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Short Communication

Seeking control during uncontrollable times: Control abilities and religiosity predict stress during COVID-19

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ARTICLE INFO

Keywords:

COVID-19 stress
Cognitive control
Religiosity
Self-control
Health locus of control

ABSTRACT

The COVID-19 pandemic has created an urgent need to understand the protective factors that can buffer individuals against psychological distress. We employed a latent-variable approach to examine how control-related factors such as religiosity, self-control, cognitive control, and health locus of control can act as resilience resources during stressful periods. We found that cognitive control emerged as a protective factor against COVID-19-related stress, whereas religiosity predicted a heightened level of stress. These results provide novel insights into control factors that can safeguard individuals' psychological well-being during crises such as a pandemic.

1. Introduction

People across the world are struggling with the impacts of the COVID-19 pandemic, which include the fear of contracting COVID-19 and anxiety about uncertainty, unemployment, and the constraints related to quarantine or lockdown measures (Taylor et al., 2020). It is critical, therefore, that we examine the psychological resources that can buffer against COVID-19-related stress. Given that lack of control over negative life events induces heightened depression and anxiety (Johnson & Sarason, 1978), we examined how religiosity, self-control, cognitive-control abilities, and control beliefs (i.e., health locus of control) could act as psychological resilience factors against COVID-19 stress.

Religion can function as a source of support or reason for disappointment (e.g., unanswered prayers) during difficult times (Pargament, 2002). On one hand, being religious could buffer against stress by providing an interpretative framework, enhancing coping resources, or facilitating access to social support (Siegel et al., 2001). However, specific forms of religious coping that involve a passive shift of problem-solving responsibilities to God may implicate poorer adjustment (Pargament, 2002). Therefore, it remains unclear whether religiosity ameliorates or aggravates COVID-19 stress.

Self-control, which facilitates adaptive stress responses, may serve as a resilience factor against COVID-19 stress. Previous studies suggest that individuals with high self-control tend to experience fewer stressors due to their habitual avoidance of temptation (Galla & Duckworth, 2015). Accordingly, high self-controllers may find it easier to regulate their

behaviors in line with various measures to limit the spread of COVID-19, and thereby experience lower COVID-19 stress.

Similarly, cognitive control—such as working memory capacity, which supports goal-directed behaviors (Hofmann et al., 2008)—may facilitate adaptive coping with COVID-19 stress. Studies have shown that cognitive control undergirds cognitive reappraisal and emotion regulation abilities, which are critical in alleviating psychological distress (Schmeichel & Tang, 2015). Thus, we predicted that individuals with better cognitive-control abilities would experience lower COVID-19 stress.

Aside from the domain-general control factors described above, we sought to understand how domain-specific control beliefs such as health locus of control (HLOC) would influence COVID-19 stress. HLOC has three facets: internal, powerful others, and chance. Individuals with high internal HLOC believe that their own behaviors influence their health status, whereas individuals with high external HLOC believe that powerful others or “chance” factors (e.g., luck and fate) are more critical (Wallston et al., 1978). Past studies suggest that individuals holding external HLOC beliefs are more vulnerable to stress than those holding internal HLOC beliefs (Hutner & Locke, 1984). Given the instrumentality of control beliefs, we hypothesized that individuals' HLOC would be pertinent to COVID-19 stress.

Taken together, we set out to examine how control factors would predict COVID-19 stress when the pandemic was spreading at an alarming rate locally. To this end, we employed a rigorous latent-variable approach to obtain unbiased estimates of the relations while controlling for measurement errors.

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2. Method

2.1. Participants

Two hundred and seventeen Singaporean undergraduate students participated in the study ($M_{age} = 21.9$ years, female = 73.3%; see Table S1 and S3 in Supplementary materials for details). All procedures were approved by the university's institutional review board.

2.2. Measures

2.2.1. COVID-19 stress

Participants rated their COVID-19-related stress using four items ($\alpha = 0.576$): (a) "How stressful is the recent COVID-19 outbreak for you?" (1 = *Not at all*, 5 = *Very much*); (b) "When did you start becoming more stressed about the COVID-19 outbreak?" (1 = *Starting this week*, 6 = *More than 5 weeks ago*—i.e., before the first locally reported case); (c) "How much do you think your daily life is constrained or affected by the recent COVID-19 outbreak?" (1 = *Not at all*, 5 = *Very much*); and (d) the reasons (e.g., under a quarantine order) for the stress/constraints they felt due to COVID-19. Higher scores indicate greater stress.

2.2.2. Religiosity

Individual differences in religiosity were assessed using an adapted four-item scale from the World Values Survey ($\alpha = 0.896$): (a) "Apart from weddings and funerals, about how often do you attend religious services these days?" (1 = *Never, practically never*, 7 = *More than once a week*); (b) "Apart from weddings and funerals, about how often do you pray?" (1 = *Never, practically never*, 7 = *More than once a week*); (c) "Independent of whether you attend religious services, how religious would you say you are?" (1 = *Not at all*, 5 = *Very much*); (d) "How important is God in your life?" (1 = *Not at all important*, 5 = *Extremely important*). Higher scores indicate greater religiosity.

2.2.3. Self-control

Participants' self-control was assessed using a 13-item brief trait self-control scale (1 = *Not at all*, 5 = *Very much*; $\alpha = 0.826$; Tangney et al., 2004). Higher scores indicate greater self-control.

2.2.4. Cognitive control

Participants' cognitive control was assessed using three complex span tasks: rotation, operation, and symmetry (Spearman-Brown coefficients = 0.636–0.706; Foster et al., 2015). The tasks were similar, in that participants were directed to remember a list of items (e.g., a sequence of letters) while completing a distractor task (e.g., identifying the correctness of a rotated alphabet). The number of trials varied from two to seven, and participants were instructed to complete the tasks as fast as possible. The total number of correctly remembered items (in the correct order) indexed participants' performance.

2.2.5. Health locus of control (HLOC)

Participants' HLOC was assessed using the multidimensional HLOC scale (1 = *Strongly disagree*; 6 = *Strongly agree*; Form A; Wallston et al., 1978). Three six-item subscales were used to assess internality ($\alpha = 0.791$; e.g., "I am in control of my health"); powerful-others externality ($\alpha = 0.723$; e.g., "Health professionals control my health"); and chance externality ($\alpha = 0.731$; e.g., "If it's meant to be, I will stay healthy").

2.2.6. Covariates

Participants' age, sex, monthly household income, perceived health, and neuroticism served as covariates.

3. Results

3.1. Measurement models

Model fits were assessed using Hu and Bentler's (1999) fit criteria. For COVID-19 stress and religiosity, respectively, we fitted a one-factor model to the data, with their corresponding four scale items as indicators. For self-control, we fitted a one-factor model with four parcels as indicators; parcels were formed according to the 13 scale items' factor loadings. For cognitive control, we fitted a one-factor model, with the three tasks as indicators, to the data. For HLOC, we first fitted a three-factor model to the data, with scale items as indicators of the respective factors, but the model fit was unacceptable, similar to previous findings (e.g., Kassianos et al., 2016). Given that parcelling offers better psychometric properties (Little et al., 2002), we fitted a two-factor model with internality (based on its scale items) and externality factors (based on four parcels formed by items from highly correlated powerful-others and chance subscales, $r > 0.80$). All individual measurement models displayed acceptable or perfect model fit (see Table A1 in the Appendix for fit indices). The full measurement model, containing all of the established individual measurement models (see Fig. S1), also showed acceptable model fit.

3.2. Structural equation models

To examine how individual differences in religiosity, self-control, cognitive control, and HLOC predicted COVID-19 stress, we performed a structural equation analysis. We found that only religiosity ($\beta = 0.203$, $SE = 0.082$, $p = .013$) and cognitive control ($\beta = -0.287$, $SE = 0.092$, $p = .002$) significantly predicted COVID-19-related stress. Next, we tested the adjusted model including the covariates (age, sex, perceived health, monthly household income, and neuroticism). The results remained similar. Religiosity ($\beta = 0.192$, $SE = 0.083$, $p = .020$) and cognitive control ($\beta = -0.222$, $SE = 0.096$, $p = .021$) still significantly predicted COVID-19 stress. Self-control ($\beta = 0.012$, $SE = 0.091$, $p = .895$), HLOC-internality ($\beta = 0.112$, $SE = 0.089$, $p = .207$), and HLOC-externality ($\beta = 0.116$, $SE = 0.090$, $p = .199$) did not predict COVID-19 stress (see Fig. A1 in the Appendix).

4. Discussion

Our findings demonstrate that religiosity, cognitive control, self-control, and HLOC are differentially related to COVID-19 stress. Notably, we found that better cognitive control predicted lower COVID-19 stress. Cognitive control likely facilitates the downregulation of negative affect through cognitive reappraisal (Schmeichel & Tang, 2015), which allows the reframing of negatively valenced events to modulate emotional experiences. Accordingly, higher cognitive control increases the ability to reappraise COVID-19 consequences (e.g., changes in modes of learning and assessment in school), and thereby attenuates perceived stress. This is corroborated, in part, by past findings that more proficient working memory performance is associated with better ability to reappraise negatively valenced stimuli (Schmeichel & Tang, 2015) and that better reappraisal processes are related to lower perceived stress (Jamieson et al., 2013). Moreover, cognitive control may engender more efficient and adaptive goal management, particularly in difficult situations, which lessens COVID-19 stress. For instance, individuals with lower cognitive control demonstrate lapses in goal maintenance, such as procrastination and failures in sustaining task goals (Gustavson et al., 2015), which likely lead to higher stress from the inability to manage challenging circumstances. Therefore, our findings demonstrate that cognitive control may be a protective factor against COVID-19 stress.

Notably, we found that religiosity did not emerge as a protective factor against COVID-19 stress; higher religiosity was concomitant with greater COVID-19 stress. This could be because religious individuals'

commitment to in-person participation in religious services and gatherings likely engenders greater conflicts and stress due to the risk of contracting COVID-19. Moreover, our study was conducted when COVID-19 had just begun to spread within the country, and cautionary regulations (e.g., wearing masks, social distancing measures) were not yet implemented. Thus, the impeded desire for in-person religious activities coupled with the fear of COVID-19 transmission could result in heightened stress. Alternatively, religious individuals' COVID-19 stress may stem from intrinsic religious struggles such as unanswered prayers for peace and protection (Pargament, 2002) and continued uncertainty.

In contrast, we found that HLOC and self-control were not associated with COVID-19 stress. Considering that medical knowledge of COVID-19 is still evolving (Kucharski, 2020), preexisting control beliefs about general health conditions and self-regulatory behaviors may not effectively mitigate COVID-19 stress. Alternatively, our null findings may be because general health beliefs lack predictive power for specific health domains, such as particular types of diseases (Luszczynska & Schwarzer, 2005). Nevertheless, more research is needed to understand the mechanisms underlying the associations between religiosity, self-control, HLOC, and COVID-19 stress.

Our study has several limitations. First, our use of the generic measure of religiosity could not capture intrinsic (i.e., living according to religious teachings) and extrinsic (i.e., using religion to achieve non-religious goals) religious orientations. Given that past research has shown that intrinsic, relative to extrinsic, religious orientation better predicts psychosocial outcomes (e.g., depression; Milevsky & Levitt, 2004), future work should examine how different religious motivations could modulate COVID-19 stress. Further, given that our study did not delineate between in-persons versus online religious gatherings and relied on self-reports, future studies should use more objective measures

of religiosity (e.g., an experience sampling method). Second, since complex span tasks capture working memory processes, future research should consider other cognitive-control factors (e.g., inhibition and shifting)—which have been shown to be similarly implicated in cognitive reappraisal (Schmeichel & Tang, 2015)—that may ameliorate COVID-19 stress. Third, our results, based on a relatively homogeneous undergraduate sample, may have limited generalizability and potentially contribute to the less than ideal reliability of our COVID-19 stress scale. However, it should be noted that our use of latent-variable analysis minimizes the problems associated with low reliability by accounting for measurement errors and yielding a purer estimate of the construct of COVID-19 stress. Nevertheless, future research should extend our findings to other populations (e.g., middle-aged adults) who may face different COVID-19 challenges.

CRediT authorship contribution statement

Shuna Shiann Khoo: Conceptualization, Methodology, Project administration, Data curation, Formal analysis, Writing – original draft, Writing – review & editing. **Wei Xing Toh:** Writing – original draft, Writing – review & editing. **Hwajin Yang:** Conceptualization, Methodology, Supervision, Formal analysis, Writing – original draft, Writing – review & editing, Funding acquisition.

Acknowledgements

This study was supported by a grant awarded to Hwajin Yang by Singapore Management University through a research grant (19-C242-SMU-019) from the Ministry of Education Academy Research Fund Tier 1.

Appendix A

Table A1

Model fit indices for measurement and structural models.

	χ^2	df	RMSEA	CFI	SRMR
Measurement models					
COVID-19-related stress	3.92	2	0.067	0.98	0.027
Religiosity	0.37	1	0.000	1.00	0.003
Self-control	4.17	2	0.067	0.99	0.015
Cognitive control	0.00	0	0.000	1.00	0.000
Health locus of control	58.73	33	0.060	0.96	0.053
Full measurement model	316.36**	258	0.030	0.97	0.054
Structural models ^a					
Unadjusted	316.36**	258	0.030	0.97	0.054
Adjusted	516.97***	378	0.041	0.93	0.065

^a The unadjusted model did not include the covariates of age, sex, monthly household income, perceived health, and neuroticism; the adjusted model included these covariates.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

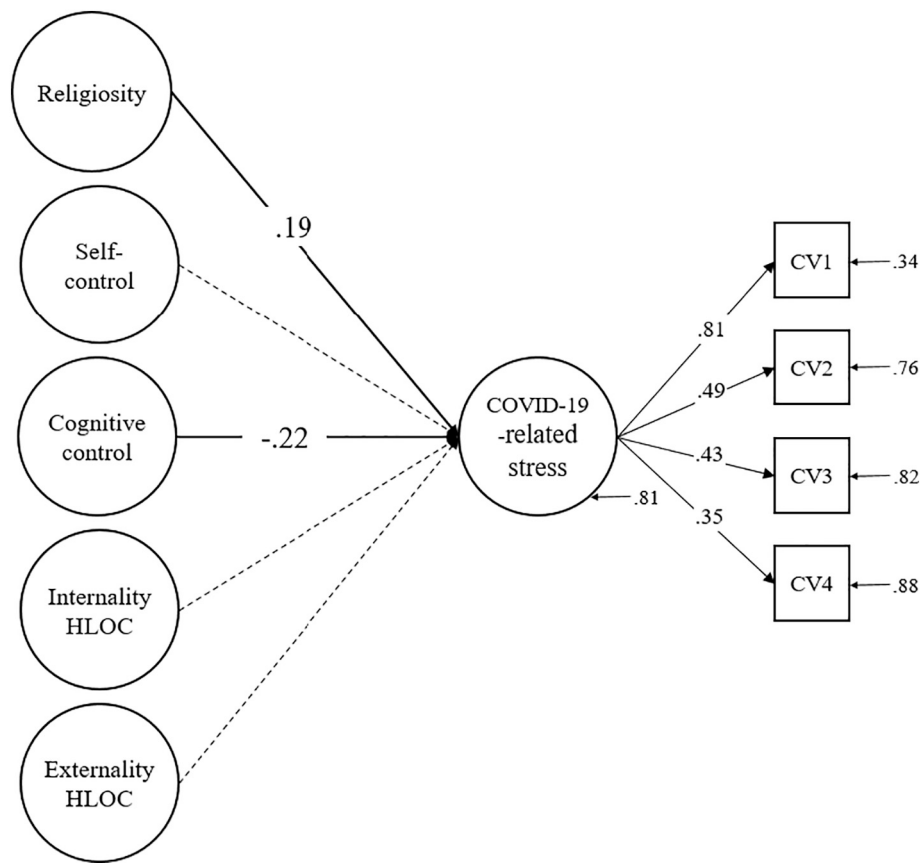


Fig. A1. Adjusted structural model of control-related individual differences predicting COVID-19-related stress. Circles represent latent factors. Squares represent indicators; CV1 – CV4 are scale items of COVID-19-related stress. Indicators for the predictors and covariates (age, sex, perceived health, monthly household income, and neuroticism) are not depicted for brevity. Values on the longer arrows signify path coefficients. Values for the shorter arrows represent residual variances. All coefficients shown are standardized and obtained statistical significance at the 0.05 level. Dotted lines indicate nonsignificant pathways.

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