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WORRY MUCH?: PREVENTIVE HEALTH BEHAVIOURS RELATED TO WORRY ACROSS COUNTRIES AMID COVID-19

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Worry Much? Preventive Health Behaviours Related to Worry Across Countries Amid COVID-19

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Abstract

The heterogeneous spread of COVID-19 around the world has led to differing mental health impacts across countries. This is on account of varying state responses to curbing the pandemic as well as differences in individual preventive health behaviours. The present study examined the relationship between worry and health behaviours using secondary data from an online survey of nearly 70000 respondents from 33 countries. We hypothesized that preventive health behaviours would predict the level of worry experienced, which in turn would predict future health behaviours. Further, to account for cultural differences, regression analyses included a metric of cultural distance from the US. Past behaviours such as avoiding social gatherings, maintaining physical distance, and regular hand washing predicted higher worry, whereas staying at home negatively predicted worry. In general, being culturally distant from the US was associated with significantly lower worry. Results also showed that avoiding social gatherings and maintaining physical distance predicted less worry among respondents in countries culturally distant from the US. In contrast, reporting symptoms increased worry in such countries. Worry, in turn, differentially predicted whether individuals would leave their home in the next 5 days, reducing the likelihood of stepping outside (more so for "bad" behaviours such as for expressing personal freedoms and meeting others socially). However, being culturally distant from the US was not associated with (future) going out behaviours. Findings are discussed from a cross-cultural perspective, analysing worry as an approach-avoidance motivator of health-related behaviour. Capitalizing on cultural differences in approach-avoidance motivations is suggested to help inform health communication strategies.

Keywords: approach-avoidance; COVID-19; cross-cultural; preventive health behaviours; public health; worry

Worry Much? Preventive Health Behaviours Related to Worry Across Countries Amid COVID-19

The novel coronavirus (COVID-19) has spread to over 215 countries and territories across the globe; at the time of writing, there are nearly 72 million confirmed cases worldwide and over 1.6 million deaths due to the virus (Dong et al., 2020). In order to contain the spread, some nations have enforced lockdown restrictions and strict social distancing guidelines in an effort to "flatten the curve." This paper compares the behavioural and psychological outcomes associated with state-sanctioned measures to curb the spread of COVID-19, using online survey data from respondents in 33 countries. Several of these nations enforced lockdown measures early and swiftly to control the spread of the virus. Typically, this involves restricting movement of citizens, closing of non-essential businesses and service providers, and prohibiting social events. Further, regular communication from national health agencies has emphasized the importance of handwashing, avoiding public gatherings, and maintaining sufficient (at least 2 meters) distance from others as preventive measures.

In addition, the countries represented different cultures, ranging from those that were culturally similar to the USA and others that were more culturally distant (see also Muthukrishna et al., 2020). The former countries are typically referred to as WEIRD (Western, Educated, Industrialized, Rich, and Democratic), whereas the latter are non-WEIRD. There has been a recent emphasis on expanding psychological and behavioral research beyond WEIRD samples (e.g., Henrich et al., 2010; Rad et al., 2018). This also applies to mental health outcomes such as worry, which has been found to vary across cultures (Marques et al., 2011). Similarly, incorporating socio-cultural context in examining the determinants of health behaviours has been recommended (Kagawa Singer, 2012). In line with a more inclusive research design, the present investigation also

factored in cultural distance from the US when examining preventive health behaviours and worry in the context of COVID-19.

The pandemic has resulted in several new behaviours being recommended, some of which require the formation of new habits (social distancing) or reinforcing earlier habits (handwashing). Such behaviour patterns are likely to have consequences on daily lives, including the extent to which people worry, not just about adhering to new norms, but also regarding their health more broadly. Past research found that higher anxiety was associated with complying with health behaviours, such as wearing a face mask in public, among the residents of Great Britain (Rubin et al., 2009) and Hong Kong (Liao et al., 2014) during the H1N1 flu outbreak in 2009. Given the stressful nature of adopting and maintaining new health behaviours (McKenzie & Harris, 2013), the first research question posed was:

RQ1: *Do past health behaviours related to COVID-19 affect the extent to which people worry in countries culturally similar to the US versus those culturally different from the US?*

In a similar vein, worry can also motivate future compliance with sustaining healthy behaviours (Sweeny & Dooley, 2017) as it is associated with adaptive preparation and planning (Watkins, 2008). From an evolutionary perspective, affective experiences like worry can facilitate adaptation by triggering approach and avoidance behaviours ((Tooby & Cosmides, 2008). Individuals might adopt a cost-benefit analysis to determine whether to move toward or away from a stimulus. In such cases, emotions like worry could help in promoting adaptive behaviour. Research has suggested that such approach-avoidance motivations vary by culture (Elliot et al., 2001; Hamamura et al., 2009): persons from individualistic cultures are often motivated by approaching positive outcomes, whereas those from collectivistic cultures tend to be motivated by avoiding negative outcomes. This is likely on account of differences in information processing, with individuals from collectivist cultures paying more attention to the presence or absence of

unfavourable information, whereas those from individualistic nations are prone to paying attention to the presence or absence of favourable information (Hamamura et al., 2009). This is also supplemented by evidence that individuals from collectivist cultures engage in more avoidance-regulation as a goal, relative to those from individualistic cultures (Elliot et al., 2001). For instance, social support networks, beliefs in superstitions, among various other factors, have been found to be important for managing health-related stress in Indian samples, relative to their British counterparts (Jobanputra & Furnham, 2005). Moreover, research has found that disease threat perception varies across countries and cultures (De Zwart et al., 2009), thereby impacting the behavioural outcomes associated with the same. Therefore, the second research question posed was:

RQ2: *Does the level of worry affect future behaviours in countries culturally similar to and differed from the US, specifically the likelihood of leaving the house during the pandemic?*

The present study was an exploratory analysis using a sample of countries that were culturally similar to or different from the US. The effects on and of worry with respect to past and future health behaviours was investigated from a cross-cultural perspective.

Method

This study used data from an international survey of COVID-19 perceptions and behaviours by Fetzer et al. (2020) conducted between 20 March and 16 April, 2020. The survey contains information on past and future behaviours related to COVID-19, personal attitudes about coronavirus measures taken by governments, and perceptions about others' beliefs, government response, and their efficacy. It also canvassed information on worries, depression, and personality, alongside socio-demographic information from all participants. As of April 27, 2020, 113,362 participants from 179 countries had participated in the online survey. This study considered only

those countries that had at least 200 participants as of April 16, which yielded 107,815 participants from 58 countries. Furthermore, when data on cultural distance from the US is combined with the survey data, the final sample size reduces to 72,700 participants from 33 countries.

Participants

Nearly 56% of all respondents in the final sample were women. The average age of respondents varied between countries, with the average age being 38.26 years, with a standard deviation of 12.92. As the survey was conducted online, sample weights constructed by Fetzer et al. (2020) were used in the analyses to ensure representativeness of data. For more details on the construction of the weights, we refer the reader to Fetzer et al. (2020).

Measures

A composite measure of worries was constructed using five individual items from the scale for each respondent. The worries index was moderately consistent across countries, $\alpha = .58$). All variables were standardized in line with the procedure outlined in Fetzer et al. (2020) for ease of interpretation.[1] Applicability of past COVID-19-related behaviour (staying at home, maintaining social distance, avoiding social gatherings, informing others of exhibited symptoms, and frequent handwashing) were included as individual standardized measures. Questions on future behaviours (going out for work, physical activity, purchasing medicines, providing care, or to express freedom, among other reasons) were used to construct a composite, standardized index which measured likelihood of engaging in future behaviours that involved violating shelter-in-place instructions (that may have been in effect at the time).

Control Variables

[1] Data on additional measures, such as the Big Five personality traits, were available but had low reliability; Cronbach's alpha ranged from .28 to .67. Prior research has indicated less than favourable personality measurement and assessment using this Ten-Item Personality Inventory (e.g., De Francisco Carvalho et al., 2012).

This included standardized variables that measured age (in years), income (in local currency), number of household members, years of education completed, and health status (measured via an item that asks "How healthy are you?", and responses ranged on the scale of 1 = *poor* to 4= *excellent*. Binary indicator variables for gender (1 = women) and marital status (1 = married) were also included. The number of coronavirus cases at the time of survey completion was used as an additional control in all regressions.

Model Specification

This study hypothesised that the worries index would be explained by past engagement in COVID-19-related behaviour, as moderated by cultural distance from the United States. Thus, to answer RQ1, an ordinary least squares (OLS) regression model was estimated, where the worries index was the dependent variable, and past COVID-19 behaviours were interacted with cultural distance (a continuous variable) as explanatory variables, with the aforementioned controls. To address RQ2, the index of future behaviours (with regard to movement outdoors) was the dependent variable and the worries index was used as an independent variable, and also interacted with cultural distance from the US alongside controls. In all estimations, country weights provided by Fetzer et al. (2020) were used and estimations were run using Stata 16.0.

Results

Table 1 presents the sociodemographic profile of participants across countries. Table 2 displays the results of the regression predicting worry on the basis of engagement in past health behaviours interacted with cultural distance from the US (RQ1). Linear associations of past behaviours with the worries index are discussed first, followed by the interaction effects. Past behaviours such as avoiding social gatherings, maintaining physical distance, and regular hand washing predicted higher worry; whereas staying at home negatively predicted worry. In linear

terms, being culturally distant from the US was associated with significantly lower worry. Among interaction effects, avoiding social gatherings and maintaining physical distance predicted less worry among respondents in countries culturally distant from the US. In contrast, reporting symptoms increased worry in such countries.

Table 1 here

Table 2 here

Table 3 presents the results of the regression predicting future behaviours pertaining to leaving the house in the next 5 days for various good reasons (e.g., to provide care to others), bad reasons (e.g., meeting friends), and a combined measure of good and bad behaviours, based on the level of worry and its interaction with cultural distance to the US (RQ2). A higher score on the worries index was associated with a reduced likelihood of leaving the home in the next 5 days (more so for "bad" behaviours such as for expressing personal freedoms and meeting others socially). Unlike the worries index, being culturally distant from the US was not significantly associated with (future) going out behaviours. For individuals in countries culturally distant to the US, a higher score on the worries index was associated with a greater likelihood of leaving the house. There is a small difference between going out for 'good' reasons and 'bad' reasons.

Table 3 here

Discussion

The purpose of this investigation was to determine the relationship of worry as an outcome of past behaviours and as a predictor of future behaviours related to the ongoing coronavirus pandemic across cultures. Using data from a cross-section of participants from 33 countries, similarities as well as differences were noted in behavioural and affective responses. In general, engaging in past health behaviours such as avoiding social gatherings, maintaining social distance,

and frequent handwashing increased the level of worry experienced. Estimating a spatial distance of 2 metres constantly required additional cognitive capacities, such as the application of conscious control on a seemingly automatic social activity (Bargh & Chartrand, 1999). For instance, Johnson et al. (2009) found that having varying goals (e.g., urgency) affects the estimation of spatial distances, as well as subsequent sense of anxiety.

Similarly, more worry was associated with higher frequency of handwashing across all respondents. This may be possibly due to the fact that regular and frequent handwashing was one of the earliest interventions communicated by the WHO as well as national health agencies across countries. In general, a positive association has been found between experiencing worry during an outbreak and handwashing behaviours (e.g., Rubin et al., 2009; White et al., 2020), largely motivated by fear and disgust sensitivity to avoid pathogens (see also Curtis et al., 2011). On the other hand, staying at home lowered worry; it is important to note that the data used in the current analysis was from the early months of the pandemic, where stay-at-home orders may have not yet had long-term effects on mental health. However, subsequent research has identified dire impacts on mental health as a result of state-sanctioned stay-at-home orders (e.g., Tull et al., 2020). Less worry was also associated with cultures more dissimilar to the US. This is consistent with earlier research identifying lower prevalence rates of anxiety disorders in Asian, Latin American, and African-American populations than in White populations (Marques et al., 2011). One of the reasons for this discrepancy could be that in current conceptualizations of worry and anxiety that do not adequately represent somatic complaints more frequently reported in cultures distant from the US.

When health behaviours and cultural distance were considered in conjunction, it was found that past health behaviours (avoiding social gatherings and maintaining physical distance) predicted less worry among respondents in countries culturally distant from the US. By avoiding public gatherings, individuals in such nations were adhering to the binding moral foundations of

ingroup/loyalty and authority, indicative of a socially oriented moral stance (Jia & Krettenauer, 2017; Khan & Stagnaro, 2016). This may have impacted the experience of worry, as avoiding social interactions could have been perceived as contributing to the collective good. Such participation could have led to greater self-worth, potentially reducing worry (Becker et al., 2011). On the other hand, cultures similar to the US tend to be individualistic in nature; thus, it is likely that personal freedoms are highly valued. Further, those who hold liberal opinions tend to be WEIRDer than conservatives, even if they belong to the same country (Talhelm et al., 2015). Overall, this implies that restricting personal freedoms (such as freedom of movement) could be associated with experiences of greater worry.

In contrast, reporting symptoms increased worry in countries culturally distant from the US. This was consistent with past evidence on health behaviours during pandemics (Bish & Michie, 2010), where anticipated, experienced, and current worry were positively associated with protective health behaviours (Liao et al., 2014). Further, it is likely that individuals in non-WEIRD countries who reported symptoms may experience worry on two accounts: first, due to the potential virus transmission that may be leading to symptoms, and/or second due to variations in public trust in health care systems (Zhao et al., 2019). However, the present investigation did not consider the latter.

Worry was perceived differently as an approach or avoidance motivator (Roth & Cohen, 1986) across countries, where more worry reduced the likelihood of leaving home in the next five days, for both good and bad reasons. In general, cultural distance from the US did not impact future going out behaviours. However, when both worry and cultural distance were considered together, greater worry implied leaving the house more in countries culturally distant from the US. In such non-WEIRD countries, worry motivated individuals to go out of their homes for various prosocial and selfish reasons to maintain existing relationships. Non-WEIRD nations are relatively more

collectivist than their WEIRD counterparts, with thicker social networks based on higher relational and communal behaviour (Hofstede Insights, 2020). At the same time, due to cultural differences in threat perception, worry may not have been at a high enough level to prevent leaving the house. On the other hand, greater worry indicated that citizens in countries culturally similar to the US would stay at home, consequently avoiding the virus. Research has shown that there is adaptive benefit to this kind of worry, which can facilitate taking more precautions concerning health behaviours, due to an increased processing of the threat (Notebaert et al., 2014). Further, WEIRD countries are relatively more individualistic, with an emphasis on a lower degree of interdependence within networks in society.

Capitalizing on such differences in approach-avoidance motivations across cultures can help inform health communication strategies (Sherman et al., 2011). For instance, highlighting potential losses from not following stay-at-home instructions (e.g., contracting the virus, transmitting the virus to loved ones) may be more effective in collectivistic cultures motivated to avoid negative consequences. Likewise, emphasizing potential gains from engaging in health behaviours (e.g., protecting oneself and loved ones) may be more successful in individualistic cultures driven toward positive consequences. Such congruence between approach-avoidance motivations and health message framing increases compliance with health-oriented behaviour (e.g., Sherman et al., 2006).

Limitations and Conclusion

The study was not without limitations. First, the survey data was cross-sectional in nature and did not provide longitudinal estimates of the quarantine behaviours or of worry. Future waves of data can be appended to the current study as and when they become available. Second, most data were collected before 3 April, suggesting that there may be a lag in the behavioural and emotional consequences of the lockdown which this study does not address. Third, other relevant variables like self-efficacy with respect to health behaviours, personality, and public trust in health

systems could influence the relationship between worry and past/future behaviours; subsequent research can explore such associations.

In sum, this study highlighted the behavioural antecedents and consequences of worry among respondents from 33 nations, with reference to the ongoing COVID-19 pandemic. Cross-cultural differences in approach-avoidance motivations can help inform appropriate health policy responses in WEIRD and non-WEIRD countries.

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Table 1: Sociodemographic characteristics of participants

Variables	Mean	SD
Worries index	16.95	3.616
Stayed at home	79.16	25.96
Avoided social gatherings	89.45	25.12
Maintained distance of two metres	73.12	29.24
Informed others if exhibiting symptoms	92.46	19.48
Washed hands more frequently	91.60	19.77
Going to work	0.248	0.432
Walking a pet	0.0854	0.279
Doing physical activity (e.g. exercising, jogging)	0.199	0.399
Procuring food for yourself or family	0.509	0.500
Going to the pharmacy	0.169	0.375
Going to the hospital / receiving medical treatments	0.0570	0.232
Taking care of dependents	0.0749	0.263
Overall "good" behaviours	0.834	1.023
Meeting friends or relatives	0.0562	0.230
Getting tired of being inside of the house	0.0914	0.288
Getting bored	0.0433	0.204
Getting some adrenaline (from breaking the law)	0.00153	0.0390
Exercising my freedom	0.0221	0.147
Overall "bad" behaviours	0.214	0.613
Years of education completed	16.73	4.282
Share of married respondents	0.56	0.49
Household size	2.95	1.74
Share of female respondents	0.56	0.49
Proportion reporting 'poor' health	0.017	0.13
Age in years	38.27	12.93
Average confirmed COVID cases per capita per day	0.172	0.227
Observations	72,700	

Table 2: Effects of Past Behaviour on Worries Index

VARIABLES	(1) Standardized Worries index
Stayed at home	-0.0405**
Avoided social gatherings	0.146***
Maintained distance of at least two metres to others	0.0913***
Informed others if exhibiting symptoms	-0.0120
Washed hands more frequently	0.130***
Cultural distance to US	-2.326**
Interaction effects	
Stayed at home * Cultural distance	0.932
Avoided social gatherings * Cultural distance	-2.020***
Maintain distance * Cultural distance	-1.030**
Informed others if exhibiting symptoms * Cultural distance	0.558***
Washed hands more frequently * Cultural distance	0.125
Observations	69,033
R-squared	0.121

Coefficients reported are from ordinary least squares regressions that also included individual controls (standardized) of age, years of education completed, marital status, income (in local currency), household size, health status, and gender. Also includes the number of coronavirus cases at the time of taking the survey. Both regressions are run using country weights computed by Fetzer et al. (2020). *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Table 3: Effect of Worries Index on Future Behaviours

VARIABLES	(2) Bad going out behaviours	(3) Going out behaviours	(4) Good going out behaviours
Cultural distance to US	-1.707	-1.314	-0.680
Standardized Worries index	-0.156***	-0.144***	-0.0925***
Worries Index * Cultural Distance	0.980**	1.386***	1.200***
Observations	69,033	69,033	69,033
R-squared	0.033	0.054	0.064

Coefficients reported are from ordinary least squares regressions that also included individual controls (standardized). *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$