



Values in Crisis: Societal Value Change under Existential Insecurity

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Abstract

The COVID-19 pandemic has had a profound impact on societies, with possible consequences for their fundamental values. Inglehart's revised modernization theory links societal values to the underlying subjective sense of existential security in a given society (scarcity hypothesis), while also claiming that influences on values diminish once individuals reach adulthood (socialization hypothesis). An acute existential crisis such as the COVID-19 pandemic offers a rare opportunity to test these assumptions. We analyze data from representative surveys conducted in Japan shortly before and after the onset of the pandemic. Remaining survey sample differences are statistically controlled via propensity score weighting and regression adjustment, while post-stratification weights allow conclusions about the Japanese population. In three sets of analyses, we reveal that the pandemic and the experienced psychological distress are negatively associated with emancipative and secular values, entailing a reversal to traditionalism, intolerance, and religiosity. First, we document a substantial decline in both emancipative and secular values in the first months of the pandemic compared to five months earlier. This decline remained stable a year later. Second, we find that value change was stronger in prefectures more severely affected by the pandemic. Third, individuals who experienced higher psychological distress emphasized the same values more strongly, as evident in two surveys from May 2020 and April 2021. In contrast to the socialization hypothesis, our study provides evidence that, under extraordinary environmental conditions, values can shift even within a negligibly short time period.

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1 Introduction

The COVID-19 pandemic is arguably the most acute existential crisis humanity has faced since World War II. As of October 2023, the coronavirus has infected at least 8.6% of the global population and caused 6.9 million deaths (Worldometer, 2023). The pandemic's economic impact was also devastating, estimated as dozens of billions of USD (Cutler & Summers, 2020; Levy & Filippini, 2021). The emotional terror the pandemic has caused, the suffering under repeated lockdowns, the loss of human capital due to school closures and the inability to travel and maintain close social relationships are other consequences societies had to and even continue to endure. Societal values—what we prioritize in life and desire as societal goals—are shaped by our natural and social environment (Schwartz, 2006). As existential security and standard of living have been rising globally (Pinker, 2018), so has societal culture changed to appreciate freedom, equality, and diversity (Welzel, 2013). This change is reportedly slow partly because rapid jumps in the quality of life are impossible on a societal level. However, the sudden and acute environmental change the pandemic brought offers a unique opportunity to study if values can also change in reverse and through what mechanisms they may do so.

Focusing on Japan as a case study, we examine these questions regarding two sets of values—emancipative and secular values—derived from Inglehart/Welzel's revised modernization theory (Inglehart & Welzel, 2005). Emancipative values emphasize individual freedom and equality of opportunity, while secular values entail freedom from traditional sources of authority such as religion, nation, family, and group norms (Welzel, 2013). According to the revised modernization theory, these values reflect the level of existential security in a society, which makes them suitable for the current investigation. Despite their prominence in the political science and sociological literature, these social indicators have not yet been studied in the context of the pandemic.

By analyzing nationally representative data from three large surveys and investigating whether the pandemic affected societal values in Japan, we assess the validity of competing views about the stability and change of cultural values. The first survey was conducted shortly before the pandemic, the two following surveys during the pandemic, with a longitudinal follow-up of the same respondents. The investigation is guided by the following research question: *Has the existential insecurity associated with the COVID-19 pandemic caused a shift to more traditional (less emancipative and less secular) values in Japan?*

The stated question is important for the social sciences as well as policymakers due to the substantive role of these values in political processes and societal well-being. Emancipative values specifically have been featured as the key cultural component underpinning democratic development, as they manifest societal support for individual freedoms and equality, spurring demand for universal and impartial democratic institutions (Welzel, 2013, 2020). Secular values are related to emancipative values as they enable the liberation of individuals from sacred institutions and thus coevolve with emancipation in other domains (Alexander et al., 2016). Cultures that value freedom, equality, and diversity allow more of their members to contribute to society and to realize their potential, thus enhancing psychological health, pro-social behavior, institutional quality, creativity, and economic

performance (Akaliyski, 2023; Inglehart et al., 2008; Welzel, 2013). These values have been equated to an “assertive” civic political culture that has an equivalent impact on democratic development across the globe, including East Asia (Dalton & Welzel, 2015).

1.1 Previous Research and Gaps in the Literature

Findings from recent empirical studies on the pandemic’s impact on values are mixed, which may reflect methodological and/or true between-country differences. Two panel studies examine values and attitudes most similar to those we study. A 24-country study, including Japan, finds that the pandemic has resulted in a stronger emphasis on freedom, emancipation, post-materialism and lower support for patriarchy and law and order (Lampert et al., 2021). A Dutch study using European Values Survey data, which contains many survey items identical in wording to those we examine, also finds that some values such as gender equality, immigration permissiveness, and social trust continue to increase during the pandemic (Reeskens et al., 2021). Values they consider stable—so-called ‘easy’ issues—such as religiosity and national pride, however, remained unchanged, while traditional moral permissiveness, post-materialism, and support for strong leaders decreased.

Most other studies either document a conservative change in values during the pandemic or an individual-level relationship between psychological distress (e.g., fear of COVID-19, existential insecurity) and conservative values. For example, a steep increase in interest in religion throughout the globe has been reported (Bentzen, 2021). In the US, studies document a reversal to traditional gender roles and stereotypes (Rosenfeld & Tomiyama, 2021), including gendered parenting roles (Mize et al., 2021), and an association between pathogen threat and conservatism among Democrats (but not Republicans) (Samore et al., 2021), as well as between pathogen threat and conservative ideological self-placement and partisan preference (O’Shea et al., 2021) and right-wing authoritarian traits (Pazhoohi & Kingstone, 2021). A study from US, Germany, and Singapore reports increased traditional gender norms (Reichelt et al., 2020). Another study shows that experimentally activating Polish and American participants’ thoughts about the COVID-19 pandemic results in stronger social conservative values and support for conservative presidential candidates (Karwowski et al., 2020). We are aware of only one study from the US which finds no change, specifically on moral foundations comprising items related to harm, fairness, authority, in-group loyalty, and purity (Vartanova et al., 2021).

Surveys from Poland reveal an increase in authoritarianism, a desire for national cohesion, rejection of sexual dissenters (Golec de Zavala et al., 2021), and religiosity (Boguszewski et al., 2020). In Italy, Molteni et al. (2021) find a revival of religiosity in terms of prayer and attendance of religious services (via the internet, radio, or TV) among individuals whose family members were infected.

Individual values also reversed to stronger conservation (emphasizing order and stability), as well as weaker openness to change (self-direction and stimulation), according to a longitudinal study from Australia (Daniel et al., 2021) and a study of retrospective reports from France (Bonetto et al., 2021). In both countries, these value changes were associated with worrying about the pandemic and perceived threat, respectively.

Evidence from East Asia, however, remains scarce. A small study of Chinese students from Wuhan reports an increase in altruism, cooperation, and aversion to risk and a decrease in trust during the first several weeks of lockdown (Shachat et al., 2021).

Another study shows an increase in collectivist expressions such as personal pronouns on a Chinese online social network following the onset of the pandemic (Han et al., 2021). A third study, from South Korea, reports a change towards stronger collectivism, but, somewhat paradoxically, not weaker individualism (Na et al., 2021).

Our literature review reveals several remaining gaps, which we intend to fill. First, most surveys were not longitudinal and did not attempt to solve the problem of comparability between the samples from before and during the pandemic, which casts concerns that the differences might be due to sampling bias, instead of actual change. In addition, most studies use convenience samples of, for example, students or self-selected volunteers, thus revealing little about the processes in the larger population. None of them tracks the longer term dynamics of change from the onset of the pandemic to its unfolding in later years. Daniel et al. (2021) show that, in their last survey in November–December 2020, previously documented value changes have begun to reverse, thus suggesting that other studies may also document only short-lived changes in volatile attitudes, instead of deeper and lasting value changes.

Moreover, almost all evidence comes from samples that are typically overrepresented in the literature, viz. WEIRD (Western, educated, industrialized, rich, and democratic) (Henrich et al., 2010). Numerous research indicates different psychological processes taking place in East Asia and the West (Akaliyski, 2023; Markus & Kitayama, 1991; Nisbett, 2004). The pandemic's effects in the Japanese unique cultural environment to date remain unknown.

1.2 The COVID-19 Pandemic in Japan

To better understand the Japanese context, we provide some details on how the pandemic unfolded. Although Japan was among the first countries to register COVID-19 infections, the pandemic remained relatively well-contained in terms of the number of cases and mortality rate. In contrast to other countries where strict lockdowns were enforced, the Japanese government relied more heavily on voluntary cooperation by individuals to avoid unnecessary social contacts, practice good personal hygiene, and wear face masks (Li et al., 2022). At the time of the second survey used in the present analyses (mid-May 2020), there were only approximately 16,400 people tested positive and 744 reported deaths (Japan Broadcasting Corporation, 2021). Nevertheless, the economic and social costs were high: GDP dropped by approximately 5% in 2020 (IMF, 2020), social life was suddenly and severely disrupted, and daily necessities such as masks and toilet paper were in short supply, similar to other countries more severely affected by the pandemic. School closures forced parents to take care of children at home, putting pressure excessively on working mothers.

Crucially for the current study, the pandemic increased psychological distress, associated with pandemic-related factors such as medical issues, difficulties in daily life, unavailability of groceries, and adjustment to new modes of work (Nagasu et al., 2021). Severe psychological distress increased by 2 percentage points to reach 11.5% of the Japanese population between the end of February, when Japan registered the first infection cases, and early April, when it experienced the first serious wave of infections, enforced an entry ban and prepared to declare a state of emergency in several prefectures (Kikuchi et al., 2020). In September 2020, the national prevalence of severe psychological distress was 10% and was associated with a mix of pandemic-related and socio-demographic factors such as fear of COVID-19, younger age, lower income, providing caregiving to family members and experience of domestic violence (Yoshioka et al., 2021).

Noteworthy, not all parts of the country were affected with the same severity. At the time of our first survey, several prefectures (Japan's 47 administrative units) were in a state of emergency due to substantially higher infection rates (see supplementary Appendix E) and the risk of overburdening the medical facilities. These were large urban areas such as Greater Tokyo (Kanto region), Greater Osaka (Kansai region), as well as Hokkaido.

1.3 Theoretical Framework

Emancipative and secular values are derived from Inglehart's revised modernization theory and Welzel and Inglehart's human development theory (Inglehart, 2008; Welzel et al., 2003). These theoretical approaches stem from the classic modernization theory which depicts development as an isomorphic process: countries at the same stage of modernization share similar features in terms of institutions, economic structure, and societal culture. The classic modernization theory can be traced back to early sociologists such as Karl Marx and Émile Durkheim who were concerned with the way industrialization and modernization increase societal complexity and profoundly transform societies (Eisenstadt, 2000). Later works in this theoretical tradition include Talcott Parsons' (1964) concept of "evolutionary universals in society", and Bell's postindustrial society theory (Bell, 1976).

Embedded within this broad intellectual tradition, Inglehart and Welzel's revised modernization theory, which we draw upon, specifically focuses on the value changes taking place as societies develop socio-economically and increase their sense of existential security. The theory is revised in the sense that it analyzes contemporary societal changes but it also considers the importance of historical legacies. Their theory of value change is based on the understanding of human nature originating in European Enlightenment philosophy, according to which "*Virtually everyone aspires to freedom and autonomy*" (Inglehart, 2008, p. 131).

However, these aspirations are supposedly restricted by the necessity to satisfy more pressing needs such as physical security and survival (Inglehart, 2008; see also psychological theory by Maslow, 1954). With socio-economic development, a larger share of the population satisfies these basic needs and both emancipative and secular values are expected to increase as individuals break free from traditional norms (Welzel, 2013). This pattern of cultural change is argued to occur across the globe, including in non-Western societies, such as Japan (Welzel, 2012). Instead of directly linking development to emancipative and secular values, Inglehart (2008, p. 132) argues that such values reflect "*the general sense of security prevailing in one's society*", a proposition referred to as *scarcity hypothesis*. Economic prosperity is a major such source of existential security, but existential insecurity may come from various sources such violent conflict, environmental disaster, or indeed a deadly pandemic.

Although the revised modernization theory is primarily occupied with studying societal-level value change, some of their insights are also applied to the study of processes within societies. For example, the so-called Cultural Backlash theory (Norris & Inglehart, 2019) suggests that individuals feeling left behind from the process of globalization are inclined to revert to traditional values. The current study is primarily interested in how the pandemic has affected Japanese society's values as a whole, but we also explore the mechanisms of this change by shifting attention to smaller units of analysis, i.e., prefectures and individuals. If the mechanism of value change is indeed through one's subjective experience of existential (in)security, as the revised modernization theory claims, we

would expect changes at each of these three levels of analysis—national, prefecture, and individual—as long as there is variation in the way these units of analysis experienced the pandemic.

This study also relates to prominent theoretical debates on cultural change. According to Inglehart (2008), values do not adjust immediately to changing circumstances; they reflect the conditions in the pre-adult years and hardly change afterwards (*socialization hypothesis*). This perspective is supported also by the so-called *settled disposition model*, which examines cultural change through the lenses of intergenerational replacement and limited adaptation of individuals in their post-formative years (Kiley & Vaisey, 2020; Vaisey & Kiley, 2021). However, Tormos (2019) challenges this model by finding substantial value changes within the lifetime of individuals in Western societies, thus lending credibility to the alternative *active updating model*. Most studies we discussed in our literature review also consider the possibility of active adaptation of values to a rapidly changing environment (e.g., Daniel et al, 2021; Molteni et. al, 2021), although others state that this depends on the type of values or attitudes, some of which more stable than others (Reeskens et al, 2021).

In sum, the literature largely agrees that values reflect the level of existential insecurity (*scarcity hypothesis*), but continues debating whether change occurs mainly between generations (*socialization hypothesis* and *settled disposition model*) or also within individuals' adult life (*active updating model*).

1.4 Hypotheses

Based on the revised modernization theory's *scarcity hypothesis*, which emphasizes existential security as a source of value change, and the *active updating model*, which allows this change to happen fast, we expect that the immediate experience of the pandemic has caused values to shift towards a *lower* emphasis on freedom, equality, and secularity. Moreover, we expect that the stronger the psychological distress (as a proxy for existential insecurity) caused by the pandemic, the more values will reverse to traditionalism, meaning weaker support for individual and sexual liberties and gender equality, and stronger religiosity, nationalism, and family values. Based on this proposition, we formulate three more specific hypotheses as follows.

Since the pandemic is global in nature and virtually the whole Japanese population was aware of the entailed threat, regardless of their personal circumstances, we expect that:

Hypothesis 1 The Japanese population has become more traditional in its values due to the onset of the pandemic.

As noted earlier, some Japanese regions were more seriously affected than others. Particularly, at the time of our first survey during the pandemic, a state of emergency was announced in eight prefectures where the situation was most critical and the number of infections varied widely between prefectures (supplementary Appendix E). Therefore, we expect that:

Hypothesis 2 Prefectures more severely affected by the pandemic experienced stronger change towards traditional values.

Furthermore, regardless of the area of residence, individuals experienced the pandemic differently. Even if equally affected in terms of objective measures such as losing a job or having to work from home, not everyone necessarily experienced it subjectively in the same way, and we expect values to change as a reaction to personally perceived distress. Therefore, our third hypothesis is the following:

Hypothesis 3 Values of individuals who experienced more psychological distress during the pandemic turned more traditional than individuals who experienced less distress.

2 Data and Methods

2.1 Data

To test these hypotheses, we use datasets from three surveys: the World Values Survey (WVS) and the Values in Crisis (VIC), the latter of which conducted in two waves: at the beginning of the pandemic and a year later (Table 1). Fortunately, in terms of timing, the most recent wave (wave 7) of the WVS (henceforth WVS7) was carried out in September 2019, only a few months before the onset of the pandemic and approximately eight months before the first VIC survey.

WVS7 surveyed 1353 respondents over the age of 17 per mail, applying triple quotas based on census data from 2015 for gender, age, and area (Yamazaki, 2019). The VIC survey is part of a larger collaboration including more than a dozen countries globally (Welzel et al., 2020). The first wave of the Japanese VIC survey (VIC1) was conducted online on 15 and 16 May 2020 and included 3000 respondents. The data represent the population of Japan as of census data from 2015, in three strata: gender, age, and city size. The second wave (VIC2) was collected almost a year later and aimed to reach as many respondents from the first wave as possible, thus was carried out for a longer time period than the first wave: 5 to 19 April 2021. The retention rate was almost 60% ($N=1882$) and a refreshment sample of 1118 was added to reach the same total number of respondents as VIC1 ($N=3000$).

Even though both WVS7 and VIC surveys aimed to be nationally representative with respect to demographic characteristics, there are certain deviations from the actual population as per the census data (Table 1). Older, more educated, and female respondents are

Table 1 Description of surveys

| | WVS7 | VIC1 | VIC2 |
|----------------------------------|---|----------------------------|----------------------------|
| Time of survey | September 2019 | May 2020 | April 2021 |
| Number of respondents | 1353 | 3000 | 3000 (1882 + 1118) |
| Data collection mode | Mail-out | Online | Online |
| Quotas | gender, age, and area | gender, age, and city size | gender, age, and city size |
| Main deviations from census data | Older, more educated, and female respondents slightly overrepresented | Age < 70 | Age < 70 |

slightly overrepresented in the WVS7 (Yamazaki, 2019), while the VIC survey could not reach respondents at the age of 70 or older (see also supplementary Appendix C for sample differences between surveys).

2.2 Variables

Our dependent variables are emancipative and secular values and their comprising items. High emancipative values mean strong societal support for individual freedom and equality of opportunity; high secular values, in turn, denote strong support for freedom from traditional sources of authority such as religion, nation, family, and group norms (Welzel, 2013). In the original framework, the polar opposites to these values are labeled “patriarchal” and “sacred”, respectively. However, for convenience, we refer to both value polarities together as “traditional”, which is empirically justifiable by the observation that they generally covary across nations (see supplementary Appendix B).

These values are constructed using a formative, instead of latent-variable approach (Welzel, 2013), meaning that they comprise conceptually related items that may not correlate strongly with each other. Hence, we refer to them as indices—Emancipative Values Index (EVI) and Secular Values Index (SVI), respectively (see Fig. 1)—and we run all analyses also separately for their components, in order to capture dynamics in more specific attitudinal measures. Their original versions comprise four sub-indices each measured by three items from the WVS (Welzel, 2013). The VIC surveys include a short version of these values comprising only two sub-indices, albeit those with the highest loadings on the composite index (Welzel, 2013). Item wording and response scales were identical with a few exceptions. Two VIC survey items, measuring EVI’s Equality sub-index, use different scales than the corresponding items in the WVS7, and are therefore excluded from comparisons between WVS7 and VIC surveys. Additionally, one item of SVI’s Agnosticism sub-index is also not comparable, because it asks respondents about attendance of religious services *before the pandemic* instead of current attendance. We measure EVI as the extent to which respondents support gender equality in education, labor market, and politics (the last two not available for the WVS7-VIC comparisons), and accept homosexuality, abortion, and divorce. For SVI, we have five items: disagreeing that one of the important goals in life is to make parents proud, not being proud with nationality, not approving greater respect for authority, not finding religion important in life, and defining oneself as an atheist or

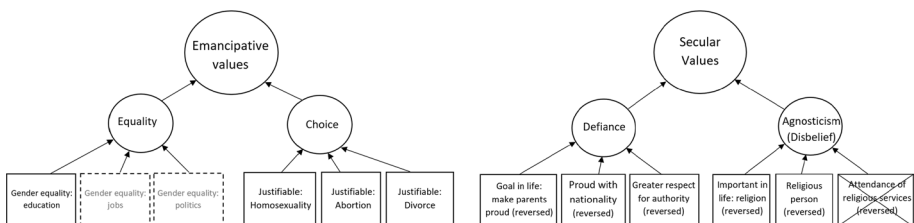


Fig. 1 Composition of Emancipative and Secular Value indices. *Note.* In rectangles are observed items; in circles are composite indices and sub-indices. In rectangles with dashed borders are items included only in the analyses using exclusively VIC1 and VIC2 data sets (i.e., these items are not used when computing the respective index for the WVS7-VIC1 comparison). The crossed-out item was not used in any analysis as an outcome variable

agnostic (versus a religious person). All items and indices were rescaled to vary between 0 and 100. EVI and SVI were coded as missing if a single component item was missing.

The VIC surveys measure psychological distress by a scale consisting of five items: (1) Feeling nervous, anxious, or on edge; (2) Not being able to stop or control worrying; (3) Feeling down, depressed or hopeless; (4) Little interest or pleasure in doing things; and (5) Feeling lonely. A Cronbach's alpha of 0.92 indicates high internal scale consistency. The psychological distress variable had a range from 1 to 4 ($Mean = 1.67$, $SD = 0.83$ in the pooled VIC1/VIC2 sample).

Those two surveys also included shortened measures of the Big Five personality traits (10 items) (Rammstedt & John, 2007). Besides values and psychological measures, we use a set of socio-demographic variables from all three surveys to adjust our analysis for potential differences in these characteristics, which we describe in Sect. 2.3.

Only observations having information on the full set of adjustment variables and on at least one of the indices (EVI or SVI) were retained for analysis ($N = 1138$ from WVS7, $N = 2920$ from VIC1, $N = 2827$ from VIC2).

2.3 Empirical Strategy

2.3.1 Hypotheses 1 & 2

The first two hypotheses were tested by comparing results from national surveys conducted before and during the pandemic. Importantly, causally attributing any observed differences in values between the surveys to the pandemic requires excluding other confounding factors. WVS7 and VIC respondents might differ in some characteristics that also predict EVI and SVI, which requires adjusting for such differences.

Although both surveys are designed to target nationally representative samples, there are differences in sample composition with respect to some demographic variables (see supplementary Appendix C). Nevertheless, the range of observed characteristics overlaps to a large extent. Therefore, it is possible to employ inverse probability of treatment weighting (IPTW; explained in more detail in supplementary Appendix A) to statistically control for these differences (Austin & Stuart, 2015). A particular strength of the data is that VIC1 asked about the frequency of religious service attendance *before the pandemic*, a question also present in WVS7 (phrased to mean *current* attendance), such that, besides demographic and geographical factors, respondents could also be weighted with respect to a behavioral proxy for their "baseline" religiosity before the pandemic, making the samples more comparable in a dimension that is very likely linked to the outcomes of interest.

To construct weights for IPTW, we estimated propensity scores for all WVS7 and VIC1 respondents based on nine characteristics: age, number of children, household size (all continuous), gender, marital status, education, prefecture, town size, and prior religious services attendance. These scores represent the probability of being surveyed in WVS7 rather than VIC1, given each respondent's socio-demographic characteristics (see supplementary Appendix A for details), and were estimated via logistic regression (estimated model shown in supplementary Appendix D). Propensity scores show a large region of common support between WVS7 and VIC1 (Fig. 2a) and weighting strongly improves the balance between samples (Fig. 2b and supplementary Appendix C). To adjust for remaining sample differences, the same covariates used for propensity score estimation were also included as predictors in the outcome regression models, adding also a squared term for

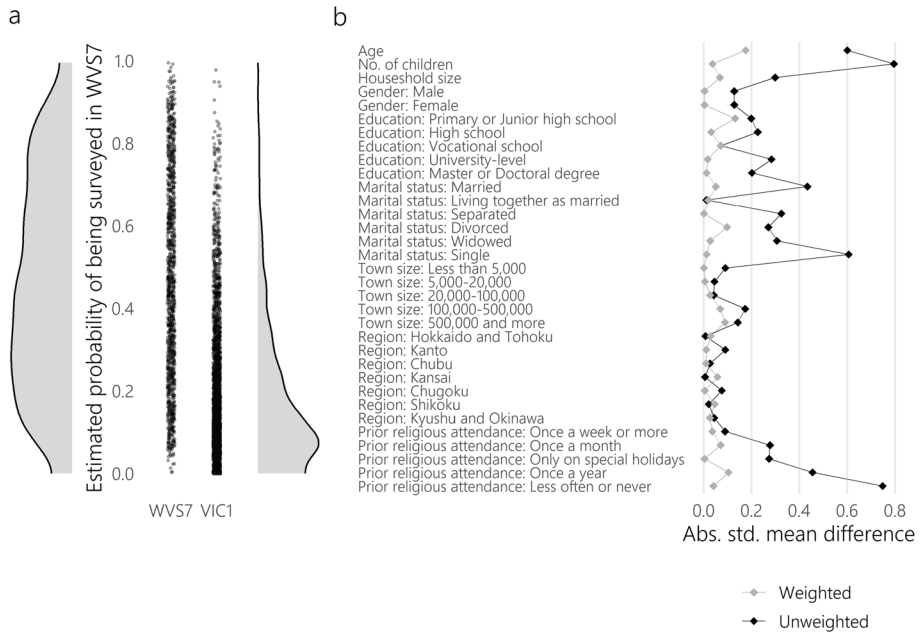


Fig. 2 **a** Overlap of propensity scores between WVS7 and VIC1 surveys. **b** Absolute standardized mean difference in individuals' characteristics between the two surveys when using inverse probability of treatment weighting based on estimated propensity scores in combination with post-stratification weights ("Weighted") versus raw sample data ("Unweighted")

age. The combination of IPTW with regression adjustment represents a "doubly-robust" approach to causal inference (e.g., Hernan & Robins, 2020).

To also improve the generalizability of findings from our samples for the Japanese adult population as a whole, we further used post-stratification weights, which we then multiplied with the propensity weights to simultaneously account for aspects of confounding and survey design (Dong et al., 2020; Ridgeway et al., 2015). In particular, we post-stratified by gender, age, and prefecture based on recent Japanese census data from 2020 (for details, see supplementary Appendix A) and indeed achieved close alignment of sample frequencies and population frequencies (supplementary Appendix C).

For assessing Hypothesis 1, we estimated the contrast between values before and after the pandemic's onset (WVS7 to VIC1) as the coefficient of a dummy variable (1 if the observation belonged to the VIC1 survey, 0 if it belonged to WVS7) in linear regressions with heteroscedasticity-robust standard errors (HC1 type), weights and all adjustment variables. To analyze longer-term impacts, we also ran linear regressions comparing WVS7 and VIC2. As a robustness check, these were run once with the remaining longitudinal sample of respondents from VIC1 (i.e., those that took part in both VIC1

and VIC2), and once with the full sample from VIC2 (i.e., the remaining longitudinal sample + the refreshment sample).

For assessing Hypothesis 2, we focus on the comparison of WVS7 with VIC1. The goal was to test whether the pandemic effect on values was stronger in prefectures that were more severely affected at the pandemic's initial onset. The indicator of prefecture-level severity was the number of cumulative COVID-19 infections per 100,000 up to the day of the VIC1 survey in May 2020 in the respondent's prefecture (Japan Broadcasting Corporation, 2021). Hence, this variable captures between-prefecture heterogeneity in exposure to health risk, but also in exposure to psychological, economic, and social impacts of the pandemic. It strongly correlates with the cumulative incidence of COVID-19 deaths up to the VIC1 survey day ($r=0.90$) and the declaration of a state of emergency in the prefecture ($r=0.62$). Cumulative infections ranged between 0.0 and 36.1 (*Median* = 5.9, *Mean* = 7.8, *SD* = 7.4; see supplementary Appendix E for geographical differences).

To estimate the effect of crisis severity, linear regressions were fit with an interaction term between cumulative infections in the prefecture and a dummy indicating whether the respondent was from the VIC1 (vs. WVS7) survey, as well as all adjustment variables (now using region dummies instead of prefecture dummies to avoid perfect collinearity). A negative coefficient for this interaction term would indicate that a decrease in certain values was larger in prefectures with a higher cumulative incidence of infections. Standard errors were clustered at the prefecture level.

2.3.2 Hypothesis 3

The third set of analyses exploited individual differences in experience of psychological adversity during the crisis and therefore excludes WVS7 respondents. Accordingly, propensity weights play no role in this analysis and only post-stratification weights are used in the regressions. We tested whether variation in values was linked to variation in psychological distress, adjusting for the same variables as above and additionally for the shortened measures of all Big Five personality traits, household income (which had not been elicited in WVS7 in similar detail and completeness) and VIC survey wave (1 or 2). All respondents from VIC1 were included in the analysis as well as the refreshment sample from VIC2.

We preferred to conduct the analysis between instead of within individuals for two reasons. First, we identified that the 40% drop-outs in our second survey were not random with regard to our key explanatory variable, psychological distress. The drop-outs had higher distress in VIC1 than the retained sample (1.75 vs. 1.65 points, $p=0.003$, Welch's t-test) and the replacement sample had higher distress in VIC2 than the retained sample (1.74 vs. 1.61 points, $p<0.001$). The fact that distressed respondents were more likely to be lost to follow-up may introduce bias in within-individual analysis, which needs to exclude those respondents. Second, we expect that value change occurred mostly in the early stage of the pandemic, i.e., around VIC1 survey, when, due to the initial shock, there was a significant increase in psychological distress (Kikuchi et al., 2020). Subsequently, between the VIC1 and VIC2 surveys, people likely became accustomed to the continuous threat. In contrast to many Western countries, the pandemic in Japan remained relatively well under control during the observed time frame, resulting in no further exacerbation of distress (Yoshioka et al., 2021). In line with these considerations, we find high intra-individual correlation of distress between survey

waves ($r=0.53$). An analysis that discards all variation except within-individual changes hence has limited power. For completeness, results from within-individual analysis (fixed-effect regression) are nevertheless presented in supplementary Appendix F.

All analyses were conducted in R 4.3.1 (R Core Team, 2023). Data and code are available for the reader to reproduce all findings at <https://github.com/stefgehrig/japanvalues>.

3 Results

3.1 National-Level Change

Results in Fig. 3 indicate differences in values between shortly before (WVS7) and after the onset of the pandemic (VIC1). Emancipative and secular values have decreased significantly in the first few months of the pandemic. Most striking are the greater respect for authority and importance of religion, as well as the substantially lower support for gender equality and acceptance of homosexuality. Two items changed in an unexpected direction: acceptance of abortion and not being proud with the nation, both of which increased (we discuss possible reasons in Sect. 4). Given the correction for sample differences via weighting and regression adjustment, and since the two surveys were only eight months apart, with the long-term trend before the pandemic being in the emancipative/secular direction (see supplementary Appendix B), we conclude that the pandemic has overall negatively affected the values and attitudes of Japanese people, thus confirming Hypothesis 1.

Figure 4 shows longer-term differences in values compared to before the pandemic. Almost a year after VIC1, the point estimates of both EVI and SVI have remained largely unchanged between VIC1 and VIC2. Some increase is observed in not being proud with the nation and acceptance of abortion, which essentially continue the trends from the previous survey. Other moral permissiveness items, such as acceptance of homosexuality

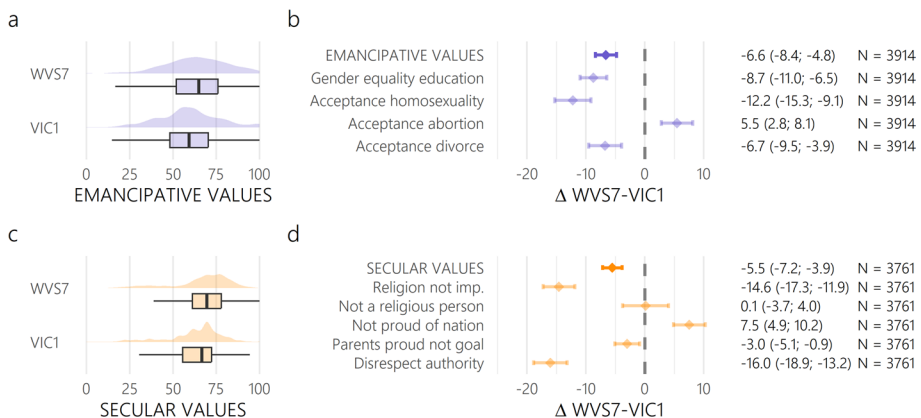


Fig. 3 Box and density plots show the weighted distribution of **a** EVI and **c** SVI before (WVS7; 2019) vs. after the onset of the pandemic (VIC1; 2020). Forest plots show changes in **b** EVI and **d** SVI and all their component items as estimated in weighted linear regressions including adjustment variables. *Note.* All variables are coded in such a way that negative values reflect a decrease in EVI and SVI. Estimates are shown with 95% confidence intervals (columns on the right). Models are adjusted for age, gender, number of children, household size, marital status, education, prefecture, town size, and prior religious services attendance

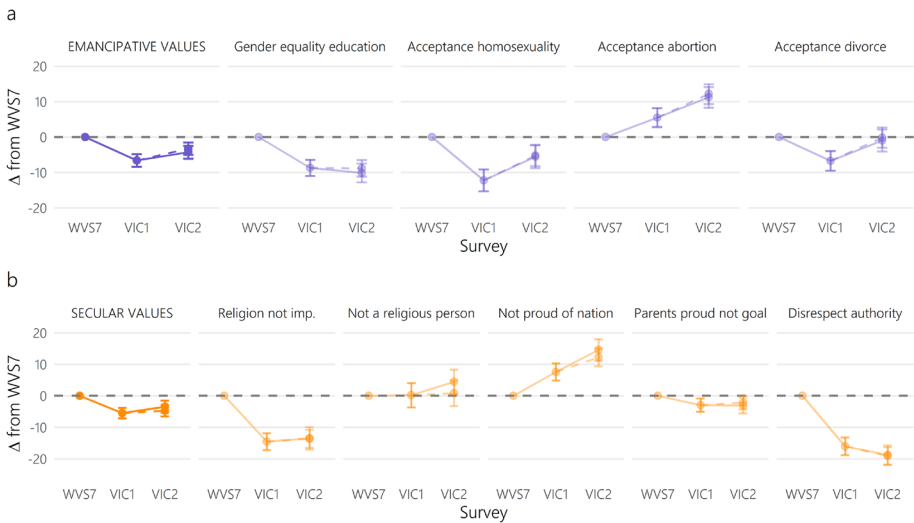


Fig. 4 Value changes between WVS7 (2019) and the two VIC surveys (2020 and 2021) as estimated in weighted linear regressions including adjustment variables. *Note.* For VIC2, results are shown from an analysis based on the follow-up of respondents from VIC1 (solid line) and based on the complete VIC2 sample (dashed line). All variables are coded in such a way that negative values reflect a decrease in EVI and SVI. Estimates are shown with 95% confidence intervals. Models are adjusted for age, gender, number of children, household size, marital status, education, prefecture, town size, and prior religious services attendance

and divorce have also registered slight increases, implying a modest recovery back in the direction of pre-pandemic levels. Attitudes towards gender equality, importance of religion, and disrespect for authority, which were most strongly affected by the pandemic according to our first survey, have apparently not yet begun to recover a year later. These results indicate a lasting impact of the pandemic on values, at least for some aspects.

3.2 Prefecture-Level Variation in Change

Next, we present the effect of the severity of the pandemic on the change in values from before to during the pandemic (WVS7 to VIC1), with severity measured as the cumulative infection rate at the prefecture level (Fig. 5). The results broadly resemble those of the overall changes presented in the previous analysis, although there is higher uncertainty in the estimates and most confidence limits are not far from the zero line. As hypothesized, the pandemic’s severity appears to accelerate the decrease in both EVI and, to a slightly lesser extent, SVI, and most strongly so for the disrespect of authority item. Again, we see that national pride deteriorates with the pandemic’s severity, despite the tendency of other traditional values to become more pronounced. To ease interpretation of the interaction effects, we visualize model-based predictions in supplementary Appendix E.

3.3 Individual-Level Variation in Psychological Distress and Values

Next, we report the association between psychological distress and values among respondents from both surveys conducted during the pandemic (VIC1 and VIC2), adjusted for several socio-demographic variables and measures of personality. The effect of distress

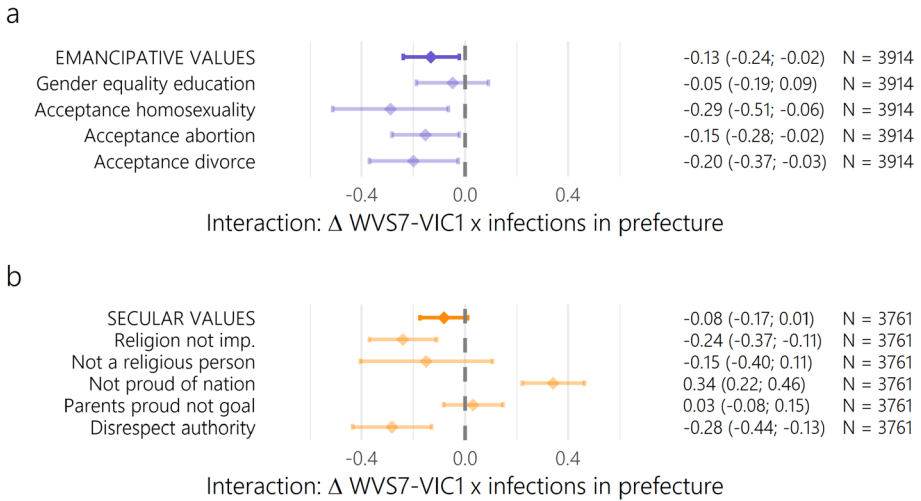


Fig. 5 Effect of the number of cumulative infections in the prefecture (per 100,000) on the change in values from before to during the pandemic as estimated in weighted linear regressions including adjustment variables. *Note.* Negative estimates indicate that the decrease in values from WVS7 (2019) to VIC1 (2020) is stronger in prefectures with higher infection rates. Estimates are shown with 95% confidence intervals (columns on the right). Models are adjusted for age, gender, number of children, household size, marital status, education, region, town size, and prior religious services attendance

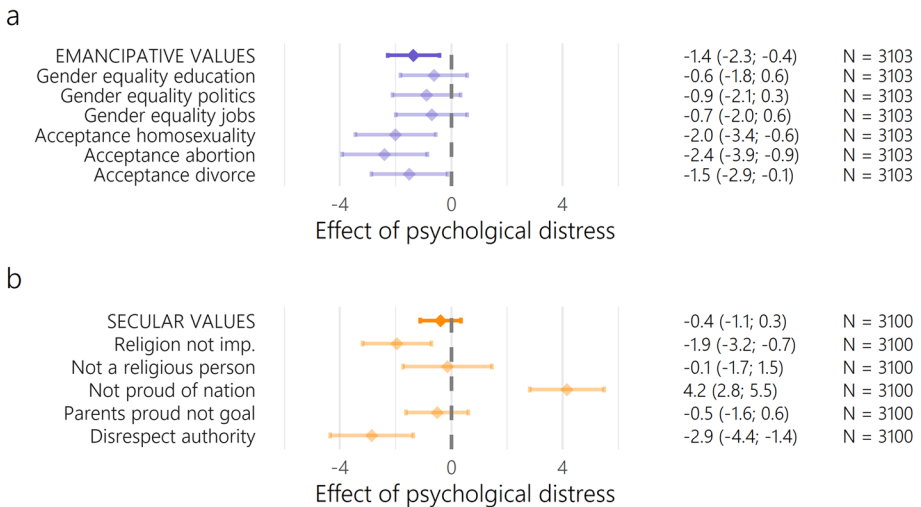


Fig. 6 Association between psychological distress and **a** EVI and **b** SVI among VIC1 and VIC2 respondents as estimated in weighted linear regressions including adjustment variables. *Note.* Estimates are shown with 95% confidence intervals (columns on the right). Models are adjusted for age, gender, number of children, household size, marital status, education, prefecture, town size, prior religious services attendance, household income, and brief measures of the Big Five personality dimensions

on items measuring EVI is rather uniform (Fig. 6): persons reporting more psychological distress tend to exhibit somewhat lower support for gender equality, however, with more marked effects on the choice sub-index items (acceptance of homosexuality, abortion, and divorce). Regarding SVI, a higher level of psychological distress is associated with higher importance of religion and more respect for authority, thus remarkably overlapping with the findings on the national- and prefecture-level change. Again, in accord with those findings, individuals who suffer from psychological distress are distinctly less proud with being Japanese. Likely due to the strong positive effect on not being proud with the nation, the overall effect on SVI is rather weak (indeed, if we exclude that item from the index, the overall effect of distress on SVI turns out to be strong, with a point estimate of -1.4 [95% CI: -2.1; -0.6] instead of -0.4 [95% CI: -1.1; 0.3]).

4 Summary of Empirical Findings

To summarize, examining the variation at all levels of analysis—national, regional, and individual—we find that the experience of the pandemic is linked to a reversal to more traditional, intolerant, and religious values. In the national-level analysis (Hypothesis 1), comparing national pre-versus post-pandemic values, effects are strong for the emancipative and secular indices as well as most of their components. This average national pattern largely re-emerges when quantifying the moderating role of pandemic severity in the prefecture of the respondent, albeit with more uncertain estimates (Hypothesis 2). The individual-level analysis (Hypothesis 3) delivers substantial evidence that levels of psychological distress are also correlated with lower emancipative and secular values, conditional on an extensive set of potential confounders (i.e., variables that might be linked both to susceptibility to distress and personal values).

Notably, the pattern of change was not uniform across all the individual items. Among the most consistent and strong effects were the increase in religiosity and respect for authority suggesting that amid the pandemic individuals may seek security in traditional sources of authority such as religion and family. Considering the simultaneous decrease in national pride emerging in all three analyses, the nation may not provide the same source of security for Japanese people. Signals are most mixed for the item on acceptance of abortion. Such acceptance appears to increase in the national average with the start of the COVID-19 pandemic and remains high a year later, but when examining variation in pandemic exposure between prefectures and individuals, the effect is in the opposite direction.

5 Discussion

Our study across different levels of analysis, utilizing three large surveys, suggests that the pandemic has caused a reversal toward more traditional societal values in Japan. This supports Inglehart's revised modernization theory (*scarcity hypothesis*) in linking existential insecurity to conservative values, as well as theories that more specifically focus on the effects of pathogen prevalence on values (e.g., Fincher et al., 2008; Welzel, 2013). Our study takes advantage of the unprecedented occurrence of a global pandemic in modern times to document this mechanism of cultural change. This study also contributes to our understanding of cultural differences between modern societies, which ostensibly reflect

the accumulation of learnt patterns of thought and behavior that is adaptive to the prevalent environmental conditions in a given society throughout its history.

We demonstrate that such adaptation to changing environment can occur even for a much shorter period than previously supposed and on issues that were considered rather stable such as religiosity and gender equality (Reeskens et al., 2021). Gradual cultural change that happens primarily between generations (Inglehart, 2008; Kiley & Vaisey, 2020) may only account for a part of the total change produced by socio-environmental changes, which is also driven by period effects (Tormos, 2019). Given a sudden and acute existential crisis, such as the COVID-19 pandemic, humans might adapt to threat by swiftly shifting their value priorities. Our study, therefore, enriches the debate between *settled disposition* and *active updating models* of stability and change in culture (Kiley & Vaisey, 2020). While Kiley and Vaisey (2020) find stronger support for the stability of attitudes within individuals, their evidence is drawn from a relatively stable pre-pandemic time period. The reason we find ample evidence in favor of the alternative active updating model might be precisely because we tracked the change at a time of considerable environmental turmoil. In the presence of a glacial-speed environmental change, attitudinal adaptation might be equally difficult to detect in a short time period.

Our findings should not be surprising given the magnitude of the pandemic's impact that has brought concerns about our very existence on a mass societal scale. We find that the societal adaptation in terms of values in Japan is considerably large. Our models estimate a decline of about 7 and 6 points on a 100-point scale for EVI and SVI, respectively, and even larger for specific issues such as respect for authority (16 points), importance of religion (15 points), and acceptance of homosexuality (12 points; Fig. 3). Such changes, in either direction, typically take a decade or longer to occur. Our empirical strategy, which re-weights VIC observations to align them with the Japanese population surveyed in the WVS, allows making reasonable comparisons between our estimated effect sizes and the longitudinal change documented over the five most recent WVS waves (see supplementary Appendix B). Such a comparison indicates that, a few weeks after the onset of the pandemic, emancipative values had been "set back" to the level of roughly a decade earlier, with no clear recovery in the following year. Of course, this interpretation is only warranted under the assumption that our methods largely eliminate alternative explanations (see Sect. 5). Noteworthy, though, even accounting for the estimated impact of the pandemic, Japan retains its fairly high relative global position in emancipative and secular values (see supplementary Appendix B).

Other studies from Western countries on the pandemic's impact suggest a turn to conservatism, but at a negligible rate and not uniformly across all investigations (e.g., Vartanova et al., 2021), and some indicate even change in the opposite direction in all (Lampert et al., 2021) or at least some specific attitudes considered more volatile (Reeskens et al., 2021).

We offer potential methodological and substantive explanations for these discrepancies. First, it is important to consider the timing of the investigation. Lampert et al.'s study surveyed respondents for the first time between end of January and March 2020 when the pandemic was already causing serious concerns across the globe. Thus, the first survey may already reflect the initial impact of the pandemic rather than a "baseline" measurement. Second, the authors report that at least 1000 respondents were surveyed initially, while an average of 365 respondents completed the survey at the second time point (p. 45). There are no further details on how the authors addressed this issue, which casts a serious doubt that the differences between the two waves reflect actual population changes. In contrast, Reeskens et al.'s study achieves a retention rate

of about 60% (comparable to ours) and also applies post-stratification weights to correct for the sociodemographic structure of the Dutch population. Their first wave of data, however, was collected at the end of 2017, thus their results likely reflect more than two years of pre-pandemic growth in these values (plausibly assuming that previous trends continued) rather than only the pandemic's impact.

Furthermore, societies experience the pandemic with different intensities, not only in terms of prevalence of the disease, mortality, and economic impact, but also psychologically. East Asian populations top the global ranking in terms of being frightened of the COVID-19 pandemic, despite (or as a result) having substantially lower infection rates than countries from all other world regions, which exhibited more relaxed attitudes towards the risks of infection (Li et al., 2022). Thus, a culture's susceptibility to experience threat and uncertainty may act as its own catalyst of cultural change. In that case, our findings likely reflect not only the pandemic's impact, but also its interaction with Japanese culture's extreme aversion to uncertainty (Hofstede et al., 2010). Although the existential threat's impact on values may be universal across the globe, the magnitude may be amplified in Japan's (or East Asia's) unique cultural setting.

Noteworthy, along with the changes in the expected direction towards more traditional values, we also observed some effects on individual items that were in the opposite direction to that of the rest. Justifiability of abortion has increased on average, which in the highly secular Japanese context is more disassociated from religiosity, and may reflect an increased desire to control reproductive decisions in times of uncertainty (Aassve et al., 2020). National pride has decreased, in contrast to the marked and stable increase in respect for authority, and the slight and non-robust increase in desire to make parents proud, all of which together form the conceptually derived Defiance sub-index of SVI. The decreased national pride may be linked to people's negative evaluation of the performance of the government in dealing with the pandemic (Taniguchi et al., 2022), which may not necessarily reflect its actual performance in comparison to other nations. The increased respect for authority and diminished national pride thus may occur simultaneously because people demand strong authority during periods of insecurity, such as a pandemic, while they may be unable to feel proud of their nation because the government has failed to meet that expectation. Moreover, positive feelings such as pride might generally be inhibited by psychological distress. These two examples suggest that, at least in the short term, items that supposedly fall under the same conceptual umbrella may be affected differentially by specific environmental changes.

6 Limitations and Further Research

Interpreting the statistical results causally requires assuming that our adjustment strategies are sufficient to control for confounding and therefore to rule out alternative explanations. This includes, for example, the assumption that the WVS7 and VIC1 samples do not differ in important *unobserved* predictors of emancipative and secular values. Put differently, we assume that the characteristics we control for (see, e.g., supplementary Appendix C) are sufficient to eliminate confounding between survey participation (WVS vs. VIC) and emancipative/secular values. Panel surveys that follow the same individuals are in general preferred because observed changes cannot be due to changes in sample composition. However, panel surveys are prone to other issues, like a typically high and non-random drop-out rate. Thus, while panel studies enable making stronger claims about causal effects

occurring within individuals, generalizations regarding population-level effects require great caution. In contrast, our study used data sets from surveys that targeted representative samples of the entire Japanese population and used IPTW in combination with regression adjustment to control for remaining sample differences. Still, we cannot completely rule out remaining biases, especially response bias in online (VIC) as compared to mail surveys (WVS7), which may distort our comparisons. Nevertheless, previous studies show that paper-and-pencil and online modes of data collection provide comparable results when measuring social values (Lilleoja et al., 2016). Moreover, our findings are strikingly consistent across analyses at three levels of variation and go against the previous temporal trend in Japan (supplementary Appendix B). Noteworthy, the VIC sample is slightly younger, has fewer children, is less often married and attended religious services less frequently before the pandemic than the WVS7 sample (supplementary Appendix C). These characteristics, for which we adjust, indicate that, if anything, the VIC sample is biased in the direction of a more liberal and less traditionally-minded subset of the Japanese population. For example, age is negatively correlated with EVI ($r = -0.33$) and SVI ($r = -0.28$) among Japanese WVS7 respondents. Therefore, we expect remaining biases due to sample differences to work *against* rather than in favor of our hypotheses.

Besides sample composition and survey mode, confounding due to other events that occurred between WVS7 and VIC1 could also be a concern. However, it is reasonable to assume that, given the exceptional impact of the COVID-19 pandemic on all domains of life, the typically slow pace of “natural” value change in an upward direction (supplementary Appendix B), and the small time window between the two surveys (eight months), no other events occurred in Japan that could have affected national values in a similarly impactful way. This is especially the case for the combined indices, in contrast to individual items, which could more easily be affected, for example, by a recent and salient media discourse on a particular topic.

We are curious to know how durable these value changes are. For example, the global religious resurgence in the first months of the pandemic documented by Bentzen (2021) leveled off relatively quickly, but her measure of religiosity remained above pre-pandemic levels until at least December 2020. For Japan, the VIC2 survey, conducted 11 months after VIC1, indicates that the initial decline in emancipative and secular values remains mostly stable, but we are unable to predict whether the previous trend might be permanently altered or values will return to their baseline level when the effects of the pandemic dissipate. It is similarly uncertain if more significantly affected individuals would remain traumatized and take longer to recover than the general population. Therefore, even if the overall trend in values in the Japanese society reaches and surpasses the pre-pandemic levels, this may be due to the changes experienced by the majority of the population, despite individuals who experienced stronger psychological distress continuing to hold more traditional values. The upcoming WVS wave 8, expected around 2024–2026, would allow to provide evidence-based answers to these questions.

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Declarations

Conflicts of interests The authors have no relevant financial or non-financial interests to disclose.

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