explain the relationships between boredom and stress and anxiety, but not depression. Meaning in life was a first-stage moderator of the relationship, and the mediating effect of media use between boredom and stress and anxiety increased with the increase of meaning in life. Our results suggest to improve the mental health condition in the disaster of the indirectly exposed population, reducing boredom and media use may be helpful, especially those with high sense of meaning in life. Future research should address causal directionality of this association, and the generalization to countries from different cultures.

Contributors

MC designed the study and wrote the draft of the manuscript. XC collected and prepared the data. TL designed the study and conducted the data analysis. HY gave special advice in the study design. BJH critically revised the manuscript for important intellectual contributions. All authors contributed to and have approved the final manuscript.

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