



# How Can the Coping Strategies Mediate the Relationship Among COVID-19 Stress, Depression, and Anxiety?

Jeongsoo Park<sup>1</sup> ✉ and Seon-Cheol Park<sup>2,3,4</sup>

<sup>1</sup>Department of Psychology, Ajou University, Suwon, Republic of Korea

<sup>2</sup>Department of Psychiatry, Hanyang University College of Medicine, Seoul, Republic of Korea

<sup>3</sup>Department of Psychiatry, Hanyang University Guri Hospital, Guri, Republic of Korea

<sup>4</sup>Hanyang Institute of Bioscience and Biotechnology, Hanyang University, Seoul, Republic of Korea

**Objective** The coronavirus disease-2019 (COVID-19) pandemic has had a severe impact on mental health. To explore the underlying mechanisms that influence mental health, a critical question is whether different types of coping strategies may mediate the relationships between COVID-19 related stress and mental health.

**Methods** Recruited between October 19 and 24, 2021, a total of 500 participants aged 20 to 69 years completed an online survey to evaluate the COVID-19 stress, coping orientation, depression and state anxiety. The period corresponded to the highest level of COVID-19 restrictions (level 4) immediately before the adjusted restriction to level 3. Parallel mediation analyses were conducted using structural equation modeling.

**Results** Distinct mediation effects of the COVID-19 stress (i.e., fear of infection, difficulties of social distancing, anger toward others) through three types of coping strategies (i.e., functional, dysfunctional, seeking support) were found. Fear of infection was likely to be related to functional coping and dysfunctional coping. Social distancing model indicated dysfunctional coping and seeking support, while anger toward others model was associated with functional coping and seeking support.

**Conclusion** The results highlight the different relationships between COVID-19 stress and mental health coping strategies. The identification of these mediation pathways offers guidance for designing effective interventions and support systems to promote psychological well-being during challenging times like the COVID-19 pandemic.

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**Keywords** COVID-19; Coping strategies; Mental health; Stress; Intervention.

## INTRODUCTION

The coronavirus disease-2019 (COVID-19) pandemic has changed many aspects of daily life.<sup>1,2</sup> Adjusting to unprecedented social distancing and non-face-to-face online systems, meetings or events have been canceled or held virtually. These changes have induced high rates of depression and anxiety may be induced by social isolation and fear of being infected.<sup>3-5</sup> Specifically, reduced social relationships due to social isolation and fear of infection have led children and adolescents in Asian and Austrian countries to spend more time on the internet and playing online games to cope with negative

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✉ **Correspondence:** Jeongsoo Park, PhD

Department of Psychology, Ajou University, 206 Worldcup-ro, Yeongtong-gu, Suwon 16499, Republic of Korea

**Tel:** +82-31-219-2769, **Fax:** +82-31-219-1618, **E-mail:** jeongsoopark@ajou.ac.kr

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feelings.<sup>6</sup> For adults, the COVID-19 pandemic has caused significant job losses in many countries, leading to higher rates of mental health issues such as depression and suicidal thoughts.<sup>7</sup> In Korea, the higher level of depression symptoms reported in middle-aged adults compared to older adults in Korea may be related to job stability.<sup>8</sup> Despite a higher rate of vaccination and fewer cases per day on average in Korea than in other countries, the COVID-19 outbreak has had a severe impact on mental health, including a high rate of depression (18.8%–29.7%) and anxiety (10.8%–48.8%).<sup>9,10</sup> As the pandemic continues, research on the negative effects of COVID-19 on psychological health has moved to an underlying mechanism to improve mental health.<sup>11-13</sup> Although the negative effects of COVID-19 are evident, where individuals live may influence their well-being. Above all, Korea has controlled COVID-19 without a nationwide lockdown, unlike the United States and Europe.<sup>14</sup> The interaction between institutional efforts, such as contact-tracing measures, including mandatory data sharing in Korea<sup>15</sup> and individuals' functioning (i.e.,

exosystem),<sup>16</sup> would positively or negatively influence one's mental health. These situational specificities within each country suggest that context-specific evidence of COVID-19 is required. Thus, the present study aimed to investigate COVID-19 related stress and mental health issues in Korea.

Despite institutional efforts, the degree to which COVID-19 stress influences mental health varies. For example, engaging in physical activity is associated with better well-being, even during a pandemic.<sup>17</sup> Also, gratitude, optimism, perceived social support, and spirituality are found to be protective factors to reduce unpredictable stress such as COVID-19 in Korea showed a positive effect on individuals who experienced dear of COVID-19 infection in Korea.<sup>18,19</sup> In other words, not all individuals have experienced psychological distress by coping with this pandemic. Previous research has shown that coping is related to psychological well-being.<sup>12,17,20</sup> Thus, understanding what coping strategies in response to this pandemic stress are related to mental health would inform us to implement more adequate support or intervention for COVID-19 stress.

Coping is an individual's cognitive and behavioral response to stressful events.<sup>21</sup> Different coping styles toward stress have been distinguished,<sup>22</sup> which could be either functional or dysfunctional. For example, active coping is related to life satisfaction.<sup>22</sup> Conversely, dysfunctional coping (e.g., denial, disengagement),<sup>23,24</sup> was found to be maladaptive leading to greater depression and anxiety.<sup>25-27</sup> These results indicate that effective coping strategies may lessen the negative effects of COVID-19 on mental health.

Our understanding of coping strategies for COVID-19 related stress and mental health remains limited. Research on previous crises (i.e., SARS)<sup>27,28</sup> and a few studies related to COVID-19 found that a primary factor associated with mental health affected by COVID-19 may be coping.<sup>11-13</sup> Although these studies highlighted the potential role of coping, specific groups of participants (i.e., pregnant women,<sup>11</sup> college students<sup>13</sup>) were investigated. In addition, summed coping strategies against suggestions to create second-order factors<sup>22</sup> reduce the distinct features of coping strategies. Therefore, effective coping strategies are inconsistent across crises and samples.

To address these limitations inherent in previous research, structural equation modeling (SEM) was used to examine second-order factors related to coping strategies and to explore the causal pathways between COVID-19 stress, coping strategies, and mental health in Korean adults. The utilization of SEM enables to test models involving multiple variables and pathways. This framework enhances the precision of parameter estimation and explicitly addresses measurement errors.<sup>29</sup> Thus, the goals of the present study were to 1) determine how COVID-19 stress specific to Korea (i.e., fear of infection, difficulties of social distancing, anger toward

others) is related to coping strategies and 2) identify whether coping strategies may mediate the relationship between COVID-19 stress and mental health. It was hypothesized that the examination of adaptive coping strategies that exhibit variability in response to COVID-19 stress, informing mental health professionals seeking to targeted interventions related to COVID-19.

## METHODS

### Study overviews and participants

Participants were recruited through an anonymous online survey on October 19–24, 2021. A professional survey company via MARKETLINK ([www.marketlink.co.kr](http://www.marketlink.co.kr)) emailed randomly selected lists of targeted gender and age distribution. Electronic written informed consent was obtained from all adult participants at the beginning of the online survey. Each participant (n=500) was compensated with 2,000 points that can be cashed out. The company provided data with all identifiable personal information removed.

The methods used in this study were reviewed and approved by Ajou University Institutional Review Board under 202109-HB-002. All methods were performed in accordance with the relevant guidelines and regulation—the Declaration of Helsinki.

### Measures

#### COVID-19 Stress Scale for Koreans

Given the contextual differences related to COVID-19 in Korea, a COVID-19 stress scale specific to Koreans' experiences during the COVID-19 era was published.<sup>30</sup> The 21 items consist of three factors; fear of infection (nine items; "I am anxious about not knowing when and where I could be infected with COVID-19"), difficulties of social distancing (six items; "As social distancing lasts longer, I feel more disconnected from society"), and anger toward others (six items; "I am angry with people who do not follow quarantine orders"). This scale was developed around 2020, when no Koreans had been vaccinated. However, as the present study was conducted in October 2021, situational changes, such as high vaccination rates (70%) and medical treatment,<sup>31</sup> would have impacted one's perception of COVID-19 stress. After conducting exploratory factor analysis, three items on fear of infection were not included because of low factor loadings (<0.3). Confirmatory factor analysis indicated that the three-factor model fit the data:  $\chi^2(186)=720.295$ ,  $p<0.001$ , root mean square error of approximation (RMSEA)=0.076, 95% confidence interval (CI) [0.070, 0.082], and comparative fit index (CFI)=0.907. Factor loadings ranged from 0.397 to 0.861.

### Brief-Coping Orientation to Problems Experienced

The 28-item Brief-Coping Orientation to Problems Experienced (Brief COPE)<sup>32</sup> measure 24 coping strategies. Participants rate their coping strategies on a scale ranging from 1 to 4: 1 “I haven’t been doing this at all”; 2 “A little bit”; 3 “A medium amount”; and 4 “I’ve been doing this a lot.” By creating second-order factors,<sup>22</sup> three factors were confirmed as mediators in the present study: functional coping that included the subscales of “Planning (e.g., I’ve been trying to come up with a strategy about what to do),” “Positive Reframing (e.g., I’ve been trying to see it in a different light, to make it seem more positive),” “Active Coping (e.g., I’ve been concentrating my efforts on doing something about the situation I’m in),” and “Acceptance (e.g., I’ve been accepting the reality of the fact that it has happened);” dysfunctional coping that included “Denial (e.g., I’ve been saying to myself “this isn’t real),” “Disengagement (e.g., I’ve been giving up trying to deal with it),” “Self-Blame (e.g., I’ve been criticizing myself),” and “Substance Use (e.g., I’ve been using alcohol or other drugs to make myself feel better);” and seeking support that included “Using Emotional Support (e.g., I’ve been getting emotional support from others)” and “Using Instrumental Support (e.g., I’ve been getting help and advice from other people).” The three-factor model fit indices were:  $\chi^2$  (159)=308.448,  $p<0.001$ , RMSEA=0.043, 95% CI [0.036, 0.051], and CFI=0.960. Factor loadings ranged from 0.608 to 0.822.

### Center for Epidemiologic Studies Depression Scale

The 20-item Center for Epidemiologic Studies Depression Scale (CES-D)<sup>33</sup> assesses the presence of depressive symptoms over the past week. Responses range from 0 “rarely or never (less than 1 day)” to 3 “most or all of the time (5–7 days).” The total score ranges from 0 to 30. The Korean version of CES-D was validated.<sup>34</sup> Cronbach’s alpha was 0.933.

### Korean State-Trait Anxiety Inventory (K-STAI)

The STAI state scale consists of 20 items, 35 asking how one feels at a particular moment (e.g., calm, tense); answers are rated on a 4-point scale: 1 “not at all”; 2 “somewhat”; 3 “moderately”; and 4 “very much so.”<sup>35</sup> The total score ranges from 20 to 80. This scale has been translated into Korean and validated.<sup>36</sup> The present study showed a good internal consistency of 0.941.

### Statistical analyses

Descriptive and correlation analyses and exploratory factor analyses were conducted using SPSS 26.0 (IBM Corp., Armonk, NY, USA). To examine confirmatory factor analyses and structural equation modeling, AMOS 22.0 (IBM Corp., Armonk, NY, USA) was used. As suggested by a previous

study,<sup>30</sup> we confirmed the three factors of COVID-19 Stress Scale for Koreans (CSSK) to test three models specific to COVID-19 stress (i.e., fear of infection, difficulties of social distancing, and anger toward others). Rather than combining or using overall scales,<sup>37,38</sup> we created second-order factors<sup>22</sup> and confirmed three coping factors (i.e., functional coping, dysfunctional coping, seeking support). Latent variables from the total scores of the two mental health scales (CES-D and K-STAI) were created. Three structural equation models were tested to explore whether the three coping strategies mediated the relationships between specific COVID-19 stress and mental health. To test the indirect effects, 5,000 bootstrap samples were used to generate percentile bootstrap CIs. As age and gender (coded male=0, female=1) had significant bivariate correlations with CES-D ( $r=-0.10-0.13$ ) and K-STAI ( $r=-0.12-0.12$ ), two sociodemographic variables were included as covariates in all three structural models.

To evaluate each model, the following guidelines were used as measures of good fit:<sup>29</sup> CFI>0.90 (values closer to 1 represent a good fit) and RMSEA<0.05 (<0.08, acceptable fit; values closer to 0 represent a good fit).

## RESULTS

Three SEMs examined the indirect paths from each COVID-19 related stress to mental health through three types of coping strategies (i.e., functional, dysfunctional, and seeking support). All three models yielded a good-to-acceptable model fit.

### Study participant characteristics

As shown in Table 1, the sample consisted of  $n=500$  persons aged 20 to 69 years ( $44.04\pm 13.67$ ). Demographic characteristics, responses to CES-D, K-STAI, and vaccinations were in Table 1. The selected participants completed online surveys between October 19 and 24, 2021. At the time, more than 70% of the population (35.9 million out of 51.3 million) in Korea completed the second vaccination.<sup>31</sup> In the present study, 70.4% of the participants also completed the second vaccination. This period corresponded to the extended COVID-19 restrictions—the highest level 4—through October 31, with the restrictions expected to be lifted to level 3 in November. Level 4 controlled social gatherings before 6 pm, allowing six people to gather, provided that two were fully vaccinated. The limit for gatherings after 6 pm was eight people, provided that four group members were fully vaccinated. The adjusted physical distancing in level 3 also limited the size of private gatherings to 10 people if four fully vaccinated people were included.

**Table 1.** Sociodemographic characteristics of study participants (N=500)

	Value
Age (yr)	44.04±13.67
Gender, female	250 (50.0)
Marital status	
Married	311 (62.2)
Single, not married	170 (34.0)
Others (divorced, separated, etc.)	19 (3.8)
Education	
Less than high school	2 (0.4)
High school	104 (20.8)
Associate's degree	77 (15.4)
Bachelor's degree	275 (55.0)
Master's degree	32 (6.4)
Doctorate degree	10 (2.0)
Monthly household income (\$)	4,719.79±5,519.61
Vaccination	
No	61 (12.2)
1st vaccinated	87 (17.4)
2nd fully vaccinated	352 (70.4)
Mental health	
CES-D	18.43±11.32
K-STAI	25.63±6.89

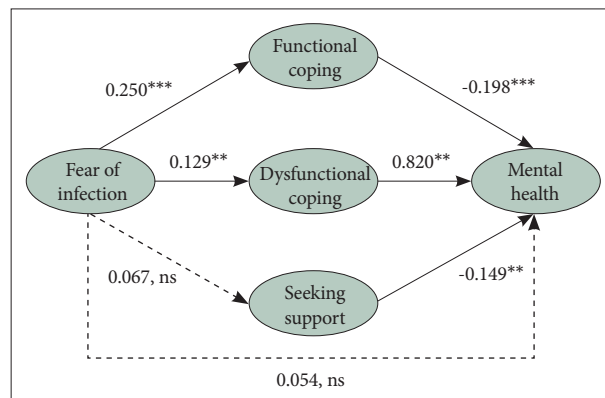
Data are presented as mean±standard deviation or number (%). CES-D, Center for Epidemiologic Studies Depression Scale; K-STAI, Korean State-Trait Anxiety Inventory

### COVID-19 stress-fear of infection

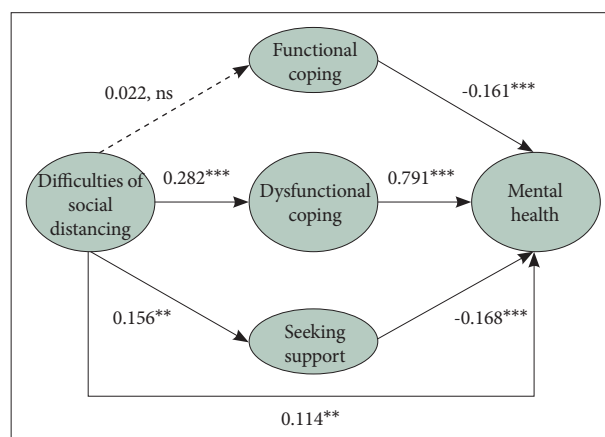
The overall fit of this model was acceptable, with  $\chi^2(382)=967.015$ ,  $p<0.001$ , RMSEA=0.055 [95% CI 0.051, 0.060], and CFI=0.903. As shown in Figure 1, fear of infection was significantly related to greater functional coping and dysfunctional coping but not to seeking support. While functional coping was negatively associated with mental health, dysfunctional coping was positively associated with mental health problems. The findings of this model indicated a significant indirect effect of fear on mental health through functional coping ( $b=-0.686$ , standard error [SE]=0.249, 95% CI [-1.303, -0.303]) and dysfunctional coping ( $b=1.465$ , SE=0.611, 95% CI [0.314, 2.711]), yet not through seeking support ( $b=-0.139$ , SE=0.141, 95% CI [-0.524, 0.063]). In other words, the negative effects of fear of infection are indirectly linked to mental health through reduced functional coping and elevated dysfunctional coping.

### COVID-19 stress-difficulties of social distancing

The model fit was acceptable, with  $\chi^2(382)=1,003.904$ ,  $p<0.001$ , RMSEA=0.057 [95% CI 0.053, 0.061], CFI=0.900.



**Figure 1.** Structural equation model of fear of infection. \* $p<0.05$ ; \*\* $p<0.01$ ; \*\*\* $p<0.001$ .

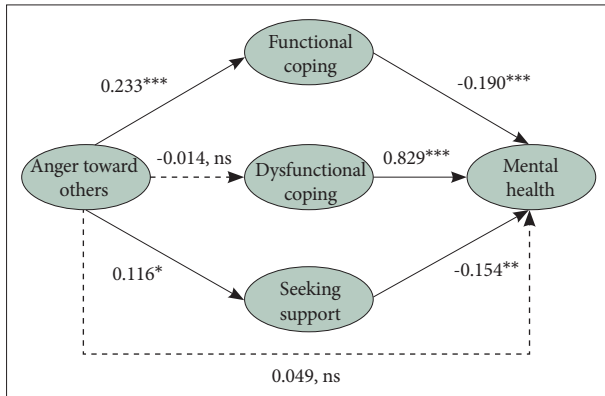


**Figure 2.** Structural equation model of difficulties of social distancing. \* $p<0.05$ ; \*\* $p<0.01$ ; \*\*\* $p<0.001$ .

Greater difficulties in social distancing were significantly associated with dysfunctional coping and support seeking, as shown in Figure 2. More support (i.e., instrumental and emotional) from others was related to better psychological health; conversely, more dysfunctional coping was associated with more severe mental health. Significant indirect effects of social distancing difficulties on psychological health were found through dysfunctional coping ( $b=5.396$ , SE=1.192, 95% CI [3.302, 7.976]) and seeking support ( $b=-1.465$ , SE=0.341, 95% CI [-1.536, -0.157]) but not through functional coping ( $b=-0.086$ , SE=0.274, 95% CI [-0.796, -0.395]). In other words, the negative effects of social distancing are indirectly linked to mental health through reduced support and increased dysfunctional coping.

### COVID-19 stress-anger toward others

The model fit was acceptable, with  $\chi^2(382)=916.597$ ,  $p<0.001$ , RMSEA=0.053 [95% CI 0.049, 0.057], and CFI=0.917. Anger toward others in this model was indirectly linked to mental health through functional coping ( $b=-0.682$ , SE=0.267, 95% CI [-1.395, -0.284]) and seeking support ( $b=-0.274$ ,



**Figure 3.** Structural equation model of anger toward others. \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ .

SE=0.174, 95% CI [-0.763, -0.041]) but not through dysfunctional coping ( $b = -0.173$ , SE=0.679, 95% CI [-1.484, 1.194]). In addition, the non-significant direct relationship between anger toward others and mental health in this model (Figure 3) was indicated only through functional coping and seeking support, and anger toward others had less of an effect on problematic mental health.

## DISCUSSION

This study aimed to investigate the relationship between COVID-19 related stress, coping strategies, and mental health among a sample of Korean adults. Consistent with nationwide studies, COVID-19 stress is related to problematic mental health—depression and anxiety.<sup>9-11,39,40</sup> Three coping strategies (i.e., functional, dysfunctional, and seeking support) mediated the effects of COVID-19 stress on mental health. Importantly, we found that the three different types of COVID-19 stress were associated with distinct coping strategies. For example, where functional and dysfunctional coping mediated the effect of fear of infection on mental health, dysfunctional coping and seeking support mediated the effect of difficulties in social distancing on mental health. These results indicate that, although the negative impact of COVID-19 stress on mental health is evident, coping with stress may lessen or increase mental health problems.

To our knowledge, this is the first study to investigate the coping strategies that mediate stress related to COVID-19 and mental health in Koreans. As the pandemic was unprecedented, earlier studies measured general stress or a single item to examine the extent to which people perceive COVID-19-related stress.<sup>41,42</sup> However, research on COVID-19 should be more specific to better understand and assess COVID-19 stress over time. Each country has different quarantine policies as well as cultural differences, continuing to change policies. For example, South Korea has never experienced a na-

tionwide lockdown. Moreover, a largely homogeneous country such as Korea may be far from the xenophobic violence and discrimination associated with COVID-19.<sup>42</sup> While one study identified fear of COVID-19 and restrictions in daily life as risk factors for depression and anxiety in Koreans,<sup>40</sup> our study confirmed three factors of COVID-19 stress (i.e., fear of infection, difficulties in social distancing, and anger toward others), in line with a prior study conducted in Korea.<sup>31</sup>

The present study also reflects contextual differences in coping strategies. Given the contextual differences of COVID-19, we first examined which coping strategies were specific to the COVID-19 stress of Koreans, confirming three coping strategies (i.e., functional coping, dysfunctional coping, and seeking support). The results of the present study showed a significant difference. For example, where prior studies defined seeking support as emotion-focused coping or problem-focused coping,<sup>11,43</sup> seeking support (emotional and instrumental) was confirmed as a factor in our study. In addition, religious coping was excluded from our study due to low factor loading ( $< 0.3$ ). Given that 56.1% of Koreans are non-religious,<sup>44</sup> our examination to better understand how Koreans cope with COVID-19 stress, which did not use prior classifications of coping strategies,<sup>11,43</sup> were appropriate.

In addition, the present study highlights the distinct relationships between COVID-19 stress, coping strategies, and mental health. As expected, where functional coping and seeking support from others are positively related to mental health, dysfunctional coping is related to problematic mental health. Specifically, we found differences between each COVID-19 stress model. Regarding fear of infection, rather than seeking support from others, people tend to adopt functional and dysfunctional strategies. This preference might be due to the concern that seeking support from others could increase the risk of infection, leading individuals to rely more on other coping strategies. Functional coping strategies such as planning, positive reframing, active coping, and acceptance were highly related to less problematic mental health. In the model of social distancing difficulties, people tended to use dysfunctional coping and seek support from others. Given that social distancing involves interpersonal relationships, seeking support from others is a positive protective strategy for better mental health. These results are consistent with studies that have suggested social bonds and supportive relations are crucial not only for individuals' mental health but also for their resilience in challenging circumstances like the outbreak of COVID-19.<sup>45-48</sup> Interestingly, anger toward others was related to functional coping and seeking support but not to dysfunctional coping. These results indicate that when our study was conducted, anger toward others was able to be addressed with positive strategies. Individuals feeling anger might seek out

support system to mitigate their feelings, rather than turning to maladaptive behaviors. Functional coping strategies, such as planning or problem-solving, as well as seeking support, provide acceptable outlets for anger. Also, Korean culture often emphasizes social harmony. As a result, individuals may feel a cultural obligation to manage their anger in ways that do not disrupt social cohesion. This could discourage dysfunctional coping strategies. These results might mean that although people have been influenced by different aspects of COVID-19 stress, they adapt to it through coping strategies. The present study had several limitations. Although we firstly investigated COVID-19 related stress specific to Koreans and its effects on mental health through coping strategies, our study was cross-sectional. Given that prior research on pathogenic pandemics (e.g., SARS-Cov, MERS-Cov) indicated prolonged effects of pandemics on depression and anxiety,<sup>27,28</sup> future longitudinal studies are needed to follow up on changes in COVID-19 stress, coping, and mental health. In addition, as the CSSK is a new, validated measure, future studies are required to establish three factors. One study in a community sample in Korea identified demographic factors, including insomnia, gender (female), experiencing a significant income decline, self-employment, as correlates of COVID-19 stress.<sup>48</sup> Future studies may explore these demographic variables further to propose more individualized psychological intervention. Also, although our study focuses on the negative effects of COVID-19 on mental health, some individuals may experience post-traumatic growth or new coping strategies in response to the COVID-19 challenges. Future research should explore positive outcomes to provide a more understating of the effects of COVID-19 stress. Finally, our findings may be influenced by context such as policies, cultural norm and social expectation in Korea. For example, Korea's relatively successful management of the pandemic and lack of a nationwide lockdown contrast with the experiences of other countries. Regarding coping strategies, seeking support might be more socially acceptable in Korea, whereas in Italy, seeking social support has been reported to have a negative impact on mental health.<sup>49</sup> These cultural differences should be considered when interpreting our results and applying these to other cultures. Despite these limitations, the present study has implications for psychological interventions targeting COVID-19 stress and mental health in South Korea. The present population-based study on COVID-19 stress and mental health provides evidence to support a response to COVID-19 stress. Furthermore, interventions to increase functional coping (i.e., planning, positive reframing, active coping, and acceptance) and seeking support (i.e., emotional and instrumental) would reduce depression and anxiety in response to crises such as COVID-19.

## Availability of Data and Material

The datasets generated or analyzed during the study are not publicly available due to institutional ownership but are available from the corresponding author on reasonable request.

## Conflicts of Interest

Seon-Cheol Park, a contributing editor of the *Psychiatry Investigation*, was not involved in the editorial evaluation or decision to publish this article. All remaining authors have declared no conflicts of interest.

## Author Contributions

Conceptualization: Jeongsoo Park. Data curation: Jeongsoo Park. Methodology: Jeongsoo Park. Supervision: Jeongsoo Park, Seon-Cheol Park. Writing—original draft: Jeongsoo Park, Seon-Cheol Park. Writing—review & editing: Jeongsoo Park, Seon-Cheol Park.

## ORCID iDs

Jeongsoo Park <https://orcid.org/0000-0001-6444-491X>  
Seon-Cheol Park <https://orcid.org/0000-0003-3691-4624>

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