



Cross-country differences in anxiety and behavioral response to the Covid-19 pandemic

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ABSTRACT

The Covid-19 pandemic is affecting health, social, mental, and economic well-being worldwide, and taking precautions and co-operation is crucial at the individual level. Using data from various sources, this study examines cross-country differences in anxiety levels and behavioral responses to the Covid-19 pandemic. Specifically, I investigate how economic preferences and development at the country-level are associated with anxiety and behavioral response and whether these factors explain contextual differences. Results show that anxiety was less common among more patient and developed societies. Yet, altruistic societies suffered more from anxiety. Higher levels of positive reciprocity and trust were also associated with stronger health-protective behavioral responses. These findings are important in eliciting the consequences of the Covid-19 pandemic for different societies during the ongoing pandemic.



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Introduction

The Corona Virus Disease 2019 (Covid-19) has been classified as a pandemic by the World Health Organization (WHO 2020a). It was first reported in December 2019, in Wuhan/China (Huang *et al.* 2020). Within the three months, the virus spread to more than 120,000 cases and caused 4291 deaths in 144 countries and has eventually affected all continents except Antarctica (Van Bavel *et al.* 2020). The crisis has affected everyday life substantially and cities are locking down, schools are closing, and individuals are asked to work from home to slow the spread of the infections (OECD 2020).

Co-operation is crucial to ending the pandemic. This is supported by previous literature showing the importance of individual-level preventive

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measures in curbing and restraining the spread and strength of infection (Jang *et al.* 2019). The WHO (2020b) also emphasized the importance of precautionary measures on an individual level. Together with this, global health campaigns have emerged to break the exponential curve of the spread by physical distancing, wearing masks, increasing handwashing, and reducing face touching, given that the virus spreads rapidly from person to person (Huang *et al.* 2020; Wang *et al.* 2020).

Beyond the impacts on physical health, employment, and income (OECD 2020), previous literature suggests that the mental well-being of individuals is affected noticeably during outbreaks of communicable diseases (Taylor 2008; Tucci *et al.* 2017; World Health Organization 2020c). In the same vein, the newness and the unknown of the Covid-19 pandemic together with the instantaneous changes in mortality statistics may affect individuals' mental well-being leading to heightened fear, worry, and stress (World Health Organization 2020c). Indeed, early evidence suggests that the Covid-19 outbreak has triggered anxiety and influenced mental well-being negatively (Adams-Prassl *et al.* 2020; Davillas and Jones 2020).

Previous literature has shown that infection risks and a history of pandemics influence the tightness of social norms and other institutions (Gelfand *et al.* 2011). Consequently, the Covid-19 outbreak could have diverse consequences for different societies, and respond to the pandemic could differ across countries. Indeed, Breznau (2020) who investigated the relationship between the welfare states and risk perception has shown that the risk perception is lower among countries with stronger welfare states. In a period characterized by global lockdowns, closure of schools worldwide that has no historical precedent, and substantial uncertainty about the duration and intensity of the pandemic (UNICEF 2020), it is important to gain insight into how societies differ in terms of mental well-being and health-protective behavioral response during the ongoing pandemic for understanding the consequences of the pandemic and tackling the crisis.

Focusing on 54 countries, this study investigates the country-level determinants of anxiety and behavioral response to the Covid-19 pandemic using economic preferences and development and tests to what extent these indicators account for cross-country differences. Building on the work of Breznau (2020), the study contributes to the literature in three main ways. First, rather than only focusing on the role of the welfare state, I examine to what extent and how economic preferences such as time preference and altruism explain cross-country differences.

Second, I theoretically argue through which mechanisms the Covid-19 outbreak could have diverse consequences for different societies and test these expectations. Third, I do not focus only on anxiety but also on the behavioral response to the Covid-19 pandemic, which is a crucial component in ending the pandemic.

Theoretical background

Social contexts are important in shaping individuals' responses to the pandemic (Van Bavel *et al.* 2020). Individuals change their behavior and attitudes to conform to social norms and gain affiliation or social approval, especially when they are not capable of evaluating their own situations (Festinger 1954). This can operate in both ways. Having information on what most others are doing might be helpful if others are engaging in health-promoting behavior. Conversely, if what others are doing is undesirable, individuals might underestimate health-promoting behaviors such as hand-washing (Dickie *et al.* 2018).

Among the factors shaping the management of the complexity and uncertainty, risk-taking attitudes are important determinants of decision-making (Rieger *et al.* 2015). Feelings and perceptions during a pandemic influence everyday activities and individuals make trade-offs about how to respond (Västfjäll *et al.* 2008). Evidence indicates that risk-averse individuals respond more to unfamiliar or uncontrollable situations (Brug *et al.* 2009). A study conducted in China showing that risk-taking regions report a relatively lower reduction in their visits to shops, parks, and grocery stores during the Covid-19 outbreak also supports this view (Chan *et al.* 2020). Therefore, I expect that individuals living in risk-averse societies would take greater precautions towards the Covid-19 pandemic. At the same time, risk-avoiding individuals are likely to perceive disasters or pandemics as more serious or risky and are more vulnerable to mental problems when being exposed to life stressors or disasters (Ishiguro *et al.* 2019; Street and Dardis 2018; Yamada *et al.* 2018). As a result, I expect that risk averse societies have higher levels of anxiety.

Time preference could also be important in understanding a society's responses to the Covid-19 pandemic. Many behaviors including health behavior include a trade-off between immediate and expected future outcomes (Van der Pol and Cairns 2011). In the case of the Covid-19 pandemic, preventive policies such as social distancing and staying at home involves a trade-off between other activities such as going to

restaurants or malls. Accordingly, those with present bias might be less proactive in response to the Covid-19 pandemic and be more adversely affected by the ongoing situation (Soofi *et al.* 2020).

In addition to time and risk preferences, decision-making might be influenced by collective interests. Fighting a pandemic requires large co-operation driven by social domains such as reciprocity, altruism, and trust that extends beyond the legal agreements and formal sanctions (Ellemers and van den Bos 2012). This creates a conflict between short-term self-interest and long-term collective interests (Van Lange *et al.* 2018) and requires people to bear an individual cost for the benefit of others (Nowak 2006). Individuals are more likely to cooperate when they believe that other individuals are cooperating (Fischbacher *et al.* 2001) Trust in others and health officials were, for instance, correlated with adopting preventive measures during the Ebola outbreak (Vinck *et al.* 2019). Accordingly, I expect that societies with higher levels of reciprocity, altruism, and trust take greater precautions.

Cooperation and social connection also help people to cope with stress and negative feelings (Haslam *et al.* 2012; Rime 2009). Thereby, individuals might be less anxious in societies where co-operation is strong. Contrary to this expectation, social distancing as well as lock-downs during the Covid-19 pandemic are interrupting individuals to connect with others (Baumeister and Leary 1995). As a result, being unable to help others and perform altruistic or reciprocate behaviors might have more adverse effects on societies with higher levels of reciprocity and altruism. Indeed, altruistic individuals felt more anxious and depressed in China during the Covid-19 outbreak (Feng *et al.* 2020).

Individuals' mental well-being could be also influenced by social inequalities and access to resources in a country due to several reasons (Van Bavel *et al.* 2020). For example, the homeless could have sheltering problems, and individuals in housing without running water might not be able to wash their hands sufficiently (Deitz and Meehan 2019). Moreover, individuals working in low-paid jobs where remote work is not possible may be unable to avoid large crowds in public transportation (CPI 2016). This, in turn, may increase the risk of infection. In case of infection, people without health insurance may avoid going to the hospital and medical sources could also be limited. For such reasons, individuals residing in less developed countries might suffer more from anxiety and have higher levels of risk perception (Breznau 2020).

Data and methods

Data

The analyses are based on three data sources: (i) The worldwide COVID-19 Attitudes and Beliefs dataset (Fetzer *et al.* 2020), (ii) global preferences survey (Falk *et al.* 2018), and (iii) Human Development Index datasets (HDI; UNDP 2019).

The worldwide COVID-19 Attitudes and Beliefs dataset (see Fetzer *et al.* 2020 for a detailed description) is an individual-level survey data covering 111,225 individuals from 177 countries. The survey instruments were translated into 69 languages and data was collected with the snow-ball sampling method. The survey was also promoted through various social media channels. The survey captures the period between 20 March 2020, and 21 May 2020, with responses to various questions including anxiety measures and behavioral response to Covid-19. Individuals with missing information on country restrictions on the interview day and countries with less than 200 observations were excluded from the analyses resulting in 98,719 individuals from 54 countries. Individual-level data were integrated with country-level data on economic preferences and human development. Accordingly, economic preferences and development information were based on exterior data and constant within countries.

Measures

Dependent variables included in the analyses were anxiety levels and behavioral responses to the Covid-19 wave. The anxiety index was generated based on the average response to the following items (5 point scale ranging from does not apply at all to strongly applies, Cronbach's alpha 0.58¹) included in the anxiety section: I am (i) 'nervous when I think about the circumstances', (ii) 'calm and relaxed' (reversed), (iii) 'worried about my health', (iv) 'worried about the health of my family members', and (v) 'stressed about leaving house'.

Behavioral response comprised five items (0 = Does not apply at all; 100 = Applies very much Cronbach's alpha 0.65) describing behavior last week: (i) 'I stayed at home', (ii) 'I did not attend social gatherings', (iii) 'I kept a distance of at least two meters to other people', (iv) 'If I

¹I note that Cronbach's Alpha shown here is informative and do not claim measurement validity. Accordingly, I replicated the analyses by including each item separately rather than using a composite measure. Results are presented in [Appendix](#).

had exhibited symptoms of sickness, I would have immediately informed the people around me', and (v) 'I washed my hand frequently than the month before'. I also included a set of control variables in the analyses at the individual-level: gender, age, education, marital status, the number of people living in the household, and a depression index based on Kroenke *et al.* (2001). Descriptive statistics are presented in [Appendix, Table A1](#).

Country-level variables came from exterior data sources and did not vary within countries. Economic preferences used in the analyses refer to time preference, risk preference, positive and negative reciprocity, altruism, and trust (see Falk *et al.* 2018). Development was measured with HDI and its three components: (i) standard of living, (ii) education, and (iii) health. A detailed description of each country-level indicator is located in the [Appendix](#). Moreover, the full list of countries included in the analyses, the number of observations per country, and missing macro-level indicators for each country are shown in [Appendix, Table A2](#).

The dataset also includes a measure of a Covid-19 daily country restriction index, which is based on the Oxford Covid-19 Policy tracker introduced in Hale *et al.* (2020) data (see Fetzer *et al.* 2020 for a detailed description). It focusses on six subcomponents of government policy: (i) school closures, (ii) workplace closures, (iii) cancelation of public events, (iv) closure of public transportation, (v) public information, and (vi) restrictions on internal movement. Using this item, I controlled for government policies and country-specific restrictions. Furthermore, given that the occurrence of the first case, the spread and fatality of Covid-19 differ noticeably across countries and countries are at the different stages of the pandemic, I controlled for the duration since the first case was observed (i) in China as well as (ii) in respondents' home country and the total number of confirmed (iii) cases and (iv) deaths on the date of the interview.

Methods

I estimated multilevel linear regression models where individuals are nested within countries using anxiety and behavioral response indexes separately with the following specification:

$$Y_{ic} = \beta'_1 X_{ic} + \beta_2 C_c + \beta_3 M_c + e_{ic} + \delta_c \quad (1)$$

where i and c denoted the individual and the country, respectively. Y_{ic} was the outcome variable (i.e. anxiety or behavioral response) of

individual i living in the country c . X_{ic} represented the set of controls included at the individual-level and C_c denoted country restriction index. M_c was the macro-level determinant (i.e. culture dimension, economic preference, and development) and β_3 was the main parameter of interest. The same equation was estimated for each macro-level determinant separately. All country-level variables were standardized for the comparability of all regression coefficients. e_{ic} denoted individual-level errors – assumed to be independent and identically distributed with a mean of zero – and δ_c denoted country-specific intercept. In all models, each country was given equal weight and sample weights correcting for differences in income, education, and gender between survey respondents and the general population in each country were used. I further used robust standard errors at the country-level to deal with heteroscedasticity.

Results

Table 1 shows how micro-level predictors were associated with different anxiety measures and the constructed anxiety index. In all models, women were more anxious than men. Moreover, single or divorced individuals significantly felt less nervous than married or cohabiting individuals felt and had lower scores on the overall anxiety index. Depression and age were also positively associated with anxiety.

Table 2 presents how these micro-level determinants were related to behavioral response towards the Covid-19 wave. Notable differences in behavioral response by gender and marital status were observed. Women and partnered individuals were more proactive than men and singles, respectively, in response to the Covid-19 pandemic in all measures examined.

Figures 1 and **2** show how macro-level determinants were associated with constructed anxiety and behavioral response measures, respectively while controlling for gender, age, education, marital status, the number of people in the household, country restriction index, depression, duration since the first case was observed in China and respondents' home country and the total number of confirmed cases and deaths on the date of the interview (full estimates are presented in [Appendix, Table A3–A6](#)). Explained variation at level 2 (i.e. country-level) with the inclusion of each macro-level predictor is shown in parentheses. Moreover, estimates, where all level 2 variables entered into regression together, are presented in [Appendix, Figures A1](#) and [A2](#). Estimates for single anxiety and behavioral response indicators are shown in [Appendix, Figures A3–A6](#). These

Table 1. Micro-level determinants of anxiety.

	I am nervous when I think about the circumstances.	I am calm and relaxed.	I am worried about my health.	I am worried about the health of my family members.	I am stressed about leaving house.	Constructed mental well-being (based on 5 items)
Gender (ref: Male)						
Female	0.202*** (0.043)	-0.152*** (0.027)	0.091* (0.042)	0.129*** (0.036)	0.161*** (0.040)	0.147*** (0.026)
Other	-0.020 (0.099)	-0.252 (0.201)	-0.016 (0.125)	-0.024 (0.089)	0.417* (0.180)	0.122 (0.077)
Age	0.003* (0.001)	-0.003* (0.001)	0.007*** (0.001)	-0.002 (0.001)	0.002 (0.001)	0.002*** (0.001)
Years of education	0.005 (0.006)	0.003 (0.003)	-0.002 (0.004)	0.005 (0.005)	0.001 (0.003)	0.001 (0.002)
Marital status (ref: Married/cohabiting)						
Single/divorced	-0.186*** (0.039)	0.052 (0.039)	-0.026 (0.035)	-0.102* (0.047)	-0.091* (0.036)	-0.092*** (0.023)
Number of people in the household	-0.033* (0.017)	-0.009 (0.012)	-0.010 (0.016)	-0.010 (0.024)	-0.005 (0.017)	-0.010 (0.011)
Restriction index	0.004 (0.027)	0.036 (0.022)	-0.039 (0.028)	0.025 (0.027)	-0.023 (0.032)	-0.014 (0.016)
Confirmed cases	0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)
Confirmed deaths	-0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Duration since first case in China	-0.020** (0.007)	0.003 (0.009)	0.004 (0.007)	-0.011 (0.009)	-0.000 (0.007)	-0.006 (0.005)
Duration since first case in home country	0.002 (0.003)	-0.001 (0.002)	-0.003 (0.003)	-0.005 (0.002)	-0.001 (0.002)	-0.001 (0.002)

Depression index	0.259*** (0.027)	-0.177*** (0.019)	0.155*** (0.022)	0.155*** (0.031)	0.213*** (0.016)	0.192*** (0.016)
Constant	5.721*** (0.832)	2.864** (0.972)	2.660** (0.840)	5.560*** (0.967)	3.108*** (0.815)	2.836*** (0.582)
Variance at level 1 (individuals)	1.252	1.301	1.343	1.123	1.506	0.451
Variance at level 2 (countries)	0.105	0.070	0.115	0.105	0.056	0.041
<i>N</i> of countries	54	54	54	54	54	54
<i>N</i>	98,719	98,719	98,719	98,719	98,719	98,719
BIC	302,772.6	306,529.3	309,679.4	292,020.9	320,940.2	202,038.4

Source: Fetzter *et al.* (2020).

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

Table 2. Micro-level determinants of behavioral response.

	I stayed at home.	I did not attend social gatherings.	I kept a distance of at least two meters to other people.	If I had exhibited symptoms of sickness, I would have immediately informed the people around me.	I washed my hand frequently than the month before.	Constructed behavioral response (based on 5 items)
Gender (ref: Male)						
Female	1.503* (0.679)	1.344 (0.791)	1.696* (0.820)	2.475*** (0.518)	1.306 (0.705)	1.665** (0.528)
Other	-2.381 (2.449)	-6.906 (5.771)	-8.297* (3.311)	-0.212 (3.474)	-8.380* (3.786)	-5.234** (1.804)
Age	-0.011 (0.038)	0.063 (0.044)	0.272*** (0.036)	0.034 (0.029)	0.066** (0.024)	0.085** (0.027)
Years of education	0.166 (0.093)	0.219** (0.074)	0.046 (0.114)	0.057 (0.072)	0.267** (0.096)	0.151* (0.068)
Marital status (ref: Married/cohabiting)						
Single/divorced	-0.016 (0.822)	-1.045 (0.966)	-3.170** (1.009)	-3.111*** (0.850)	-1.861** (0.609)	-1.841** (0.604)
Number of people in the household	-0.626 (0.540)	-1.078* (0.536)	-1.203*** (0.351)	-0.842 (0.466)	-0.704 (0.616)	-0.891 (0.459)
Restriction index	2.631* (1.025)	1.441*** (0.377)	2.203** (0.681)	1.112* (0.466)	0.365 (0.567)	1.545*** (0.367)
Confirmed cases	0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	0.000* (0.000)	0.000 (0.000)	0.000 (0.000)
Confirmed deaths	-0.001 (0.001)	0.001 (0.001)	-0.003 (0.002)	-0.001** (0.000)	-0.001 (0.001)	-0.001 (0.001)
Duration since first case in China	0.577* (0.231)	0.434** (0.166)	1.123*** (0.269)	0.014 (0.154)	-0.006 (0.139)	0.429** (0.148)
Duration since first case in home country	-0.162* (0.064)	-0.066 (0.056)	-0.138 (0.085)	-0.063 (0.049)	-0.065 (0.055)	-0.099* (0.047)

Depression index	-0.052 (0.563)	0.305 (0.485)	0.135 (0.448)	-0.541* (0.271)	-0.022 (0.451)	-0.035 (0.334)
Constant	21.414 (26.254)	41.623* (17.701)	-51.519 (30.457)	96.241*** (17.910)	91.074*** (15.264)	39.685* (16.687)
Variance at level 1 (individuals)	550.42	625.53	688.08	374.51	440.67	229.10
Variance at level 2 (countries)	70.54	44.27	105.10	30.42	25.50	31.04
<i>N of countries</i>	54	54	54	54	54	54
<i>N</i>	98,719	98,719	98,719	98,719	98,719	98,719
BIC	903,560.9	916,158.3	925,606.5	865,525.3	881,566.6	817,033.3

Source: Fetzter *et al.* (2020).

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

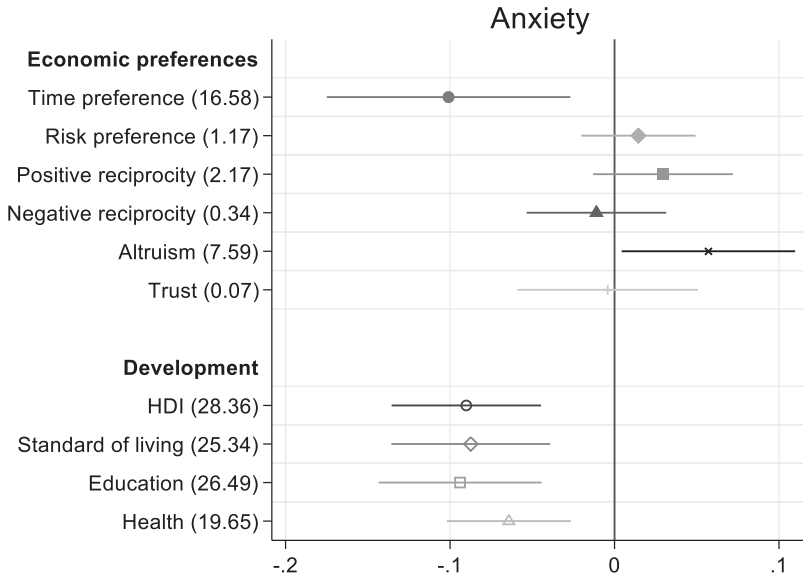


Figure 1. Macro-level determinants of anxiety. Source: Falk *et al.* (2018), Fetzter *et al.* (2020), and UNDP (2019).

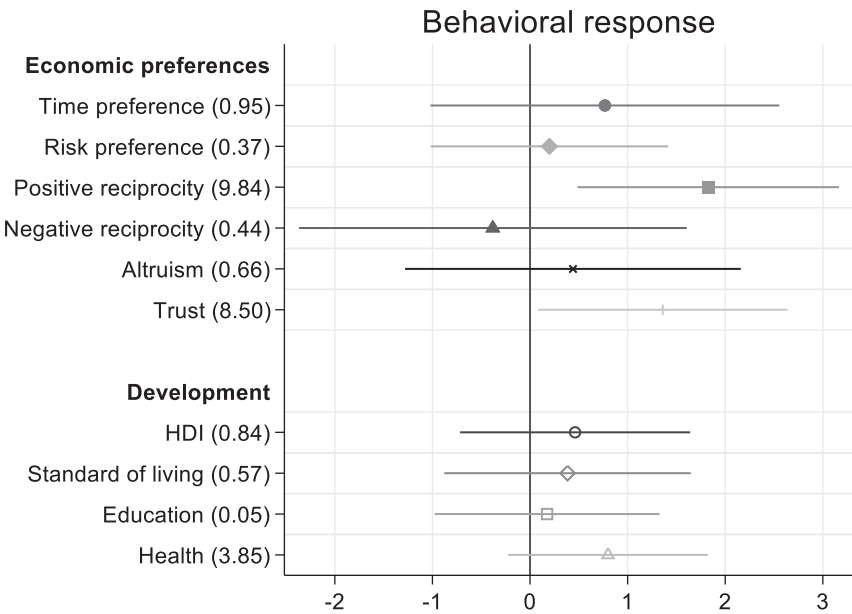


Figure 2. Macro-level determinants of behavioral response. Source: Falk *et al.* (2018), Fetzter *et al.* (2020), and UNDP (2019).

findings were qualitatively similar to the main results supporting the reliability of the composite measures.

More impatient and altruistic societies had a stronger predisposition for anxiety. These two indicators explained 16.6% and 7.6% of the country-level variation in anxiety, respectively. Moreover, consideration of all indicators of economic preferences together accounted for 30% of the cross-country variance (see [Table A5](#), Model 6 in [Appendix](#)). Development was an important determinant of cross-country differences in anxiety during the Covid-19 pandemic. Both HDI and its three components were negatively associated with anxiety. HDI was also able to explain almost 30% of the variation at the country-level.

Regarding the behavioral response to the Covid-19 wave, societies with more positive reciprocity and trust also took greater precautions, whereas development and its three components were insignificantly associated with behavioral response. More than one-fifth of the country-level variance was explained with the inclusion of all determinants of economic preferences, whereas the three subcomponents of development together only accounted for 7.2% of the country-level variance.

In additional analysis (available upon request), rather than using a composite restriction index, I included six dummies for subcomponents of government policy discussed earlier indicating whether the referred restriction was applied on the date of the interview. Moreover, I excluded Germany, Brazil, and the UK given that these countries could have a disproportionate effect due to the large sample sizes. I also replicated the analyses by controlling for self-assessed health, given that anxiety and precautions taken towards the pandemic might be correlated with it. Findings were qualitatively robust to these specifications.

Conclusion

This study advanced our understanding of the consequences of the Covid-19 pandemic for different societies by examining determinants of anxiety and health-protective behavioral response and to what extent these determinants account for contextual differences. While anxiety was less common among patient societies, altruistic societies suffered more from anxiety. The association between patience (i.e. a person's propensity wait self-possessed in the face of suffering and frustration) and anxiety is consistent with the theoretical expectations (Soofi *et al.* 2020) and what has been found previously (Schnitker 2012). More altruistic societies also suffered more from anxiety. It is possible that

individuals living in altruistic societies might feel more anxious because of being unable to help others due to social distance and self-isolation. This is in line with Feng *et al.* (2020) who found that altruistic individuals were more anxious during the Covid-19 pandemic in China.

Societies characterized by higher levels of positive reciprocity and trust took more considerable precautions. An explanation could be the importance of social norms in a society (i.e. what individuals think that others approve and disapprove of) that shapes individual actions (Van Bavel *et al.* 2020; Wood 2000).

Importantly, reported stress and worries were lower among more developed countries (i.e. countries having higher levels of standard of living, education, and health) highlighting the importance of access to resources and social equality during disasters (Brezna 2020; Fothergill and Peek 2004). Indeed, 30% of the cross-country variation in anxiety was explained by development.

Apart from these macro-level determinants, this study provided important evidence at the micro-level. Women suffered more from anxiety than men in line with the previous literature on gender differences in anxiety during life stressors (Ishiguro *et al.* 2019; Street and Dardis 2018; Yamada *et al.* 2018) and Covid-19 (Adams-Prassl *et al.* 2020; Davillas and Jones 2020; Etheridge and Spantig 2020; Hamel *et al.* 2020; Hou *et al.* 2020). Partnered individuals also had a stronger predisposition for anxiety compared to their single or divorced counterparts. As suggested by the previous literature, this might be driven by the fact that the mental and psychological well-being of individuals who need to protect, assist, and nurture their family members during disasters might be affected more with exposure to traumatic events (Millican 1993; Rivers 1982). Women also had higher awareness and took more Covid-19 precautions than men supporting Ariyabandu (2005) and Enarson and Hearne (1997) who showed that women outnumber men in taking behavioral action during disasters.

I conclude with limitations and suggestions for further research. Although the instruments used to measure anxiety provide important insights, I note that they are not validated measures. The sample included in the analyses might also be selective due to the data collection method and the fact that the collection of fully representative data is challenging during a pandemic. Individuals taking the survey may hold different characteristics due to the snowball sampling method. For instance, while the surveyed sample could be more representative among advanced societies, it could be a more specific and homogenous group of individuals in developing societies. Moreover, countries were at different stages

of the outbreak during the survey collection, which might influence the examined outcomes. To account for these factors, I included weights, which correct for the general population in each country based on income, education, and gender as well as several controls such as duration since the first case was observed in respondents' home country and the total number of confirmed cases and deaths on the date of the interview. In an era characterized by substantial uncertainty worldwide, gaining empirical evidence on the consequences of the Covid-19 outbreak during the ongoing pandemic is crucial for policy recommendations, managing the pandemic, and shedding light for further research, despite the drawbacks.

In this study, I focused on cross-country differences in anxiety and behavioral response during the Covid-19 outbreak. Yet, previous literature shows that the impact of disasters within a society differs substantially by economic position, race, and ethnicity (e.g. Cockerham *et al.* 2017; Deitz and Meehan 2019; Fothergill and Peek 2004). Further insight could be gained by examining how different groups within societies are suffered from and respond to the pandemic. Evidence also indicated noticeable gender differences in anxiety and behavioral response to the Covid-19 outbreak. Accordingly, it would be interesting to elicit the drivers of these gender differences.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Notes on contributor

Zafer Büyükkeçeci is a Research Assistant at University of Cologne, currently working on the NORFACE EQUALLIVES project in which he investigates the dynamics of inequality across the life-course. His research interests include family sociology, demography, social stratification and inequality, and life-course research.

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Appendix

Economic preferences

Time preference: refers to the willingness to wait.

Risk preference: refers to the willingness to take risks.

Positive reciprocity: individuals' propensity to act in a positive reciprocal way.

Negative reciprocity: refers to the willingness to punish others or take revenge.

Altruism: refers to the willingness to give good causes without expecting any return.

Trust: whether other people have the best intentions.

Development

Human Development Index: the geometric mean of normalized means of the standard of living, education, and health.

Standard of living: gross national income (GNI) per capita at purchasing power parity (PPP).

Education: the average of the adult literacy rate and the combined primary, secondary, and tertiary gross school enrollment ratio.

Health: annual life expectancy at birth.

Table A1. Descriptive statistics.

	Mean	Std. Dev.	Min.	Max.
<i>Anxiety</i>				
I am nervous when I think about the circumstances.	3.48	1.16	1	5
I am calm and relaxed.	2.99	1.17	1	5
I am worried about my health.	3.21	1.17	1	5
I am worried about the health of my family members.	4.08	1.10	1	5
I am stressed about leaving house.	3.10	1.24	1	5
Constructed anxiety (based on 5 items)	2.18	0.71	-2	3.8
<i>Behavioral response</i>				
I stayed at home.	80.44	24.60	0	100
I did not attend social gatherings.	90.95	23.36	0	100
I kept a distance of at least two meters to other people.	75.75	27.70	0	100
If I had exhibited symptoms of sickness, I would have immediately informed the people around me.	93.10	18.52	0	100
I washed my hand frequently than the month before.	91.98	19.13	0	100
Constructed behavioral response (based on 5 items)	86.45	14.78	0	100
<i>Gender</i>				
Male	0.43		0	1
Female	0.56		0	1
Other	0.01		0	1
Age	38.94	13.02	18	110
Years of education	16.35	4.68	0	25
<i>Marital status</i>				
Married/Cohabiting	0.56		0	1
Single/Divorced	0.44		0	1
Number of people in the household	2.90	1.68	0	30
Depression index	0.00	1	-1.1	3.6

Source: Fetzer *et al.* (2020).

Table A2. Missing macro-level data.

	Economic Preferences					Trust
	Time preference	Risk preference	Positive reciprocity	Negative reciprocity	Altruism	
Country						
Albania	X	X	X	X	X	X
Argentina						
Australia						
Austria						
Belarus	X	X	X	X	X	X
Belgium	X	X	X	X	X	X
Brazil						
Bulgaria	X	X	X	X	X	X
Canada						
Chile						
China						
Colombia						
Czech Republic						
Denmark	X	X	X	X	X	X
Dominican Republic	X	X	X	X	X	X
Ecuador	X	X	X	X	X	X
Finland						
France						
Germany						
Greece						
Hungary						
India						
Indonesia						
Ireland	X	X	X	X	X	X
Israel						
Italy						
Japan						
Kenya						
Latvia	X	X	X	X	X	X
Malaysia	X	X	X	X	X	X
Mexico						
Morocco						
Netherlands						
New Zealand	X	X	X	X	X	X
Nigeria						
Norway	X	X	X	X	X	X
Peru						
Philippines						
Poland						
Portugal						
Qatar	X	X	X	X	X	X
Romania						
Russian Federation						
Singapore	X	X	X	X	X	X
Slovakia	X	X	X	X	X	X
South Africa						
South Korea						
Spain						
Sweden						
Switzerland						
Thailand						
Turkey						
Ukraine						
United Kingdom						
USA						
Uruguay	X	X	X	X	X	X
Venezuela						
Viet Nam						

Notes: HDI and its components were available for all countries.

Source: Falk *et al.* (2018) and UNDP (2019).

Table A3. Anxiety and economic preferences (standard errors in parentheses).

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Gender (ref: Male)								
Female	0.153*** (0.027)	0.153*** (0.027)	0.153*** (0.027)	0.153*** (0.027)	0.153*** (0.027)	0.153*** (0.027)	0.153*** (0.027)	0.153*** (0.027)
Other	0.134 (0.080)	0.134 (0.080)	0.134 (0.080)	0.134 (0.080)	0.134 (0.080)	0.134 (0.080)	0.134 (0.080)	0.134 (0.081)
Age	0.002*** (0.001)	0.002*** (0.001)	0.002*** (0.001)	0.002*** (0.001)	0.002*** (0.001)	0.002*** (0.001)	0.002*** (0.001)	0.002*** (0.001)
Years of education	0.002 (0.002)	0.002 (0.002)	0.002 (0.002)	0.002 (0.002)	0.002 (0.002)	0.002 (0.002)	0.002 (0.002)	0.002 (0.002)
Marital status (ref: Married/ cohabiting)								
Single/divorced	-0.086*** (0.024)	-0.086*** (0.024)	-0.086*** (0.024)	-0.086*** (0.024)	-0.086*** (0.024)	-0.086*** (0.024)	-0.086*** (0.024)	-0.086*** (0.024)
Number of people in the household	-0.012 (0.011)	-0.012 (0.011)	-0.012 (0.011)	-0.012 (0.011)	-0.012 (0.011)	-0.012 (0.011)	-0.012 (0.011)	-0.012 (0.011)
Restriction index	-0.016 (0.016)	-0.016 (0.016)	-0.016 (0.016)	-0.016 (0.016)	-0.016 (0.016)	-0.016 (0.016)	-0.016 (0.016)	-0.017 (0.016)
Confirmed cases	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Confirmed deaths	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Duration since first case in China	-0.006 (0.005)	-0.008 (0.005)	-0.006 (0.005)	-0.006 (0.005)	-0.006 (0.006)	-0.005 (0.005)	-0.006 (0.005)	-0.007 (0.005)
Duration since first case in home country	-0.001 (0.002)	0.001 (0.002)	-0.001 (0.002)	-0.001 (0.002)	-0.001 (0.002)	-0.002 (0.002)	-0.001 (0.002)	-0.000 (0.002)
Depression index	0.186*** (0.017)	0.186*** (0.017)	0.186*** (0.017)	0.186*** (0.017)	0.186*** (0.017)	0.186*** (0.017)	0.186*** (0.017)	0.186*** (0.017)
Time preference		-0.101**						-0.122**

(Continued)

Table A3. Continued.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
		(0.038)						(0.046)
Risk preference			0.015 (0.018)					0.039 (0.021)
Positive reciprocity				0.029 (0.022)				0.023 (0.048)
Negative reciprocity					-0.011 (0.022)			0.014 (0.023)
Altruism						0.057* (0.027)		0.038 (0.049)
Trust							-0.004 (0.028)	-0.004 (0.030)
Constant	2.858*** (0.604)	2.963*** (0.603)	2.854*** (0.603)	2.830*** (0.601)	2.869*** (0.610)	2.777*** (0.605)	2.863*** (0.604)	2.889*** (0.595)
Variance at level 1 (individuals)	0.450	0.450	0.450	0.450	0.450	0.450	0.450	0.450
Variance at level 2 (countries)	0.043	0.036	0.043	0.042	0.043	0.040	0.043	0.030
Variance explained (%)		16.58	1.17	2.17	0.34	7.59	0.07	30.03
<i>N</i> of countries	42	42	42	42	42	42	42	42
<i>N</i>	93,366	93,366	93,366	93,366	93,366	93,366	93,366	93,366
BIC	190,778.2	190,782.6	190,789.2	190,788.7	190,789.5	190,786.6	190,789.6	190,833.4

Source: Falk *et al.* (2018) and Fetzer *et al.* (2020).* $p < 0.05$.** $p < 0.01$.*** $p < 0.001$.

Table A4. Anxiety and development (standard errors in parentheses).

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Gender (ref: Male)						
Female	0.147*** (0.026)	0.147*** (0.026)	0.147*** (0.026)	0.147*** (0.026)	0.147*** (0.026)	0.147*** (0.026)
Other	0.122 (0.077)	0.122 (0.077)	0.122 (0.077)	0.122 (0.077)	0.122 (0.077)	0.122 (0.077)
Age	0.002*** (0.001)	0.002*** (0.001)	0.002*** (0.001)	0.002*** (0.001)	0.002*** (0.001)	0.002*** (0.001)
Years of education	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)
Marital status (ref: Married/cohabiting)						
Single/divorced	-0.092*** (0.023)	-0.092*** (0.023)	-0.092*** (0.023)	-0.092*** (0.023)	-0.092*** (0.023)	-0.092*** (0.023)
Number of people in the household	-0.010 (0.011)	-0.010 (0.011)	-0.010 (0.011)	-0.010 (0.011)	-0.010 (0.011)	-0.010 (0.011)
Restriction index	-0.014 (0.016)	-0.015 (0.015)	-0.015 (0.015)	-0.014 (0.015)	-0.015 (0.015)	-0.015 (0.015)
Confirmed cases	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Confirmed deaths	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Duration since first case in China	-0.006 (0.005)	-0.007 (0.005)	-0.007 (0.005)	-0.007 (0.005)	-0.007 (0.005)	-0.007 (0.005)
Duration since first case in home country	-0.001 (0.002)	-0.000 (0.002)	-0.000 (0.002)	-0.001 (0.002)	-0.000 (0.002)	-0.000 (0.002)
Depression index	0.192*** (0.016)	0.192*** (0.016)	0.192*** (0.016)	0.192*** (0.016)	0.192*** (0.016)	0.192*** (0.016)
HDI		-0.090*** (0.023)				
Standard of living			-0.087*** (0.025)			-0.039 (0.039)

(Continued)

Table A4. Continued.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Education				-0.094*** (0.025)		-0.053 (0.038)
Health					-0.064*** (0.019)	-0.007 (0.022)
Constant	2.836*** (0.582)	2.880*** (0.576)	2.884*** (0.578)	2.845*** (0.574)	2.899*** (0.577)	2.870*** (0.573)
Variance at level 1 (individuals)	0.451	0.451	0.451	0.451	0.451	0.451
Variance at level 2 (countries)	0.041	0.029	0.031	0.030	0.033	0.029
Variance explained (%)		28.36	25.34	26.49	19.65	28.60
<i>N of countries</i>	54	54	54	54	54	54
<i>N</i>	98,719	98,719	98,719	98,719	98,719	98,719
BIC	202,038.4	202,032.9	202,034.9	202,034.3	202,038.7	202,055.8

Source: Fetzler *et al.* (2020) and UNDP (2019).

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

Table A5. Behavioral response and economic preferences (standard errors in parentheses).

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Gender (ref: Male)								
Female	1.789** (0.549)	1.789** (0.549)	1.789** (0.549)	1.789** (0.549)	1.789** (0.549)	1.789** (0.549)	1.790** (0.549)	1.789** (0.549)
Other	-5.226** (1.836)	-5.227** (1.836)	-5.226** (1.836)	-5.225** (1.835)	-5.226** (1.836)	-5.226** (1.836)	-5.227** (1.835)	-5.226** (1.835)
Age	0.080** (0.029)	0.080** (0.029)	0.080** (0.029)	0.080** (0.029)	0.080** (0.029)	0.080** (0.029)	0.080** (0.029)	0.080** (0.029)
Years of education	0.165* (0.070)	0.165* (0.070)	0.165* (0.070)	0.165* (0.070)	0.165* (0.070)	0.165* (0.070)	0.165* (0.070)	0.165* (0.070)
Marital status (ref: Married/ cohabiting)								
Single/divorced	-2.011** (0.625)	-2.011** (0.625)	-2.011** (0.625)	-2.010** (0.625)	-2.011** (0.625)	-2.011** (0.625)	-2.010** (0.625)	-2.010** (0.625)
Number of people in the household	-0.988* (0.482)	-0.988* (0.482)	-0.988* (0.482)	-0.988* (0.482)	-0.988* (0.482)	-0.988* (0.482)	-0.988* (0.482)	-0.987* (0.482)
Restriction index	1.411*** (0.319)	1.412*** (0.318)	1.411*** (0.318)	1.402*** (0.320)	1.412*** (0.319)	1.410*** (0.319)	1.409*** (0.317)	1.399*** (0.317)
Confirmed cases	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Confirmed deaths	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
Duration since first case in China	0.383* (0.154)	0.398** (0.154)	0.384* (0.155)	0.407* (0.159)	0.380* (0.153)	0.393* (0.153)	0.406* (0.158)	0.386* (0.154)
Duration since first case in home country	-0.089 (0.054)	-0.105 (0.059)	-0.090 (0.053)	-0.112* (0.055)	-0.086 (0.049)	-0.099 (0.054)	-0.111* (0.053)	-0.090* (0.042)
Depression index	-0.023 (0.344)	-0.023 (0.344)	-0.023 (0.344)	-0.023 (0.344)	-0.023 (0.344)	-0.023 (0.344)	-0.023 (0.343)	-0.022 (0.343)
Time preference		0.767						-0.001

(Continued)

Table A5. Continued.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
		(0.911)						(0.893)
Risk preference			0.199 (0.621)					0.953 (0.623)
Positive reciprocity				1.826** (0.684)				3.378** (1.253)
Negative reciprocity					-0.381 (1.014)			-0.097 (0.946)
Altruism						0.440 (0.878)		-2.460 (1.401)
Trust							1.361* (0.652)	0.733 (0.646)
Constant	44.874** (17.360)	44.079* (17.366)	44.828** (17.385)	43.307* (17.659)	45.242** (17.245)	44.284* (17.266)	43.422* (17.709)	44.364* (17.370)
Variance at level 1 (individuals)	230.6	230.6	230.6	230.6	230.6	230.6	230.6	230.6
Variance at level 2 (countries)	36.12	35.78	35.99	32.57	35.96	35.88	33.05	28.52
Variance explained (%)		0.95	0.37	9.84	0.44	0.66	8.50	21.04
<i>N</i> of countries	42	42	42	42	42	42	42	42
<i>N</i>	93,366	93,366	93,366	93,366	93,366	93,366	93,366	93,366
BIC	773,321.2	773,332.2	773,332.5	773,328.3	773,332.4	773,332.4	773,328.9	773,379.9

Source: Falk *et al.* (2018) and Fetzer *et al.* (2020).* $p < 0.05$.** $p < 0.01$.*** $p < 0.001$.

Table A6. Behavioral response and development (standard errors in parentheses).

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Gender (ref: Male)						
Female	1.665** (0.528)	1.665** (0.528)	1.665** (0.528)	1.665** (0.528)	1.665** (0.528)	1.666** (0.528)
Other	-5.234** (1.804)	-5.234** (1.803)	-5.234** (1.803)	-5.234** (1.804)	-5.234** (1.803)	-5.235** (1.803)
Age	0.085** (0.027)	0.085** (0.027)	0.085** (0.027)	0.085** (0.027)	0.085** (0.027)	0.085** (0.027)
Years of education	0.151* (0.068)	0.151* (0.068)	0.151* (0.068)	0.151* (0.068)	0.151* (0.068)	0.151* (0.068)
Marital status (ref: Married/cohabiting)						
Single/divorced	-1.841** (0.604)	-1.841** (0.604)	-1.841** (0.604)	-1.841** (0.604)	-1.840** (0.604)	-1.841** (0.604)
Number of people in the household	-0.891 (0.459)	-0.891 (0.459)	-0.891 (0.459)	-0.891 (0.459)	-0.891 (0.459)	-0.891 (0.459)
Restriction index	1.545*** (0.367)	1.546*** (0.367)	1.546*** (0.367)	1.545*** (0.366)	1.550*** (0.367)	1.551*** (0.367)
Confirmed cases	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Confirmed deaths	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
Duration since first case in China	0.429** (0.148)	0.434** (0.148)	0.434** (0.148)	0.430** (0.148)	0.442** (0.149)	0.445** (0.148)
Duration since first case in home country	-0.099* (0.047)	-0.103* (0.046)	-0.103* (0.046)	-0.100* (0.047)	-0.111* (0.046)	-0.115* (0.045)
Depression index	-0.035 (0.334)	-0.035 (0.334)	-0.035 (0.334)	-0.035 (0.334)	-0.035 (0.334)	-0.035 (0.334)
HDI		0.462 (0.602)				
Standard of living			0.384 (0.645)			-0.409 (1.229)

(Continued)

Table A6. Continued.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Education				0.175 (0.588)		-1.030 (1.204)
Health					0.799 (0.522)	1.672* (0.707)
Constant	39.685* (16.687)	39.470* (16.691)	39.476* (16.655)	39.672* (16.696)	38.913* (16.717)	38.372* (16.679)
Variance at level 1 (individuals)	229.10	229.10	229.10	229.10	229.10	229.10
Variance at level 2 (countries)	31.04	30.78	30.86	31.02	29.85	28.82
Variance explained (%)		0.84	0.57	0.05	3.85	7.16
<i>N of countries</i>	54	54	54	54	54	54
<i>N</i>	98,719	98,719	98,719	98,719	98,719	98,719
BIC	817,033.3	817,044.3	817,044.5	817,044.7	817,042.7	817,075.5

Source: Fetzter *et al.* (2020) and UNDP (2019).

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

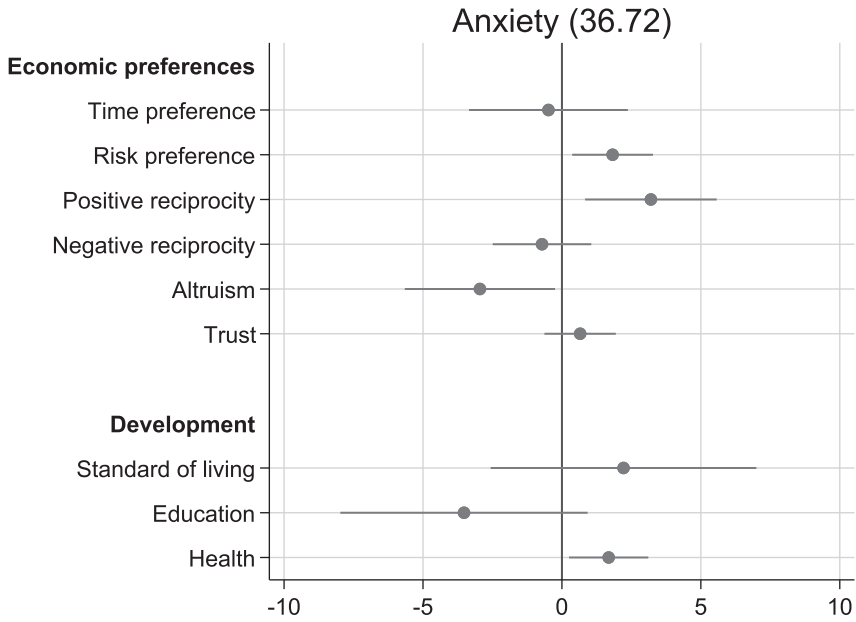


Figure A1. Anxiety with all level 2 variables (explained variance at level 2 in parenthesis). Source: Falk *et al.* (2018), Fetzer *et al.* (2020), and UNDP (2019).

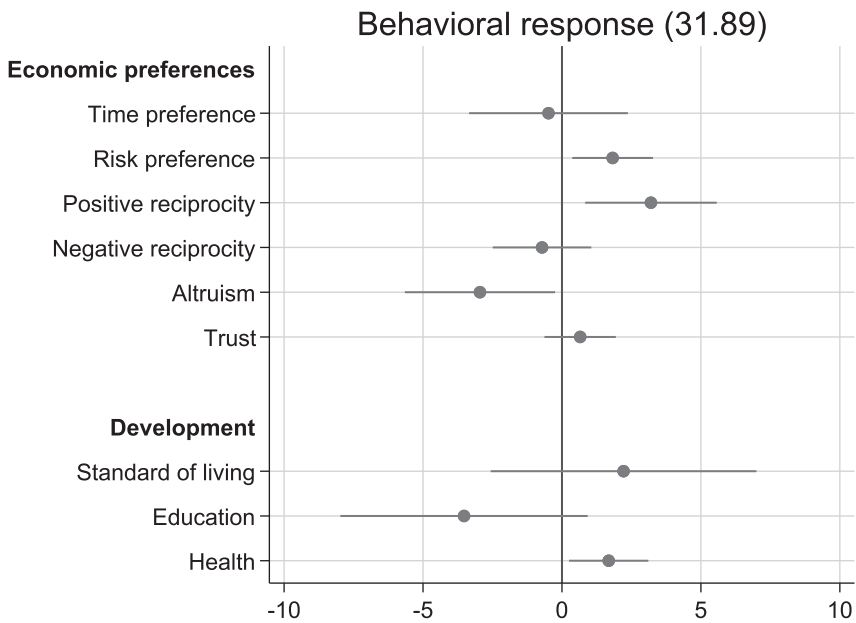


Figure A2. Behavioral response with all level 2 variables (explained variance at level 2 in parenthesis). Source: Falk *et al.* (2018), Fetzer *et al.* (2020), and UNDP (2019).

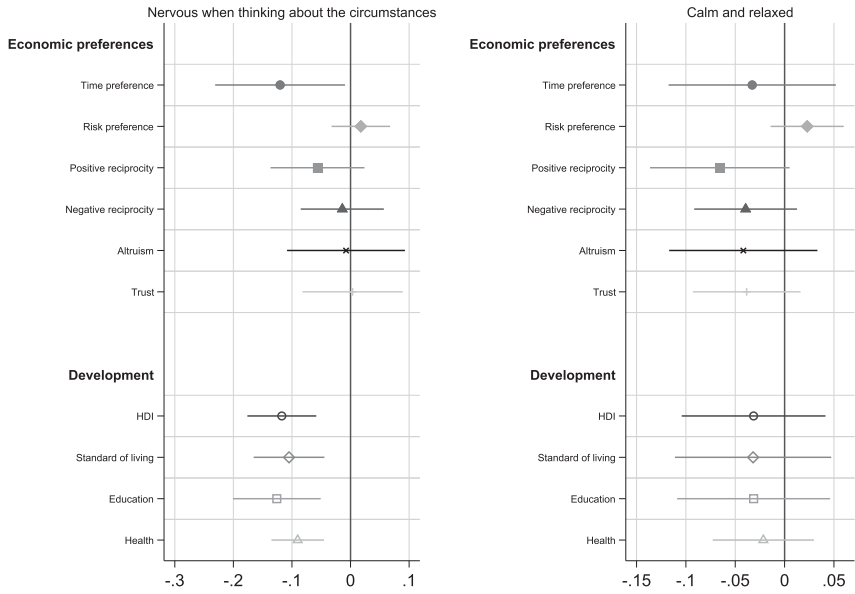


Figure A3. Components of anxiety separately. Source: Falk *et al.* (2018), Fetzer *et al.* (2020), and UNDP (2019).

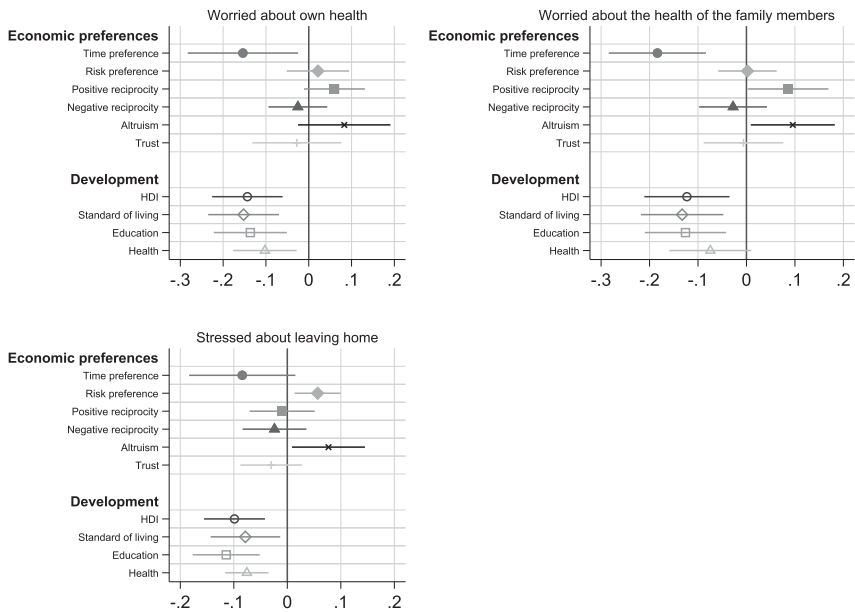


Figure A4. Components of anxiety separately (continued). Source: Falk *et al.* (2018), Fetzer *et al.* (2020), and UNDP (2019).

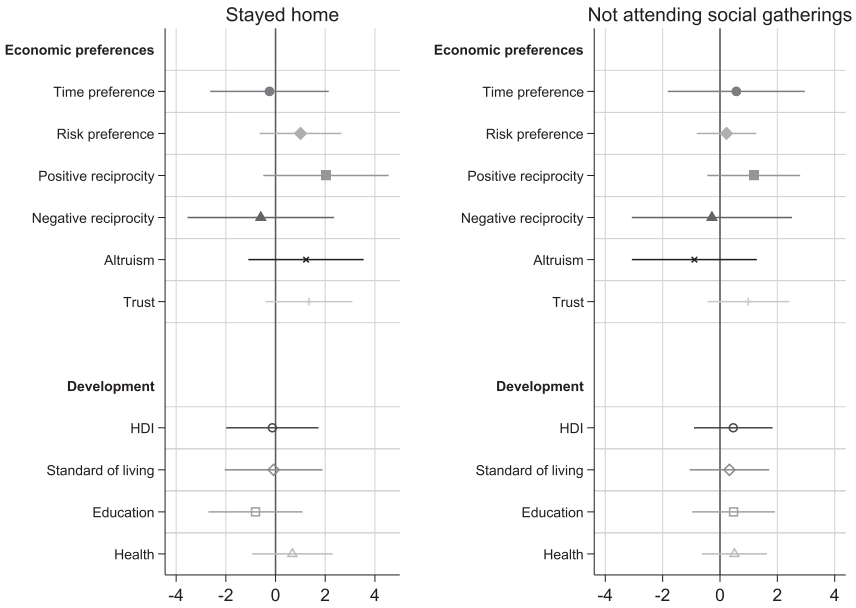


Figure A5. Components of behavioral response separately. Source: Falk *et al.* (2018), Fetzer *et al.* (2020), and UNDP (2019).

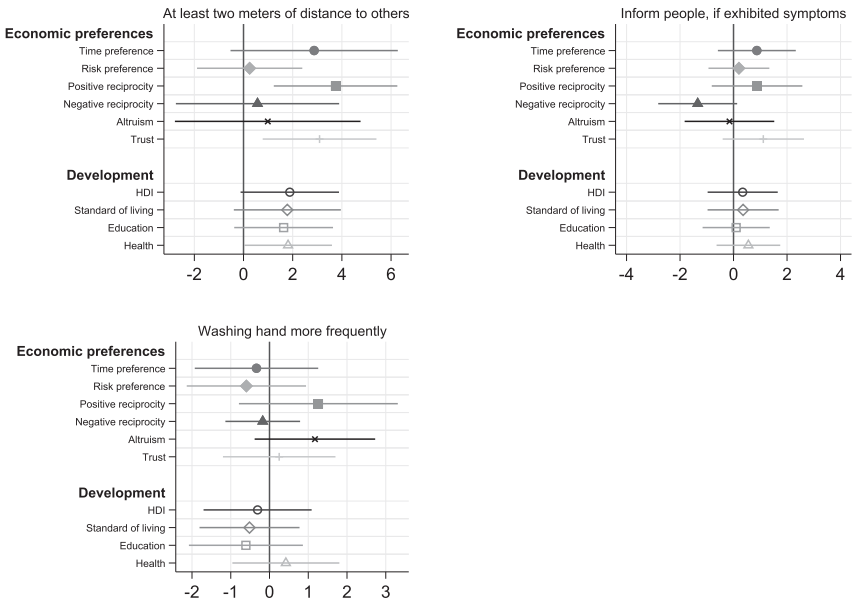


Figure A6. Components of behavioral response separately (continued). Source: Falk *et al.* (2018), Fetzer *et al.* (2020), and UNDP (2019).