FRONT MATTER

Full Title (98 characters): Latent Profile Analyses of Explanations about the Origin of SARS-CoV-2 Within and Across Countries

Short Title (46 characters): SARS-CoV-2 Beliefs Within and Across Countries

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Abstract (148 words): Research on belief endorsement typically estimates an average mean value to describe all individuals even though groups of individuals can have coexisting beliefs within the mind. This study employed a person-centered approach based on latent profile analysis (LPA) to investigate within- and between-population variation in the endorsement patterns of multiple explanations for the origin of SARS-CoV-2, including zoonotic, human-made, and supernatural explanations, across eleven countries. Results revealed seven latent profiles that varied in the number and type of explanations endorsed, as well as the degree of certainty associated with each. Among demographic characteristics, political orientation and religious affiliation predict whether particular types of explanations are endorsed or rejected. Latent profiles characterized by explanatory uncertainty and endorsement of conspiratorial explanations were less likely to wear masks and vaccinate. We discuss the implications of person-centered analytical approaches for documenting variation in explanation endorsement and as predictors of behavioral health outcomes.

Teaser (124 characters): Groups of individuals that are uncertain or endorse conspiracies are less likely to engage in preventative health behaviors.

MAIN TEXT

Introduction

The origin of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) remains a subject of controversy (*1*, *2*). The transfer of pathogens from non-human animals to humans remains the most plausible explanation for the origin of SARS-CoV-2 (*2–5*). However, a plethora of explanations exist, varying in relative endorsement by global region and country. For example, multiple explanations have circulated within the U.S. that propose the virus was created as a bioweapon at the Wuhan Institute of Virology (WIV), spread through 5G cellular technology, or intentionally designed as a means of population control (*6*, *7*). The types of explanations available are not always the same within or between countries, such as claims in China that SARS-CoV-2 originated from the U.S. (*8*), claims in South Asia and the U.K. that immigrant and minority communities introduced the virus (*7*), or claims in Southeast Asia that global elites introduced the virus to stop the rise of Islam (*7*).

Infectious diseases are complex natural phenomena that often evoke multiple causal explanations for their occurrence (*9*). There are different psychological strategies for reconciling or integrating multiple explanations – a process referred to as explanatory coexistence (*10*). One line of research demonstrates the coexistence of scientific and intuitive theories (*11*), where children and adults hold intuitive theories that often conflict with scientific theories regarding cause and effect of natural phenomena (*12–14*). Another line of research demonstrates the coexistence of natural and supernatural explanations (*10*, *15*), where children and adults differ in the extent to which they integrate scientific and religious explanations to explain phenomena such as illness, death, and evolution (*9*, *10*).

SARS-CoV-2 is an ideal context for studying explanatory coexistence because it is likely to invoke multiple causal explanations (*10*, *15*). First, the pandemic involves the spread of microorganisms—causal agents unobservable to our everyday senses. Microorganisms such as SARS-CoV-2 likely originate from pathogens that spread from non-human animals to humans due to prior instances of zoonotic spillover of infectious diseases (*16*, *17*). However, the lack of identifying a progenitor or causal pathway of SARS-CoV-2 may lead people to speculate that hidden, powerful human groups (*6*, *7*) or supernatural agents (*18–20*) are causally responsible for the pandemic. Second, disease prevention and treatment practices are deeply rooted in cultural traditions that predate our current scientific understanding of pandemics. For instance, despite a lack of efficacy, home remedies or vitamin supplements have been consumed in attempts to prevent or cure SARS-CoV-2 infection (*21*). Finally, the pandemic is associated with strong emotions such as impassioned political discourse over adopting novel preventative behaviors (*22*).

Beliefs regarding the origin of infectious diseases may ultimately impact health behaviors, namely, facial mask-wearing and vaccination status. Discussion regarding the origin of SARS-CoV-2 remains heated as the U.S. government claims it was a lab leak from China (*23*, *24*), China claiming it was a lab leak from the U.S. (*25*), and the WHO releasing a report stating that zoonotic origins remain the best supported hypothesis despite uncertainties (*4*). In the current political context, assessments of future disease outbreaks can have significant consequences for implementing actions that either facilitate or hinder the spread of emerging infectious diseases. In the United States, the government has dismantled much of the vaccine infrastructure, from defunding research on vaccines to spreading false information on the dangers of vaccination (*26*). Mask-wearing was also the subject of political division despite evidence that masks are effective in reducing airborne transmission when used correctly (*27*). Sources of information about

infectious diseases that are misleading or false can hinder engagement in preventive health behaviors crucial to preventing disease outbreaks, whether now or in the future. Thus, implementing health behaviors requires understanding how groups of individuals might differ in the types of origin explanations they endorse or reject.

The vast majority of research to date has examined explanation endorsement for the origin of SARS-CoV-2 with binary response options, a single question with multiple response options, or multiple statements with multiple categories (*18–20*, *28–34*). For example, one study found that when participants in Italy were asked to select only one response option, 40% endorsed zoonotic origins, followed by 33% who believed the virus originated from failed scientific experiments, 13% who attributed it to U.S.-China warfare, and 13% who were unsure (*34*). The previous example, however, shows that selecting one response option obscures their degree of confidence in the explanation itself and other explanations. For instance, when accounting for the degree of endorsement, 39.7% of Dominican Republicans were unsure that SARS-CoV-2 had zoonotic origins, 32.5% disagreed, and 27.8% agreed (*31*). In another study, when U.S. participants could select all options that applied, 59.8% endorsed zoonotic origins, followed by 35.2% endorsement for the virus originating from biological warfare, 14.8% for the will of a higher power, 14.5% for the Earth cleansing itself, and 6.6% for a hoax (*19*). While these findings describe the level of endorsement for a particular explanation across individuals, they do not indicate whether individuals endorse a single explanation or multiple explanations.

Identifying distinct subgroups that differ in their distribution of explanation endorsement provides insight into shared characteristics of subgroups rather than assuming an average estimate across every individual. A person-centered approach assumes that individuals are homogeneous within their group but heterogeneous across groups (*35*). A latent profile analysis (LPA) is a type of person-centered analytic tool that identifies latent subpopulations within a population based on a combination of variables (*36*). Specifically, a latent profile analysis estimates the number and configuration of latent profiles based on observed indicators and then assigns each individual a probability of belonging to each latent profile (*35*). Identifying latent subpopulations, or latent profiles, helps to distinguish whether endorsement levels are consistently high or low across all variables for an individual and whether individuals vary in their level of endorsement across variables (*37*).

Adopting a person-centered approach complements the explanatory coexistence framework, which has demonstrated that individuals often hold multiple explanations for the same phenomenon (*10*). Using LPAs as an analytic tool to study explanatory coexistence provides a fine-grained perspective on studying whether levels of endorsement revolve around a single explanation or a combination of explanations. The current work extends previous research by conducting LPAs with a globally diverse sample and including a comprehensive range of scientifically endorsed, human-made explanations, as well as supernatural explanations. Additionally, we investigate how groups that differ in their endorsement of explanations are associated with variations in demographic characteristics or health behavioral outcomes.

Recent studies that have conducted LPAs on misinformation (*38*, *39*) and conspiracy theories (*40*) offer some insight into the kinds of latent profiles that might emerge. Two studies found latent profiles that differed in their endorsement of explanations, including one profile that only endorsed the zoonotic explanation (*38*, *39*). They also demonstrated that a higher level of religious commitment was associated with a latent profile characterized by explanatory uncertainty (*38*). In contrast, more political commitment was associated with a latent profile characterized by endorsement that COVID-19 was meant to restrict personal liberties (*39*). In another study, three latent profiles were identified that differed in their levels of endorsement of COVID-19 conspiracy explanations; however, demographic characteristics such as age, gender, and education were not associated with latent profiles (*40*).

The current work investigates four research questions: 1) What are the patterns and levels of endorsement of multiple explanations for the origin of SARS-CoV-2; 2) to what extent do they vary between and within globally diverse populations; 3) what kind of demographic variation is associated with latent profile membership and; 4) how do the latent profiles predict health behavioral outcomes such as facial mask-wearing and vaccination status? To answer these research questions, the current study used a globally diverse sample of 4,831 participants from Brazil, China, Germany, India, Israel, Japan, Mexico, Russia, South Africa, the U.K., and the U.S. In the face of uncertainty about the origin of infectious diseases, this study proposes that individuals are likely to endorse a combination of explanations, including scientifically endorsed, natural explanations (e.g., zoonotic transmission), human-made explanations (e.g., virus created as a bioweapon), and supernatural explanations (e.g., punishment from God). Moreover, identifying subgroups that are distinct but share similar characteristics helps to pinpoint which psychologically meaningful subgroups differ in demographic characteristics and provides insight into which diverse origin beliefs predict engagement in preventive health behaviors.

Our work makes several contributions to the explanatory coexistence literature. First, to our knowledge, no previous studies on explanatory coexistence have employed mixture modeling, despite this analytic approach complementing the theoretical framework that suggests groups of individuals can differ in the types of explanations they endorse. Second, we examine how groups of individuals differ in their endorsement of a broad range of explanations, building on previous work that primarily focuses on the coexistence of intuitive and scientific theories (*11*) or natural and supernatural explanations (*10*). Third, our study provides a cross-cultural comparison on explanatory coexistence, building upon previous studies limited to single sample populations (*9*, *41–43*) or cross-cultural comparisons with a limited number of populations (*44*, *45*). Finally, we investigate the impact of explanatory coexistence on engaging in behaviors that are critical to health outcomes.

Results

What are the patterns and levels of endorsement for explanations about the origin of SARS-CoV-2?

We applied the LPA model across the eleven countries. Table 1 presents model fit indices from two to nine latent profile solutions. Statistical fit indices generally improved as the number of profiles increased. The entropy values were high for all profile solutions (.911-.962), indicating that each solution had high accuracy in assigning individuals to their appropriate latent profiles. The adjusted Lo-Mendell-Rubin likelihood ratio test (LMR) was significant for all solutions for the seven, eight, and nine profile model solutions. For each solution, the mean endorsement levels were assessed for meaningful latent profile characteristics based on previous literature. The seven-profile solution was selected because increasing the number of profiles (i.e., eight-profile and nine-profile solutions) introduced latent profiles that are spread along a continuum in their level of endorsement among the indicator variables.

Figure 1 presents the seven-profile solution that includes the estimated mean levels of endorsement and the distribution of the raw data points for the eight explanations within each latent profile. *Profile A* was the largest group (36.22%) with low endorsement for wealthy elites (M = 1.15), divine punishment (M = 1.08), Mother Nature (M = 1.39), and karma (M = 1.23). The distribution of the raw data indicates that none of the individuals endorsed conspiratorial or supernatural explanations, with a few exceptions for the karma explanation. Among the remaining explanations, the bat explanation had the highest mean level of endorsement (M = 3.88) compared to the seasonal flu (M = 2.02), spontaneous (M = 2.96), and bioterrorism (M = 3.23) explanations. *Profile B* was the second-largest group (20.48%), with no clear endorsement of a particular explanation, as most responses expressed uncertainty regarding all explanations. *Profile C* (13.72%) primarily endorsed one of the supernatural explanations – Mother Nature (M = 5.19)

and not divine punishment (*M* = 1.20). *Profile D* (9.14%) primarily endorsed the conspiratorial explanations – the bioterrorism (*M* = 5.05) and wealthy elite (*M* = 5.02) explanations. *Profile E* (8.90%) had no clear endorsement for a particular explanation, but had low endorsement for the wealthy elite explanation (*M* = 1.44). *Profile F* (8.38%) generally had high levels of endorsement for all explanations, especially for the divine punishment explanation (*M* = 6.16). Finally, *Profile G* (3.17%) primarily endorsed one of the supernatural explanations – divine punishment (*M* = 6.49) - although they were uncertain about Mother Nature (*M* = 4.40).

To what extent do latent profiles vary between and within globally diverse populations?

We also applied the LPA model to each country individually. The final latent profile solutions for each country varied between three and eight profiles (see Table S3 for model fit indices). Some countries had overlapping numbers of latent profiles when selecting the final solution: Japan, Mexico, Russia, and South Africa each had four latent profiles, while China and India had six latent profiles, and the United Kingdom and the United States had seven latent profiles. For the remaining countries, Brazil had three latent profiles, Germany had five latent profiles, and Israel had eight latent profiles. Configural measurement invariance was not established because the number of latent profiles was different across countries. Thus, additional analyses were refrained from that imposed equality constraints on within-profile means, within-profile variances, and relative size of profiles across groups (Morin et al., 2016).

Across countries, *Profile A* refers to the largest proportion of individuals grouped based on homogeneous response patterns (see Table 2). In general, individuals in *Profile A* are grouped by their lack of endorsement for conspiratorial and supernatural explanations across Brazil (70.4%), Germany (50.27%), Israel (44.12%), Mexico (51.93%), Russia (43.39%), South Africa (50.54%), United Kingdom (41.80%), and United States (33.12%). For Japan (43.49%) and India (33.87%), individuals in *Profile A* are grouped by their uncertainty – a lack of clear preference for any explanation. For China (30.02%), individuals in *Profile A* are primarily grouped by their endorsement of the "Mother Nature" explanation and their lack of endorsement of the "wealthy elite" or "divine punishment" explanations.

The remaining latent profiles within each country vary in their kind and level of endorsement, but specific patterns of endorsement seem more common across countries. In China (*Profile A* – 30.02%), Israel (*Profile C* – 9.16%), Japan (*Profile C* – 19.30%), Mexico (*Profile B* – 25.85%), Russia (*Profile C* – 20.64%), United Kingdom (*Profile C* – 12.43%), and the United States (*Profile E* – 6.06%), individuals are grouped primarily by their endorsement for the mother nature explanation, and low endorsement for the wealthy elite and divine punishment explanation. In China (*Profile B* – 20.19%), Germany (*Profile B* – 20.25%), India (*Profile A* – 33.87%), Israel (*Profile B* – 17.18%), Japan (*Profile A* – 43.49%), Mexico (*Profile C* – 13.15%), Russia (*Profile B* – 26.48%), South Africa (*Profile B* – 29.76%), United Kingdom (*Profile B* – 19.45%), and the United States (*Profile B* – 28.66%), individuals are grouped by their uncertainty for most or all types of explanations. In China (*Profile F* – 8.14%), India (*Profile F* – 5.16%), Israel (*Profile E* – 6.86%), South Africa (*Profile C* – 15.84%), United Kingdom (*Profile G* – 2.92%) and the United States (*Profile G* – 3.16%), individuals are grouped primarily by their endorsement for the conspiratorial explanations, and low endorsement for divine punishment. Lastly, in China (*Profile D* – 13.92%), India (*Profile B* – 28.30%), the United Kingdom (*Profile E* – 9.23%), and the United States (*Profile C* – 16.08%), individuals are grouped by their endorsement for most or all types of explanations. A description of the final LPA solution for each country can be found in the Supplemental Text section (see Figures S5-S15 for graphs of LPAs and Tables S4-S14 for LPA demographic breakdown).

What kind of demographic variation is associated with latent profile membership?

Table 3 presents the proportions of individuals who are likely to belong to a latent profile based on demographic characteristics. Table 4 presents the chi-square statistic results, and Figure 2 illustrates the contribution of each cell in the chi-square test for each demographic category, grouped by the latent profile. The R3STEP command (*46*) was also used, in which demographic variables served as latent profile predictors (see Table S15 for comparison of model fits; Tables S16-S22 for statistical results). For age, the proportion of individuals 50 years or older is higher than expected among those who do not endorse conspiratorial and supernatural explanations (*Profile A*). Additionally, those 50 years or older are less likely than expected to be in groups with explanatory uncertainty (*Profile B*) or those that endorse most explanations (*Profile* F). Conversely, those between 30 and 39 years old are more likely than expected among individuals who endorse most explanations (*Profile F*). For gender, the proportion of individuals who identify as Other is more likely than expected among individuals with explanatory uncertainty, except for the wealthy elite explanation (*Profile E*), and less likely than expected among individuals who endorse most explanations (*Profile F*). For education, the proportion of individuals with some graduate school or a graduate degree is more likely than expected among individuals who endorse most explanations (*Profile F*).

For political orientation on economic and social issues, the proportion of individuals with liberal views is more likely than expected among those who endorse the "Mother Nature" explanation (*Profile C*) and less likely than expected among those with explanatory uncertainty (*Profile B*). The proportion of individuals with conservative views is more likely than expected among individuals who endorse most explanations (*Profile F*) and less likely than expected among individuals who endorse the mother nature explanation (*Profile C*). For religiosity, the proportion of individuals who are not religious is more likely than expected among individuals who do not endorse conspiratorial and supernatural explanations (*Profile A*) and less likely than expected among individuals who endorse most explanations (*Profile F*). The proportion of religious individuals is more likely than expected in groups that endorse most explanations (*Profile F*) or the divine punishment explanation (*Profile G*) and less likely than expected in groups that do not endorse conspiratorial and supernatural explanations (*Profile A*) or the mother nature explanation (*Profile C*). For country, the proportion of individuals from India is more likely than expected among individuals who endorse most explanations (*Profile F*) and less likely than expected among individuals who do not endorse conspiratorial and supernatural explanations (*Profile A*). Similarly, the proportion of individuals from China is more likely than expected among those who endorse the "Mother Nature" explanation (*Profile C*) and less likely than expected among those who do not endorse conspiratorial and supernatural explanations (*Profile A*).

How do the latent profiles predict health behavioral outcomes?

For vaccination status, the proportion of individuals who are vaccinated for COVID-19 is less likely than expected among groups with explanatory uncertainty (*Profile B*) or those that endorse conspiratorial explanations (*Profile D*) and more likely than expected among individuals who endorse most explanations (*Profile F*). The proportion of individuals who are not vaccinated for COVID-19 is more likely than expected for groups with explanatory uncertainty (*Profile B*) or who endorse conspiratorial explanations (*Profile D*) and less likely than expected among individuals who endorse most explanations (*Profile F*). For mask-wearing, the proportion of individuals who frequently wore a mask in the past two weeks is less likely than expected among those with explanatory uncertainty (*Profile B*). The proportion of individuals who semi-frequently wore a mask in the past two weeks is more likely than expected among those with explanatory uncertainty (*Profile B*) and less likely than expected among individuals who do not endorse conspiratorial and supernatural explanations (*Profile A*). The proportion of individuals who never wore a mask in the past two weeks is more likely than expected in groups with explanatory uncertainty (*Profile B*) or those that endorse conspiratorial explanations (*Profile D*), and less likely

than expected in groups that endorse the Mother Nature explanation (*Profile C*) or endorse most explanations (*Profile F*).

Discussion

The current research employed a person-centered approach to investigate global variability in patterns and levels of endorsement for zoonotic, human-made, or supernatural explanations regarding the origin of SARS-CoV-2. Across the 11-country sample, seven latent profiles emerged that differed in the level and kind of explanation endorsement. The largest group consisted of individuals in Profile A who were united by their lack of endorsement for conspiracy and supernatural explanations. Profiles C and G mapped onto endorsements of supernatural explanations – one that primarily endorses Mother Nature (Profile C), the other divine punishment (Profile G). Profile D mapped onto the endorsement of conspiratorial explanations, namely, the bioterrorism and wealthy elite explanations. Profile B and Profile E are uncertain about most explanations, but only Profile E disagrees with the wealthy elite explanation. Finally, Profile F mapped onto the endorsement of all explanations. Our results are consistent with previous literature, which identified latent profiles that reject conspiratorial explanations (Profile A) or readily endorse all explanations (Profile F) (*38*, *39*).

The differences in the number and type of latent profiles across countries revealed evidence for explanatory coexistence, as individuals entertained multiple explanations rather than endorsing a single explanation for the origin of SARS-CoV-2 (*10*, *15*). Not all countries had the same number of latent profiles, however. For example, Brazil had three latent profiles and Israel had eight latent profiles. Countries with more latent profiles suggest within-country variation regarding the kinds of explanations that are endorsed. For example, in China, India, the U.K., and the U.S., most, if not all, individuals endorsed multiple types of explanations. The endorsement of all types of explanations may seem logically inconsistent, but empirical evidence suggests that some groups of people readily accept all types of explanations (*38*, *39*). In addition, individuals who readily endorse pseudoscientific claims, conspiracy theories, or paranormal beliefs tend to endorse all these types of beliefs (*47*).

We identified specific demographic characteristics associated with certain latent profiles. Individuals who are 50 years or older seem more likely to reject conspiratorial or supernatural explanations (Profile A) and are less likely to have explanatory uncertainty (Profile B) or endorse most explanations (Profile F). This result suggests that older adults are skeptical of unfounded claims, which aligns with previous research showing that older adults are less susceptible to misinformation (*48*, *49*). For political orientation, individuals who identified as liberal on economic and social issues were more likely to endorse the mother nature explanation (Profile C) and less likely to be in explanatory uncertainty (Profile B). In contrast, conservatives were more likely to endorse most explanations (Profile F) and less likely to endorse the mother nature explanation (Profile C). These results suggest specific explanations resonate more with individuals depending on their political ideology. Finally, non-religious individuals were more likely to reject conspiratorial and supernatural explanations (Profile A). In contrast, religious individuals were more likely to endorse most explanations (Profile F) or endorse the divine punishment explanation (Profile G). Our findings are consistent with previous literature, which found that one latent profile that only endorsed zoonotic transmission also had the lowest reported levels of religious commitment (*38*). However, we also extend the literature by finding that religious individuals are more likely to endorse other types of explanations, especially divine punishment.

We also found that explanatory uncertainty (Profile B) and endorsement of conspiratorial explanations (Profile D) are associated with lower rates of mask-wearing and vaccination. Groups of individuals with explanatory uncertainty (Profile B) are less likely to wear a mask in the past

two weeks and less likely to be vaccinated for COVID-19. Individuals who endorse both the bioterrorism and wealthy elites explanations (Profile D) are less likely to have worn a mask in the past two weeks and are less likely to be vaccinated for COVID-19. These findings highlight the potential for various reasons why individuals may not wear a mask or be vaccinated. First, individuals in a state of explanatory uncertainty may be hesitant or skeptical about engaging in health behaviors, especially if there are lingering uncertainties about the origins of SARS-CoV-2. Second, the endorsement of conspiratorial explanations (Profile D) may foster the endorsement of other conspiracy theories regarding the medical establishment, leading to skepticism about the efficacy of mask-wearing and vaccination. Notably, we found that individuals who endorsed most, if not all, explanations (Profile F) were more likely to wear a mask and more likely to be vaccinated. This result suggests that endorsing multiple explanations is not inconsistent with engaging in health-related behaviors.

Our results have implications for understanding public opinion about SARS-CoV-2. Reporting only the mean value for a single item across all respondents would fail to capture that individuals may disagree, remain uncertain, or agree with other items. For example, some groups of individuals may believe that SARS-CoV-2 originated from a lab leak. In contrast, another group of individuals may believe that both the zoonotic and lab leak explanations are still plausible. The distinction regarding the endorsement of explanations is subtle, but different groups are likely to respond differently to evidence and whether they revise their beliefs. Suppose new evidence emerged that pangolins were the intermediate animal host for SARS-CoV-2, thereby providing support for the zoonotic transmission origin. Individuals who believe both zoonotic and lab leak explanations are plausible may be more likely to update and reflect their beliefs. In contrast, individuals who only believe in the lab leak explanation may discount or reinterpret the evidence to fit with pre-existing views.

Our work provides several empirical contributions to the explanatory coexistence literature. First, the application of mixture modeling helped identify latent groups of individuals that differed in their endorsement of explanations. Focusing on single explanation endorsement in isolation from other explanations fails to capture that individuals can hold coexisting explanations or entertain multiple explanations with varying degrees of certainty. Second, our analysis highlights the distribution of explanations endorsed within and between populations. For instance, the endorsement of conspiracy explanations is a meaningful subgroup (Profile D). However, the proportion of individuals who endorse those explanations can vary between countries or when all data are pooled together in the same analysis. Finally, our data shed light on how explanatory coexistence could impact critical preventive health behaviors, such as mask-wearing and vaccination. Previous literature has speculated about the cognitive factors that influence explanatory coexistence (*11*, *15*), but our study demonstrates that people with explanatory uncertainty (Profile B) and who endorse conspiratorial explanations (Profile D) are less likely to wear a mask and less likely to vaccinate.

Our work also makes several contributions to the mixture modeling framework, specifically in the area of latent profile analyses. First, our work applies LPAs within the context of the explanatory coexistence framework, rather than the contexts of misinformation (*38*, *39*) or conspiracy theories (*40*). The explanatory coexistence framework helps guide the selection of indicators for LPAs and the possible combinations of explanation endorsement that can emerge from the latent profiles. Second, our work utilizes LPAs to examine within- and between-population variation in perceptions of emerging infectious diseases across eleven countries. Most studies that apply latent profile or latent class analysis to study psychological attitudes and behaviors related to COVID-19 only include a single sample population, such as Australia (*50*), China (*51*, *52*), Israel (Ayalon, 2021), Italy (*53*), or the United States (*38*, *39*). Third, we investigate the relationship between latent profiles and two behavioral outcomes: facial mask-wearing and vaccination. Previous research has examined how latent profiles differ across

demographic characteristics (*38*, *40*), but not distal health-related outcomes. Moreover, our study focuses on actual vaccination status, rather than previous studies that report how endorsement of COVID-19 conspiracy theories is associated with fewer intentions to vaccinate (*20*, *21*, *29*).

Finally, our results have implications for modeling responses, which raise important methodological and theoretical considerations within the latent profile analysis literature. First, some LPA solutions with relatively small profile sizes were retained despite recommendations to avoid latent profiles with redundant or small class sizes (~5-8% of the sample) when selecting final LPA solutions (*54*). Avoiding small latent profiles can be problematic because latent profiles with large proportions of individuals might oversimplify the data or obscure pattern combinations aligned with theoretical expectations. Consider the proportion of individuals who endorsed conspiratorial explanations (Profile D). The proportion of individuals who endorsed both conspiratorial explanations was 9.14% when LPAs were conducted for the entire sample. However, the proportion ranged from 2.92% to 15.84% when LPAs were conducted for each country. Second, a latent profile with a small proportion of individuals can represent instances of skewed endorsement of explanations. For instance, measuring endorsement for specific conspiracy theories is likely to result in skewed distributions with frequent disagreement (*55*). Indeed, most individuals in the U.K. did not endorse SARS-CoV-2 conspiracy theories; however, a small proportion of individuals did endorse specific conspiracy theories (*56*). Our current data illustrate that we identified meaningful groups of individuals that endorsed conspiracy-related explanations (Profile D) or the divine punishment explanation (Profile F) despite the proportion of the latent profiles being small.

The current study has some methodological limitations regarding the listed explanations about the origin of SARS-CoV-2. Only ten possible explanations about the origin of SARS-CoV-2 were provided, which may not fully represent the plethora of explanations that people could endorse. Individuals might believe that SARS-CoV-2 has zoonotic origins, but express disagreement or uncertainty with the wording of the explanation. For instance, individuals might express uncertainty about the origin of SARS-CoV-2 being from bat transmission but endorse a broader statement about animal-to-human transmission. Thus, future studies assessing explanation endorsement must account for differences in the proposed causal mechanism and whether it is intentional or non-intentional.

LPAs are advantageous over previous approaches that only consider the mean value of a single item, but caution should be taken when using them. We treated the data as continuous for analysis purposes; however, the interpretation of the mean values is unclear. Consider Profile A for the seven-class LPA solution with the entire sample. One might be tempted to label Profile A as Bat Ambivalent because the mean value for the bat explanation would suggest that individuals are uncertain of the explanation. The raw data, however, showed that individuals in Profile A varied in their endorsement of the bat explanation based on the response distribution, and that individuals were grouped due to their lack of endorsement for the wealthy elite and supernatural explanations. In other words, the interpretation of the latent profiles cannot be solely based on the parameters (i.e., the mean values) even though the parameters are used to create the latent profiles.

Our data demonstrate that studying beliefs about emerging infectious diseases requires understanding how multiple explanations are endorsed, rejected, or suspended within the same mind. The discovery of seven latent profiles demonstrates that there is no single, overarching public opinion about the origin of SARS-CoV-2 – individuals vacillate or endorse multiple types of explanations. Political and religious affiliations appear to serve as important markers for latent profiles that endorse or reject conspiratorial and supernatural explanations. Latent profiles characterized by explanatory uncertainty and endorsement of conspiratorial explanations provide insight into why certain origin beliefs predict whether groups of individuals might not wear masks or vaccinate for COVID-19. A person-centered approach offers insight into the psychological

complexity of explanatory coexistence, providing a deeper understanding of natural phenomena such as the origin of infectious diseases.

Materials and Methods

Data, research materials, and analysis scripts are available at: https://osf.io/etbv3/?view_only=2209b37f6fe34fe795cb50335dfbdf16. Data processing and descriptive statistics were conducted using *R* version 4.5.0. Latent Profile Analyses were conducted in the Mplus Base Program and Combination Add-On version 7.4. The study was not preregistered.

Participants

Six thousand seven hundred twenty-eight participant responses were recruited from eleven countries using Qualtrics Panels between July 14, 2021, and August 2, 2021. The eleven countries were selected because of differences in the rollout of vaccine accessibility in 2021. Each of the eleven countries had different trajectories of vaccine doses administered between late 2020 and August 2021 (see Figure S1). For instance, the number of vaccine doses administered in Israel plummeted in the spring of 2021. In contrast, vaccine doses in the U.S. started to decline during the Summer of 2021, despite both countries having administered the vaccine in late 2020. Moreover, countries like South Africa and Japan only started administering vaccine doses at a steady rate during the Summer of 2021, compared to other countries that had already administered doses by Spring 2021. Countries such as Brazil, India, China, Germany, Russia, Mexico, and the United Kingdom show an increase in the number of vaccine doses administered during summer 2021, with some countries exhibiting multiple peaks in their distribution, followed by a steady or gradual decline in vaccination intake.

Participants were excluded if the survey was completed in under ten minutes, if they reported their age as below 17, or if they did not pass the first two attention check questions. One participant was excluded because they had missing data on all ten items regarding explanation endorsement on the origin of SARS-CoV-2. The final analytic sample consisted of 4831 participants from the following countries: Brazil (N = 432), China (N = 445), Germany (N = 441), India (N = 429), Israel (N = 436), Japan (N = 434), Mexico (N = 441), Russia (N = 429), South Africa (N = 444), United Kingdom (N = 429), United States of America (N = 471).

The mean age of the total sample was 42.4 years (*SD* = 15.3, range 18 - 88). The gender distribution was equally balanced (47.9% females, 47.6% males), with a small number self-identifying as non-binary (0.5%). Most participants have received a university degree or graduate-level education (43.7%), followed by those with more than a high school education but no university degree (25.5%), and those with a high school education or less (19.6%). The sample had a balanced distribution of individuals who self-identified as religious (32.0%), spiritual but not religious (33.1%), or not religious (33.4%). Participants held diverse political views on economic or social issues. Table S1 provides an overview of the demographics of each country.

We also analyzed two health-related behavioral outcomes: COVID-19 vaccination and mask-wearing. Across the entire sample, roughly 36% of respondents reported not having received a COVID-19 vaccine, compared to 64% who have received one. China (88%), India (84%), and Israel (84%) have more respondents who have received a COVID-19 vaccine compared to Japan (35%), Russia (34%), and South Africa (34%) (Figure S2). Across the entire sample, roughly half of respondents (53%) wore a mask multiple times a day, followed by those who wore a mask at least once a day (37%). Brazil (77%), South Africa (72%), and Mexico (67%) have more respondents who wore a mask multiple times a day compared to the U.S. (38%), U.K. (38%), and Japan (29%) (Figure S3).

Procedures

Surveys were translated into Spanish (Mexico), Brazilian Portuguese (Brazil), German (Germany), Russian (Russia), Japanese (Japan), and Mandarin (China). All other field sites used the default English language after consultation with Qualtrics Panels. Collaborators translated the non-English surveys and made minor changes (e.g., political affiliation, income) to ensure certain survey items were locally relevant. Once the surveys were translated, a different person fluent in the language checked the survey for errors. All English surveys were reviewed for errors, and the survey items were tailored to be locally relevant and culturally sensitive.

All participants from Qualtrics Panels completed a survey ranging from 30 to 60 minutes in duration. Participants were informed that the study aimed to investigate individuals' beliefs, behaviors, and knowledge regarding COVID-19. Participants first read a page that contained only the informed consent and agreed to participate in the survey if they continued to the next page. Participants were allowed to drop out at any point during the survey. The current study uses selected measures that were part of a larger survey. Participants were compensated $2-$3 by Qualtrics Panels, depending on the field site and local exchange rate. IRB approval for this study was obtained (#NUMBER) by UNIVERSITY INSTITUTION.

Measures

Origin Explanations. Explanations on what was responsible for the origin of SARS-CoV-2 were measured with a 7-point Likert-type scale (1 = *Strongly Disagree* to 4 = *Uncertain* to 7 = *Strongly Agree*). Ten items were created to assess the level of endorsement across different types of explanations (see Supplemental Text for the exact wording for each country). We aimed to include diverse types of explanations, including scientifically endorsed, folk-intuitive, spontaneous, conspiracy, and supernatural explanations. Some of the wording was inspired by existing psychological literature (*15*, *57*) and media headlines (*58*, *59*). Higher scores indicate stronger endorsement that a particular phenomenon was responsible for the origin of COVID-19 (see Table S2 for mean and standard deviation values for each origin item).

Age. Age was converted into a categorical variable with the following categories: *18-29*, *30-39*, *40-49*, and *50* and above. These categories were created to facilitate the interpretation of the age variable, given the high standard deviation value across countries, including the entire sample.

Education. Participants were asked to indicate the highest level of education they have completed. Response options were adapted to reflect the education system of each country. Response options across countries were then collapsed into the following categories: *High School or Less*, *Post-High School, No University Degree*, *University Degree*, *Some Graduate School or Graduate Degree*, *Other*, and *Do not know*. For Mexico, the response options were not in the correct order because a response option for receiving a bachelor's degree was missing. Thus, all data for Mexico regarding education were treated as missing.

Political Ideology. Participants were asked two questions about their political ideology regarding social and economic issues: "In general, how liberal (left-wing) or conservative (right-wing) are you on social [economic] issues?" For China, participants were asked, "In general, do you favor socialism or capitalism on social issues?" The liberal/conservative labeling was kept in the descriptive reporting because the translators indicated that the socialism/capitalism dichotomy was closely related to the liberal/conservative dichotomy. Responses were on a nine-point Likert-type scale with 1 = *Very Liberal*, 4 = *Moderate*, 7 = *Very Conservative*, 8 = *Don't Know,* and 9 = *Can't pick one label*. Responses were collapsed into four groups for each issue: liberal (1-3), moderate (4), conservative (5-7), and uncertain (8-9).

Religiosity. Participants were asked to self-identify in one of three categories: *religious*, *spiritual but not religious,* or *non-religious*. They were then asked to select one of the following options: "I consider myself to be: religious/spiritual but not religious/not religious."

COVID-19 Vaccination Status. Participants were asked, "Did you receive a vaccine for COVID-19?" with the following response options (0 = *No*, 1 = *Yes*).

Mask Wearing Behavior. This item was part of a larger question matrix that asked, "In the past two weeks, how frequently have you taken the following actions to prevent getting COVID-19?" Participants were asked how often they were "wearing a mask of any kind" with the following response options: (1 = *I didn't do this activity*, 2 = *About once every two weeks*, 3 = *About once a week*, 4 = *About three times a week*, 5 = *About every other day*, 6 = *At least once a day*, 7 = *Multiple times a day*). The variable was collapsed into three groups: *Never*, *Semifrequent*, and *Frequent*. The *Semifrequent* group consisted of respondents who wore a mask once every two weeks, once a week, or three times a week. The *Frequent* group consisted of respondents who wore a mask every other day, once a day, or multiple times a day.

Statistical Analysis

LPAs were conducted using Mplus (*60*) to examine the underlying patterns of endorsement on explanations for the origin of SARS-CoV-2. All origin items were treated as continuous indicators for all LPAs. Factors were not created because of the small number of items to represent higher-order categories (e.g., one accurate biological item vs. four supernatural items). Moreover, conducting LPAs with individual items allows a fine-grained approach to knowing which items are relevant for explanatory coexistence. The 5G cellular network and the witchcraft explanation items were initially included but ultimately removed because most participants did not endorse these items, and both contributed to convergence issues. Participants were also asked if they believed "Other" explanations were possible, but examination of the response distribution showed that most strongly disagreed or were uncertain. Moreover, not everyone filled in the free response option when answering "Other". Thus, all LPAs focus on the remaining eight origin items.

The current study used the following analysis plan. All LPA models were estimated using 2,000 random start values, allowed 500 iterations, and retained the 250 best solutions for final optimization to prevent convergence on a local maximum. Starting value specifications were adjusted if the model did not replicate the best log-likelihood or failed to reach convergence. First, LPAs were performed on the entire sample, with the means freely estimated, but the variances constrained to be equal across classes. Second, separate LPAs were performed for each country with the means freely estimated, but the variances constrained to be equal across classes. All LPAs started with a two-class model solution, either evolving into a nine-class model solution or failing to converge when the number of classes was increased. Thus, the goal of running latent profile analyses was to determine 1) the number and characteristics of the latent profiles across the entire sample and 2) similarities and differences with respect to the number and characteristics of latent profiles across countries.

All LPAs were conducted as exploratory studies due to the lack of extensive empirical work on using LPAs to study explanatory coexistence and difficulties in operationalizing model constraints. First, only means were freely estimated for LPAs because previous literature suggests that freely estimating both the means and variances increases the number of free parameters estimated, which, in turn, tends to result in poor-fitting solutions or failure to converge (*61*, *62*). Second, one of the assumptions for LPAs is local independence, in which the indicators are constrained to be uncorrelated within each latent class. Some of the indicators were found to have correlation coefficients above 0.50 (see Figure S4). If the correlation coefficients are high, then the local independence assumption can be relaxed by allowing some indicators to correlate within the latent profiles. However, relaxing local independence would mean increasing the number of free parameters, thereby increasing the model's complexity.

All LPA models used maximum likelihood estimation with robust standard errors (MLR) estimation to account for missing data and nonnormality. Overall, missing data on the eight origin

items accounted for 0.373% of the data. Participants missing data on one item were 0.290%, and those missing data on two items were 0.083%. Data were missing for the following explanations: the bat explanation (0.103%), the bioterrorism explanation (0.083%), the seasonal flu explanation (0.083%), the spontaneous explanation (0.083%), the karma explanation (0.062%), the mother nature explanation (0.021%), and the wealthy elite explanation (0.021%).

The best model fit was identified using a combination of statistical indices, class interpretability, and theoretical considerations. The -2 Log-Likelihood (-2LL), Akaike Information Criterion (AIC), Bayesian Information Criterion (BIC), and sample-size-adjusted BIC (SABIC) are model fit indices, where smaller values indicate a better model fit. Entropy is a measure of classification accuracy in defining high separability between classes (*63*). Entropy values range from 0 to 1, with higher values indicating that a person is more likely to belong to only one class. The average latent class posterior probabilities (AvePP) examine the likelihood of an individual being assigned to a particular class. Generally, AvePP values should be greater than .70 as higher values indicate the classes are well-separated (*54*). Moreover, the interpretability of classes for each model was reviewed to determine if classes were redundant or too small (i.e., ~5-8% of the sample) (*54*). Reported values of the Lo-Mendell-Rubin adjusted Likelihood ratio test (LMR LRT) were used to compare whether the current number of profiles, k, was a better fit than a model with k-1 profiles. Non-significant p-values (i.e., larger than .05) for LMR LRT indicate that the *k*-1 model better fits the data than the *k*-class model.

We interpreted whether the characteristics of the latent profiles in each solution aligned with the explanatory coexistence framework (*10*, *15*) and recent empirical work (*38–40*). In interpreting the latent profiles, both the estimated mean values and the distribution of the raw data points for each indicator were plotted for each latent profile. The distribution of the raw data points helps interpret what unites individuals in the same latent profile. In particular, the raw data points may show that the distribution is negatively or positively skewed for specific indicators. In addition, demographic breakdowns of each latent profile were included for transparency, allowing for an understanding of how latent profiles differ across age, gender, education, religiosity, political ideology, COVID-19 vaccination status, and mask-wearing behavior. The breakdown of latent profiles is not intended to imply causal differences between groups, but rather reflects differences in the base rate demographics of the population sample.

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Figures and Tables

Figure 1. The seven-class latent profile solution with the entire sample. The black dots represent the distribution of raw data points, and the red line indicates the mean levels of endorsement for each explanation within each latent profile.

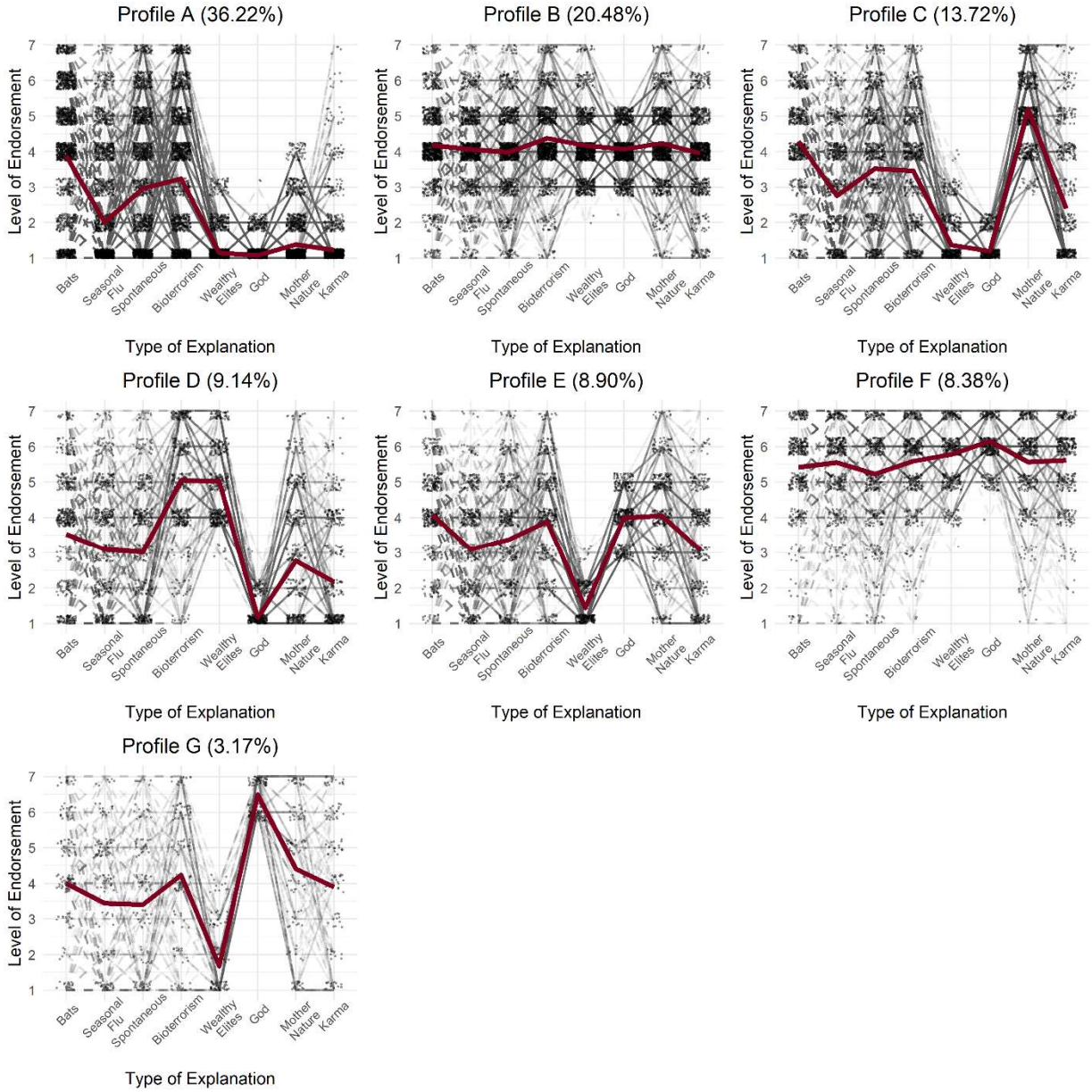

Figure 2. Percentage contributions from the Chi-Square Test for the entire sample. Higher values indicate that a particular cell's values account for more of the Chi-Square Test result.

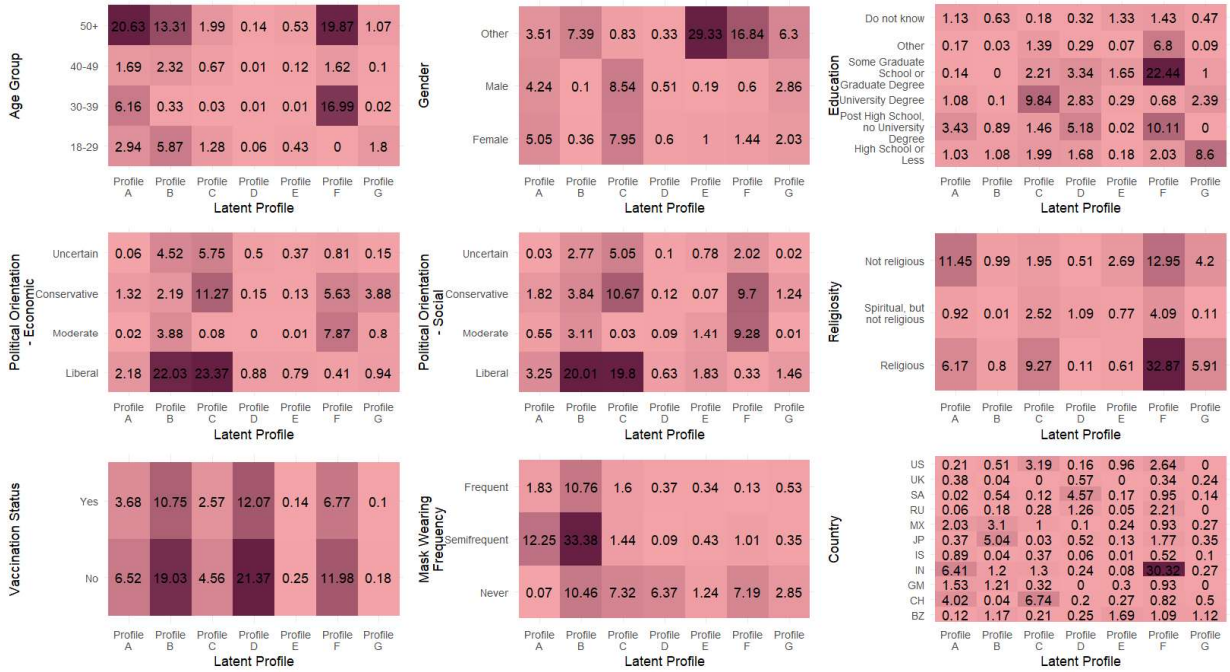

Table 1. Model fit indices for the number of latent profiles for the entire sample

Number of Classes	LL	FP	AIC	BIC	SABIC	Entropy	LMR LRT (*p*)	BLRT (*p*)
2	-75126.511	25	150303.021	150465.092	150385.651	.911	<.001	<.001
3	-73482.822	34	147033.643	147254.059	147146.019	.962	<.001	<.001
4	-72553.815	43	145193.630	145472.391	145335.752	.939	<.001	<.001
5	-71794.951	52	143693.902	144031.008	144031.008	.960	<.001	<.001
6	-71243.750	61	142609.499	143004.950	142811.114	.940	<.001	<.001
7	**-70749.801**	**70**	**141639.602**	**142093.398**	**141870.964**	**.940**	**.9940**	**1.000**
8	-70326.521	79	140811.042	141323.184	141072.151	.943	1.000	1.000
9	-69902.869	88	139981.738	140552.225	140272.593	.942	.9999	1.000

Note. All models assume homoscedasticity, which allows the means to be estimated freely, but constrains the variances and covariances to be equal. Bold text indicates the final class solution selected. FP = Free Parameters. AIC = Akaike information criterion. BIC = Bayesian information criterion. SABIC = sample-sized-adjusted BIC. LMR-LRT = Adjusted Lo-Mendell-Rubin Likelihood Ratio Test. BLRT = Bootstrap Likelihood Ratio Test.

879 **Table 2. Percentage proportions of each latent profile across the entire sample and each**
880 **country sample**
881

Sample	Profile A	Profile B	Profile C	Profile D	Profile E	Profile F	Profile G	Profile H
Qualtrics	36.22%	20.48%	13.72%	9.14%	8.90%	8.38%	3.17%	---
Brazil	70.4%	24.21%	5.39%	---	---	---	---	---
China	30.02%	20.19%	17.51%	13.92%	10.22%	8.14%	---	---
Germany	50.27%	20.25%	13.42%	9.48%	6.58%	---	---	---
India	33.87%	28.30%	14.48%	11.25%	6.95%	5.16%	---	---
Israel	44.12%	17.18%	9.16%	6.96%	6.86%	6.82%	5.02%	3.88%
Japan	43.49%	30.52%	19.30%	6.69%	---	---	---	---
Mexico	51.93%	25.85%	13.15%	9.07%	---	---	---	---
Russia	43.39%	26.48%	20.64%	9.49%	---	---	---	---
South Africa	50.54%	29.76%	15.84%	3.86%	---	---	---	---

United Kingdom	41.80%	19.45%	12.43%	9.90%	9.23%	4.28%	2.92%	---
United States	33.12%	28.66%	16.08%	9.84%	6.06%	3.16%	3.16%	---

885 **Table 3. Row proportions for each latent profile grouped by demographic variables for the**
886 **entire sample**

Variable Category	Profile A	Profile B	Profile C	Profile D	Profile E	Profile F	Profile G
Age Group							
18-29	0.32	0.25	0.12	0.09	0.09	0.08	0.04
30-39	0.31	0.22	0.14	0.09	0.09	0.13	0.03
40-49	0.33	0.24	0.12	0.09	0.09	0.10	0.03
50+	0.45	0.15	0.15	0.10	0.08	0.04	0.03
NA	0.39	0.26	0.18	0.06	0.07	0.03	0.02
Gender							
Female	0.35	0.21	0.14	0.09	0.08	0.09	0.03
Male	0.37	0.21	0.13	0.09	0.09	0.08	0.03
Other	0.44	0.12	0.16	0.08	0.20	0.00	0.00
NA	0.39	0.26	0.18	0.06	0.07	0.03	0.02
Education							
High School or Less	0.32	0.24	0.11	0.11	0.10	0.07	0.05
Post High School, no University Degree	0.39	0.20	0.11	0.12	0.09	0.05	0.03
University Degree	0.33	0.21	0.17	0.07	0.10	0.10	0.02
Some Graduate School or Graduate Degree	0.36	0.22	0.11	0.07	0.07	0.15	0.03
Other	0.37	0.23	0.17	0.10	0.08	0.02	0.03
Do not know	0.18	0.32	0.09	0.05	0.18	0.18	0.00
NA	0.45	0.15	0.18	0.10	0.06	0.05	0.02
Political Orientation - Economic Issues							
Liberal	0.39	0.14	0.20	0.08	0.08	0.09	0.03
Moderate	0.36	0.24	0.14	0.09	0.09	0.05	0.03
Conservative	0.34	0.23	0.10	0.10	0.09	0.11	0.04
Uncertain	0.35	0.26	0.09	0.10	0.10	0.07	0.03
NA	0.36	0.28	0.20	0.08	0.05	0.01	0.01
Political Orientation - Social Issues							
Liberal	0.40	0.14	0.19	0.08	0.07	0.09	0.02

Variable Category	Profile A	Profile B	Profile C	Profile D	Profile E	Profile F	Profile G
Moderate	0.34	0.24	0.14	0.09	0.10	0.05	0.03
Conservative	0.33	0.24	0.09	0.09	0.08	0.12	0.04
Uncertain	0.37	0.25	0.09	0.10	0.10	0.06	0.03
NA	0.36	0.28	0.20	0.08	0.05	0.01	0.01
Religiosity							
Religious	0.30	0.23	0.09	0.09	0.10	0.16	0.05
Spiritual, but not religious	0.34	0.21	0.16	0.11	0.10	0.06	0.03
Not religious	0.45	0.19	0.16	0.08	0.07	0.04	0.02
NA	0.35	0.27	0.20	0.08	0.05	0.04	0.01
Vaccination Status							
No	0.32	0.27	0.11	0.13	0.08	0.05	0.03
Yes	0.39	0.18	0.15	0.07	0.09	0.10	0.03
Mask Wearing Frequency							
Never	0.37	0.30	0.08	0.14	0.07	0.03	0.01
Semifrequent	0.27	0.33	0.12	0.09	0.08	0.10	0.03
Frequent	0.38	0.18	0.15	0.09	0.09	0.08	0.03
Country							
BZ	0.39	0.14	0.16	0.07	0.14	0.04	0.06
CH	0.19	0.22	0.27	0.07	0.11	0.12	0.01
GM	0.47	0.14	0.17	0.09	0.06	0.04	0.03
IN	0.14	0.28	0.08	0.07	0.07	0.31	0.04
IS	0.44	0.20	0.11	0.08	0.08	0.05	0.04
JP	0.31	0.36	0.13	0.06	0.10	0.03	0.02
MX	0.48	0.10	0.19	0.10	0.07	0.04	0.02
RU	0.38	0.24	0.11	0.14	0.08	0.02	0.03
SA	0.35	0.16	0.12	0.18	0.10	0.04	0.04
UK	0.41	0.22	0.14	0.06	0.09	0.06	0.02
US	0.40	0.25	0.05	0.07	0.05	0.15	0.03

Note. The proportions are based on assigned likely latent class membership, not estimated posterior probabilities.

Table 4. Chi-Square test statistical results for the seven latent profiles with each variable

Variable	$\chi 2$	DF	p-value
Age	158.6	18	<.001
Gender	12.573	12	.4008
Education	154.07	30	<.001
Political Orientation – Economic Issues	165.19	18	<.001
Political Orientation – Social Issues	185.1	18	<.001
Religiosity	306.37	12	<.001
Vaccination	149.18	6	<.001
Mask Wearing	122.57	12	<.001
Country	890.05	60	<.001

Supplementary Materials

Supplementary Text

Figs. S1 to S15

Tables S1 to S22

Supplementary Materials for

Latent Profile Analyses of Explanations about the Origins of SARS-CoV-2 Within and Across Countries

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This PDF file includes:

Supplementary Text
Figs. S1 to S15
Tables S1 to S22

Supplementary Text

What are the latent profiles for each country?

Materials, data files, and analysis scripts can be found at the OSF link: https://osf.io/etbv3/?view_only=2209b37f6fe34fe795cb50335dfbdf16

Brazil. In the three-profile solution, *Profile A* was the largest group (70.40%) that primarily expressed low endorsement for the karma explanation (*M* = 1.07). *Profile B* was the second-largest group (24.21%) that primarily expressed endorsement for the bioterrorism explanation (*M* = 4.61). They also expressed a degree of reservation for the karma (*M* = 4.01) explanation. *Profile C* was the third group (5.39%) that generally expressed high endorsement for most explanations, especially for the karma explanation (*M* = 6.58).

China. In the six-profile solution, *Profile A* was the largest group (30.02%) that primarily endorsed the mother nature explanation (*M* = 5.13) and expressed low endorsement for the wealthy elite (*M* = 1.32) and divine punishment (*M* = 1.36) explanation. *Profile B* was the second-largest group (20.19%) that primarily expressed uncertainty for most explanations. *Profile C* (17.51%) had low estimated mean values for all explanations, especially for the wealthy elite (*M* = 1.28), divine punishment (*M* = 1.23), mother nature (*M* = 1.62), and karma (*M* = 1.56) explanation. *Profile D* (13.92%) generally had high estimated mean values for most explanations. *Profile E* (10.22%) generally entertained supernatural explanations as they expressed uncertainty for the divine punishment (*M* = 4.36) and karma (*M* = 4.31) explanation, and endorsement for the mother nature explanation (*M* = 5.54). They also expressed low endorsement for the wealthy elite (*M* = 1.39). *Profile F* (8.14%) generally had estimated mean values that expressed endorsement for the bat (*M* = 4.50), bioterrorism (*M* = 4.73), wealthy elite

(M = 4.80), and mother nature (M = 4.64) explanations. They also expressed low endorsement for the divine punishment explanation (M = 1.31).

Germany. In the five-profile solution, *Profile A* was the largest group (50.27%) that primarily expressed endorsement for the bat explanation (M = 4.50) and had low endorsement for the seasonal flu (M = 1.32), wealthy elites (M = 1.26), divine punishment (M = 1.05), and karma (M = 1.11) explanations. *Profile B* was the second-largest group (20.25%) that primarily expressed uncertainty for most explanations. *Profile C* (13.42%) primarily endorsed the seasonal flu explanation (M = 4.79) primarily expressed uncertainty for most explanations and had low endorsement for the divine punishment (M = 1.20) and karma (1.32) explanations. *Profile D* (9.48%) had high estimated mean values for the mother nature (M = 4.89) and karma (M = 5.13) explanation, but low estimated mean values for the divine punishment explanation (M = 1.39). *Profile E* (6.58%) generally expressed high endorsement for most explanations, especially for the divine punishment explanation (M = 6.44).

India. In the six-profile solution, *Profile A* was the largest group (33.87%) that primarily expressed uncertainty for most explanations. *Profile B* was the second-largest group (28.30%) that expressed high endorsement for most explanations, especially for the wealthy elite explanation (M = 6.20). *Profile C* (14.48%) primarily expressed endorsement for the bioterrorism (M = 6.06), but low endorsement for the wealthy elite explanation (M = 1.21). *Profile D* (11.25%) generally expressed endorsement for the bat explanation (M = 4.75), mother nature (M = 5.43) and karma (M = 5.19) explanations. They also expressed low endorsement for the wealthy elite explanation (M = 1.37). *Profile E* (6.95%) had low estimated mean values for all explanations, especially for the wealthy elite (M = 1.21) and divine punishment (M = 1.47).

Profile F (5.16%) expressed high endorsement for the bioterrorism (*M* = 6.14) and wealthy elite (*M* = 6.19) explanation and generally endorsed the bat explanation (*M* = 4.62).

Israel. In the eight-profile solution, *Profile A* was the largest group (44.12%) that generally expressed low endorsement for the wealthy elites (*M* = 1.11) divine punishment (*M* = 1.09), mother nature (*M* = 1.28), and karma explanations (*M* = 1.22). *Profile B* was the second-largest group (17.18%) that primarily expressed uncertainty for most explanations. *Profile C* (9.16%) primarily endorsed the mother nature explanation (*M* = 5.09), and had low endorsement for wealthy elite (*M* = 1.24) and divine punishment (*M* = 1.09) explanations. *Profile D* (6.96%) had low endorsement for the wealthy elite explanation (*M* = 1.38). *Profile E* (6.86%) primarily endorsed the bioterrorism (*M* = 4.94) and wealthy elite (*M* = 4.94) explanation, and had low endorsement for the divine punishment explanation (*M* = 1.15). *Profile F* (6.82%) primarily had low endorsement for the divine punishment explanation (*M* = 2.60). *Profile G* (5.02%) generally expressed high endorsement for most explanations, especially for the divine punishment explanation (*M* = 5.73). *Profile H* (3.88%) had high endorsement for the divine punishment explanation (*M* = 6.64) explanation and low endorsement for the wealthy elite explanation (*M* = 1.29).

Japan. In the four-profile solution, *Profile A* was the largest group (43.49%) that primarily expressed uncertainty for most explanations. *Profile B* was the second-largest group (30.52%) that generally expressed low endorsement for the wealthy elite (*M* = 1.36), divine punishment (*M* = 1.04), mother nature (*M* = 1.35), and karma explanations (*M* = 1.37). *Profile C* (19.30%) generally expressed endorsement for the bat (*M* = 4.73) and mother nature (*M* = 4.44) explanation. *Profile D* (6.69%) generally expressed high endorsement for most explanations, especially for the wealthy elite (*M* = 5.42) and divine punishment explanation (*M* = 6.54).

Mexico. In the four-profile solution, *Profile A* was the largest group (51.93%) that generally expressed low endorsement for the wealthy elite (*M* = 1.57), divine punishment (*M* = 1.04), mother nature (*M* = 1.24), and karma explanations (*M* = 1.25). *Profile B* was the second-largest group (25.85%) that generally endorsed the mother nature explanation (*M* = 5.06) and had low endorsement for the divine punishment explanation (*M* = 1.51). *Profile C* (13.15%) primarily expressed uncertainty for most explanations except for the wealthy elite (*M* = 2.73) and karma explanation (*M* = 3.23). *Profile D* (9.07%) generally expressed high endorsement for most explanations, especially for the divine punishment explanation (*M* = 5.73).

Russia. In the four-profile solution, *Profile A* was the largest group (43.39%) that generally expressed low endorsement for the divine punishment (*M* = 1.13), mother nature (*M* = 1.38), and karma explanations (*M* = 1.06). *Profile B* was the second-largest group (26.48%) that primarily expressed uncertainty for most explanations. *Profile C* (20.64%) generally endorsed the mother nature (*M* = 4.66) explanation, but had low endorsement for the karma explanation (*M* = 1.16). *Profile D* (9.49%) generally had high levels of endorsement for the bioterrorism (*M* = 5.36), divine punishment (*M* = 5.11), mother nature (*M* = 5.29), and karma explanation (*M* = 5.74).

South Africa. In the four-profile solution, *Profile A* was the largest group (50.54%) was that primarily expressed low endorsement for the karma explanation (*M* = 1.08). *Profile B* was the second-largest group (29.76%) that primarily expressed uncertainty for most explanations. *Profile C* (15.84%) generally endorsed the bioterrorism (*M* = 5.86) and wealthy elite (*M* = 5.50) explanation. *Profile D* (3.86%) had high levels of endorsement for the bioterrorism (*M* = 5.30), mother nature (*M* = 5.53), and karma explanation (*M* = 6.58).

United Kingdom. In the seven-profile solution, *Profile A* was the largest group (41.80%) that generally expressed low endorsement for the wealthy elites (M = 1.03) divine punishment (M = 1.21), mother nature (M = 1.19), and karma explanations (M = 1.09). *Profile B* was the second-largest group (19.45%) that primarily expressed uncertainty for most explanations. *Profile C* (12.43%) primarily endorsed the mother nature explanation (M = 5.20) and had low endorsement for wealthy elite (M = 1.07), divine punishment (M = 1.35), and karma (M = 1.21) explanations. *Profile D* (9.90%) had low endorsement for the wealthy elite explanation (M = 1.50). *Profile E* (9.23%) generally expressed high endorsement for most explanations, especially for the wealthy elite (M = 5.49) explanation. *Profile F* (4.28%) had estimated mean values that suggest the bioterrorism explanation (M = 5.11) and wealthy elite (M = 3.86) explanation are perceived as plausible explanations. *Profile G* (2.92%) primarily expressed high endorsement for the bioterrorism (M = 5.32) and wealthy elite (M = 6.64) explanation.

United States. In the seven-profile solution, *Profile A* was the largest group (33.12%) that generally expressed low endorsement for the seasonal flu (M = 1.22), wealthy elite (M = 1.21), divine punishment (M = 1.10), mother nature (M = 1.16), and karma (M = 1.19) explanation. *Profile B* was the second-largest group (28.66%) primarily expressed uncertainty for most explanations. *Profile C* (16.08%) generally expressed high endorsement for most explanations. *Profile D* (9.84%) generally endorsed the seasonal flu explanation (M = 4.73) and had low endorsement for the divine punishment (M = 1.35) and mother nature (M = 1.24) explanation. *Profile E* (6.06%) generally endorsed the mother nature explanation (M = 4.98) and had low endorsement for the divine punishment explanation (M = 1.11). *Profile F* (3.16%) generally endorsed the divine punishment explanation (M = 5.15) and had low endorsement for the mother nature explanation (M = 1.52). *Profile G* (3.16%) primarily expressed high

endorsement for the bioterrorism (M = 5.92) and wealthy elite (M = 5.95) explanation and low endorsement for all other types of explanations

Survey Wording

India, Israel, South Africa, United Kingdom, and United States

The origin of COVID-19 comes from _____. **Please indicate the extent to which you disagree or agree.**

1. A research lab that was genetically engineered as a biological weapon (*Human-made explanation*)
2. Punishment from God for sinful behavior (*Supernatural explanation*)
3. A virus that was transmitted from bats (*Zoonotic explanation*)
4. A warning from Mother Nature for human actions on the environment (*Supernatural explanation*)
5. Electromagnetic fields caused by 5G and wireless technology (*Human-made explanation*)
6. Seasonal flu (*Biologically inaccurate explanation*)
7. COVID-19 is not real because it is a plot from wealthy elites to control the world (*Human-made explanation*)
8. There is no reason why the pandemic occurred, it just happens (*Spontaneous explanation*)
9. Karmic retribution for our past behaviors (*Supernatural explanation*)
10. Witchcraft (*Supernatural explanation*)

Brazil

A origem do COVID-19 vem de _____. **Por favor, indique até que ponto você discorda ou concorda.**

1. Um laboratório de pesquisa, e foi desenvolvido geneticamente como uma arma biológica
2. Punição de Deus por comportamento pecaminoso
3. Um vírus que foi transmitido pelos morcegos
4. Um aviso da Mãe Natureza para as ações humanas sobre o meio ambiente
5. Campos eletromagnéticos causados pelas tecnologias 5G e sem fio
6. A gripe sazonal
7. COVID-19 não é real porque é uma conspiração de elites ricas para controlar o mundo
8. Não há nenhuma razão para a pandemia ter ocorrido, ela apenas acontece
9. Vingança cármica por nossos comportamentos do passado
10. Feitiçaria

China

新冠肺炎的起源是____。请指出您对下列说法的同意程度。

1. 一个进行基因工程改造的生物实验室
2. 上天对有罪行为的惩罚

3. 一种由蝙蝠传播的病毒
4. 这是大自然对人类破坏环境行为的警告
5. 5G和无线技术造成的电磁场
6. 季节性流感
7. 新冠肺炎并不真实，因为它是富裕精英意图控制世界的阴谋
8. 大流行为什么会发生没有任何原因，它就是发生了
9. 为我们过去行为的因果报应
10. 巫术

Germany

COVID-19 entstand in/durch _____. **Bitte geben Sie an, wie sehr Sie zustimmen würden oder nicht.**

1. Einem Forschungslabor als gentechnisch hergestellte biologische Waffe
2. Göttliche Strafe für sündvolles Verhalten
3. Ein Virus, das von Fledermäusen übertragen wurde
4. Eine Warnung von Mutter Erde zu den menschlichen Auswirkungen auf die Umwelt
5. Durch elektromagnetische Felder, die durch 5G und W-Lan entstehen
6. Durch die saisonale Grippe
7. COVID-19 existiert real nicht, da es eine Verschwörung der mächtigen Eliten ist, um die Welt zu kontrollieren
8. Es gibt keinen echten Grund warum die Pandemie ausbrach, so etwas passiert nun eben einfach
9. Karma-Vergeltung für unsere vergangenen Verhaltensweisen
10. Hexenkunst

Japan

の由来は、_____。あなたが同意する程度を「強く賛成」から「強く反対」の中から１つ選んでください。

1. 生物兵器のために遺伝子組み換えを行う研究室
2. 罪深い行為に対する神からの罰
3. コウモリから伝染したウイルス
4. 環境に対する人間の行為に対する大自然からの警告
5. 5Gや無線技術によって生じる電磁界
6. 季節性インフルエンザ
7. COVID-19は、世界を支配するための裕福なエリートの陰謀であり、実在しない
8. パンデミックが引き起こされた理由はなく、ただ起こっただけである
9. 私たちの過去の行動に対する報復
10. 魔術

Mexico

El origen de COVID viene de _____. Por favor indica en qué medida estás en desacuerdo o de acuerdo.

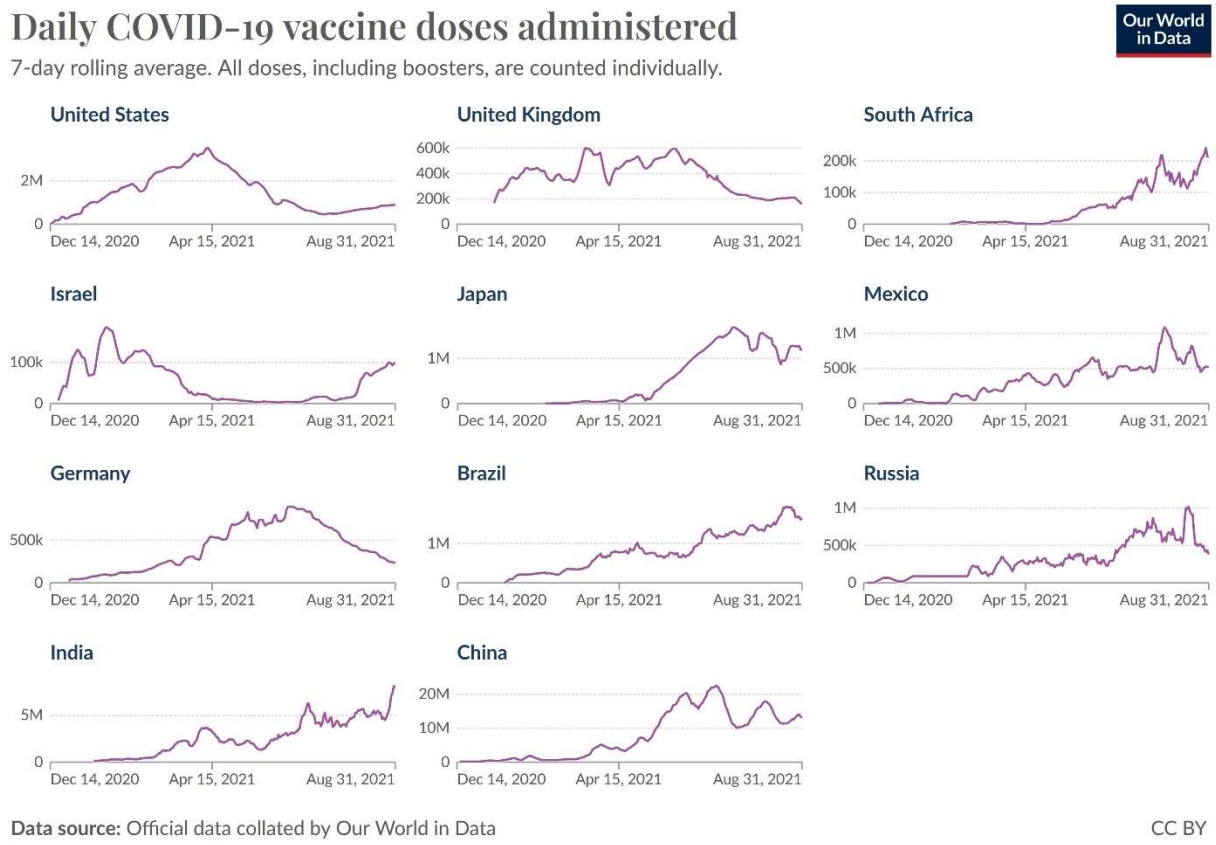
1. Un laboratorio de investigación que lo estaba diseñando genéticamente como un arma biológica.
2. Castigo de Dios por comportamiento pecaminoso
3. Un virus que fue transmitido de los murciélagos.
4. Una advertencia de la madre naturaleza por las acciones humanas sobre el medio ambiente
5. Campos electromagnéticos causados por el 5G y la tecnología inalámbrica
6. La gripe común o estacional
7. COVID-19 no es real porque es un complot de las élites ricas para controlar el mundo
8. No hay una razón de porqué la pandemia ocurrió, simplemente sucedió
9. Retribución kármica por nuestros comportamientos pasados
10. Brujería

Russia

19 произошел от _____. **Укажите, в какой степени Вы согласны или не согласны с утверждениями.**

1. Биологическое оружие, созданное с помощью генной инженерии в исследовательской лаборатории
2. Наказание от Бога за погрешности
3. Вирус, который передался от летучих мышей
4. Предупреждение от природы за человеческие действия на окружающую среду
5. Электромагнитные поля, вызванные 5G и беспроводными технологиями
6. Сезонный грипп
7. COVID-19 выдумка, которая является частью заговора богатых олигархов, которые хотят захватить контроль над миром
8. Нет причины возникновения пандемии, это естественный процесс
9. Кармическое возмездие за наше прошлое поведение
10. Черная магия

Figure S1. 7-day rolling average of COVID-19 vaccines administered for each of the eleven countries between December 2020 and August 2021



Note. Creative Commons Daily COVID-19 vaccine doses administered by Our World in Data is licensed under CC BY 4.0.

Figure S2. Descriptives of receiving a vaccine for COVID-19 grouped by country

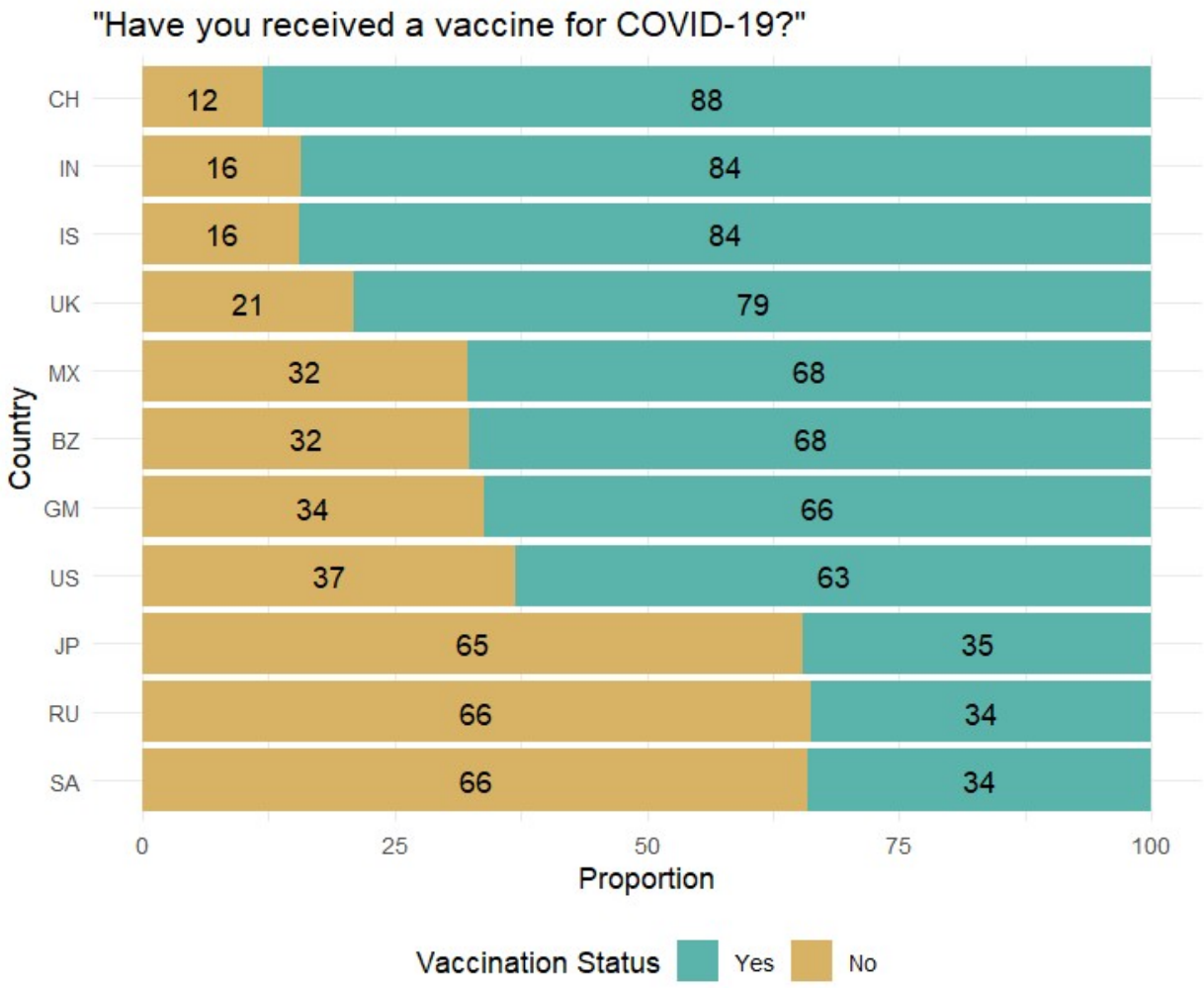


Figure S3. Descriptives of wearing a mask of any kind in the past two weeks grouped by country

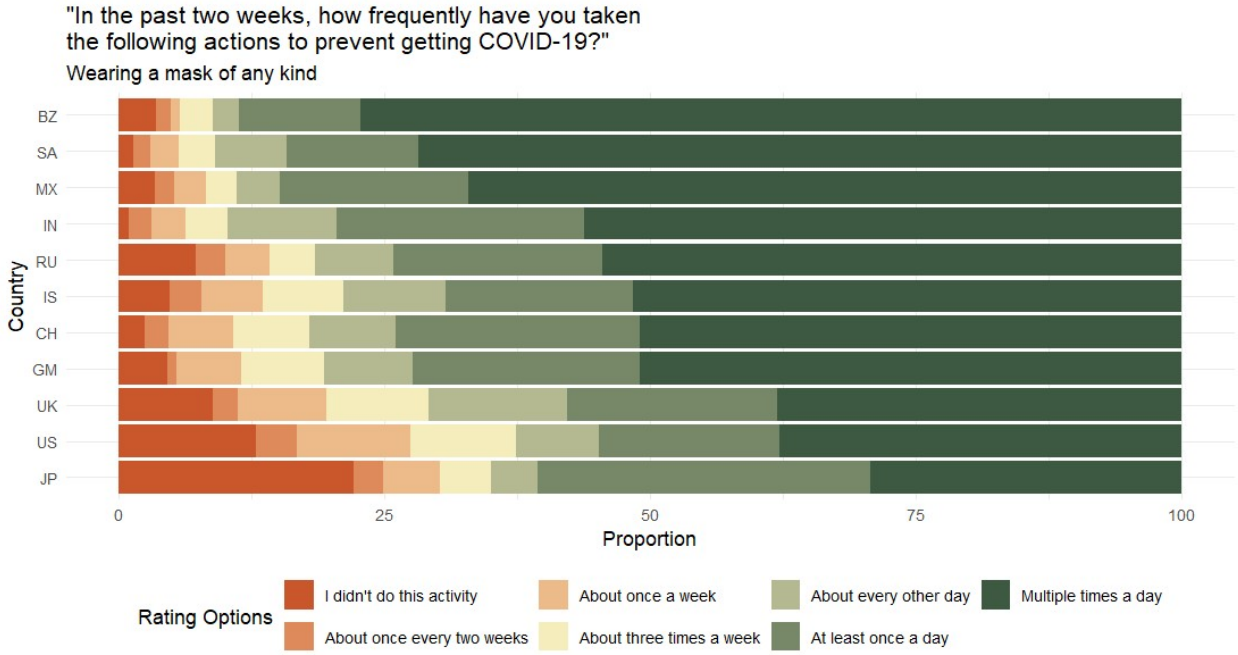


Figure S4. Correlation Matrix of the Eight Origin Items across the Entire Sample Population

Figure S5. Raw Data of Explanation Endorsement and Mean Levels of Endorsement for Each Latent Profile within Brazil

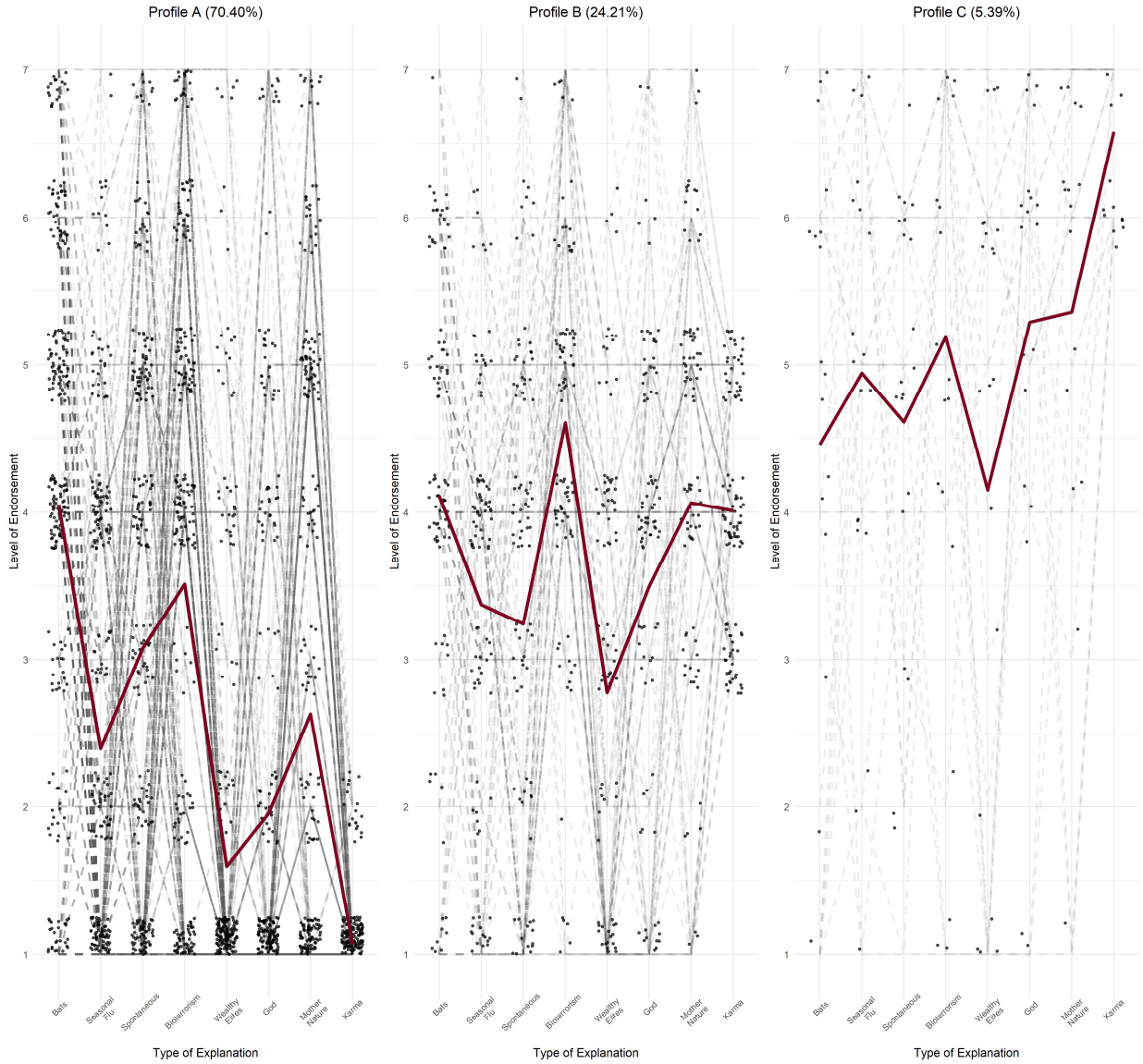


Figure S6. Raw Data of Explanation Endorsement and Mean Levels of Endorsement for Each Latent Profile within China

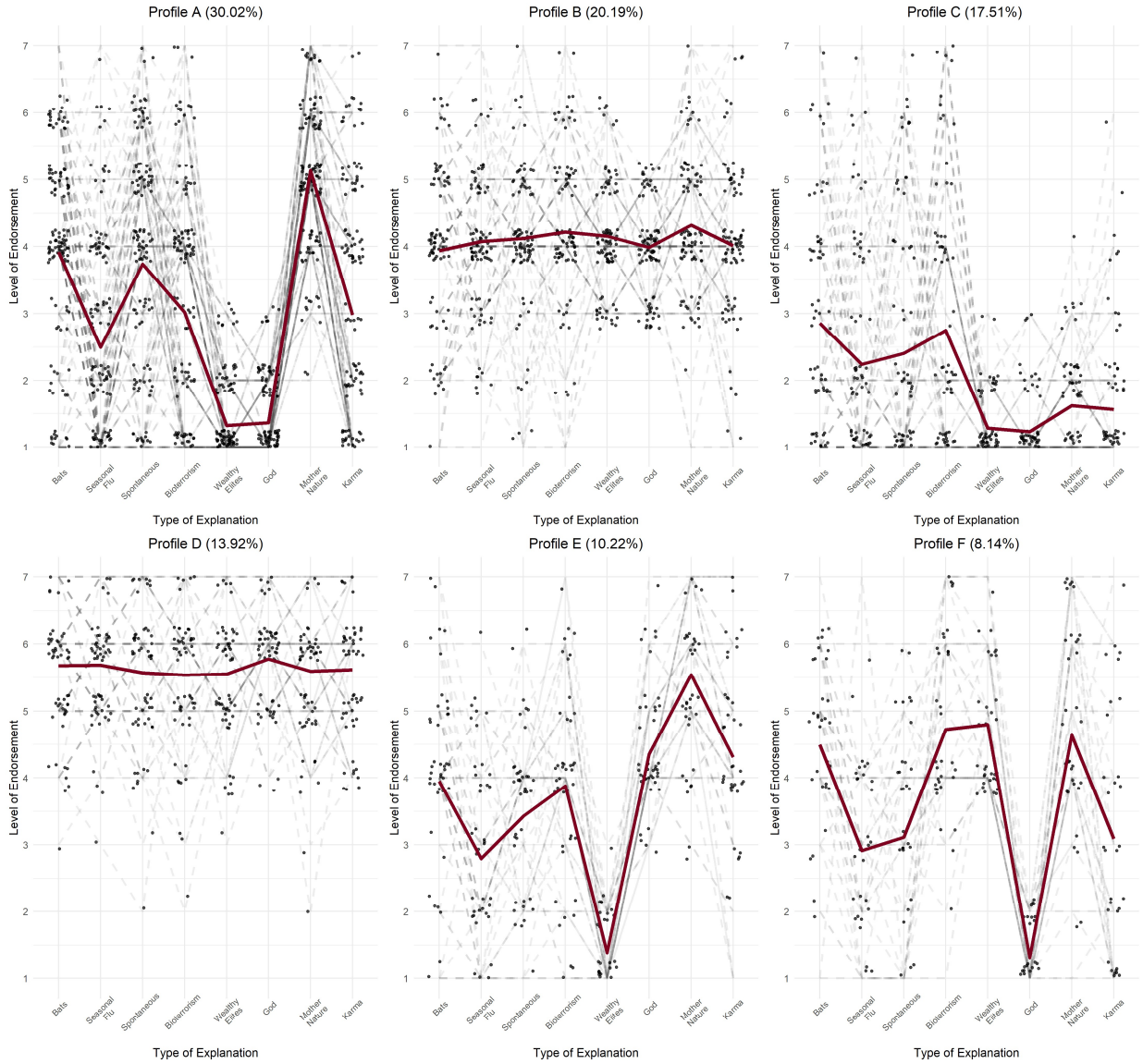


Figure S7. Raw Data of Explanation Endorsement and Mean Levels of Endorsement for Each Latent Profile within Germany

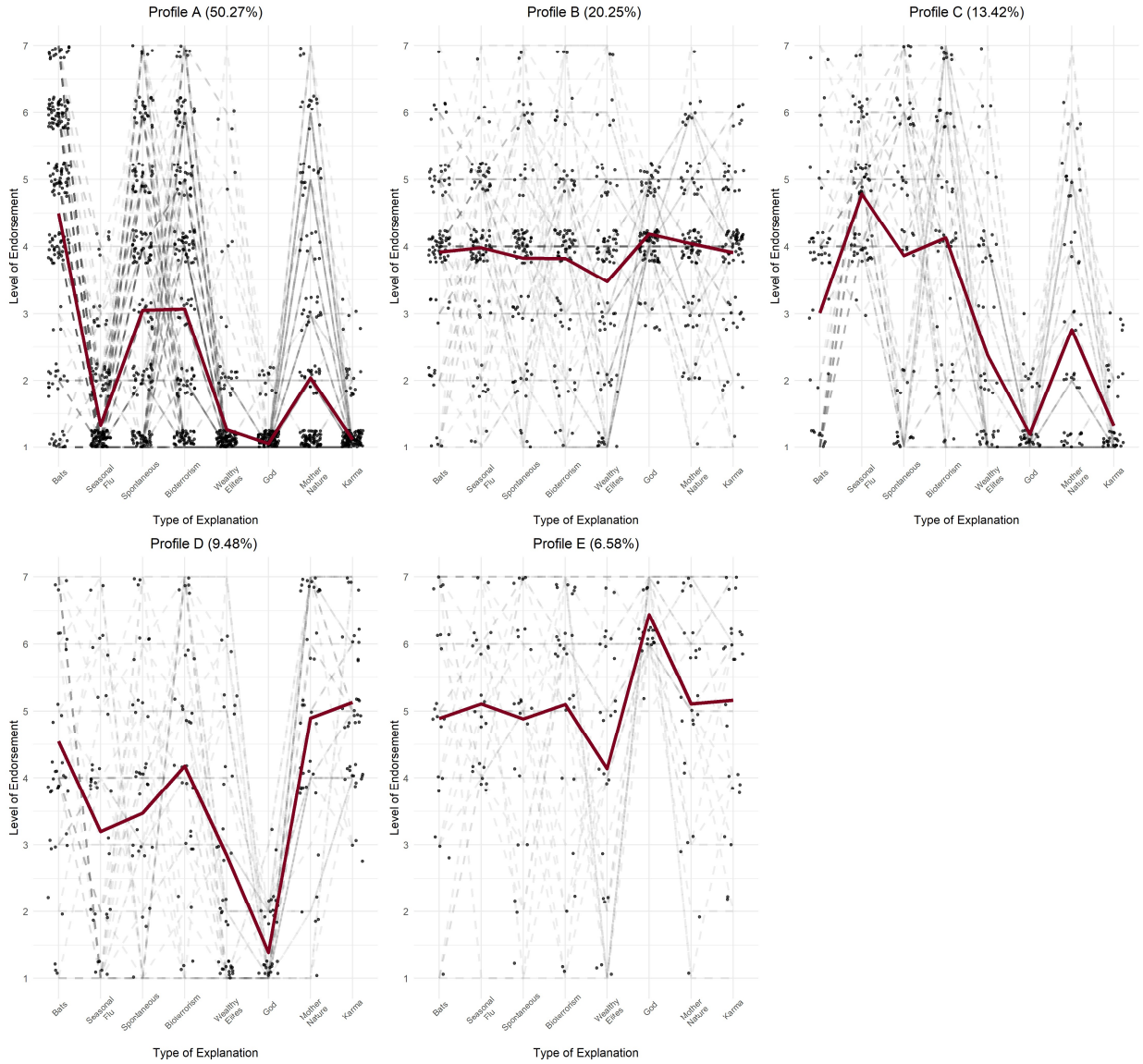


Figure S8. Raw Data of Explanation Endorsement and Mean Levels of Endorsement for Each Latent Profile within India

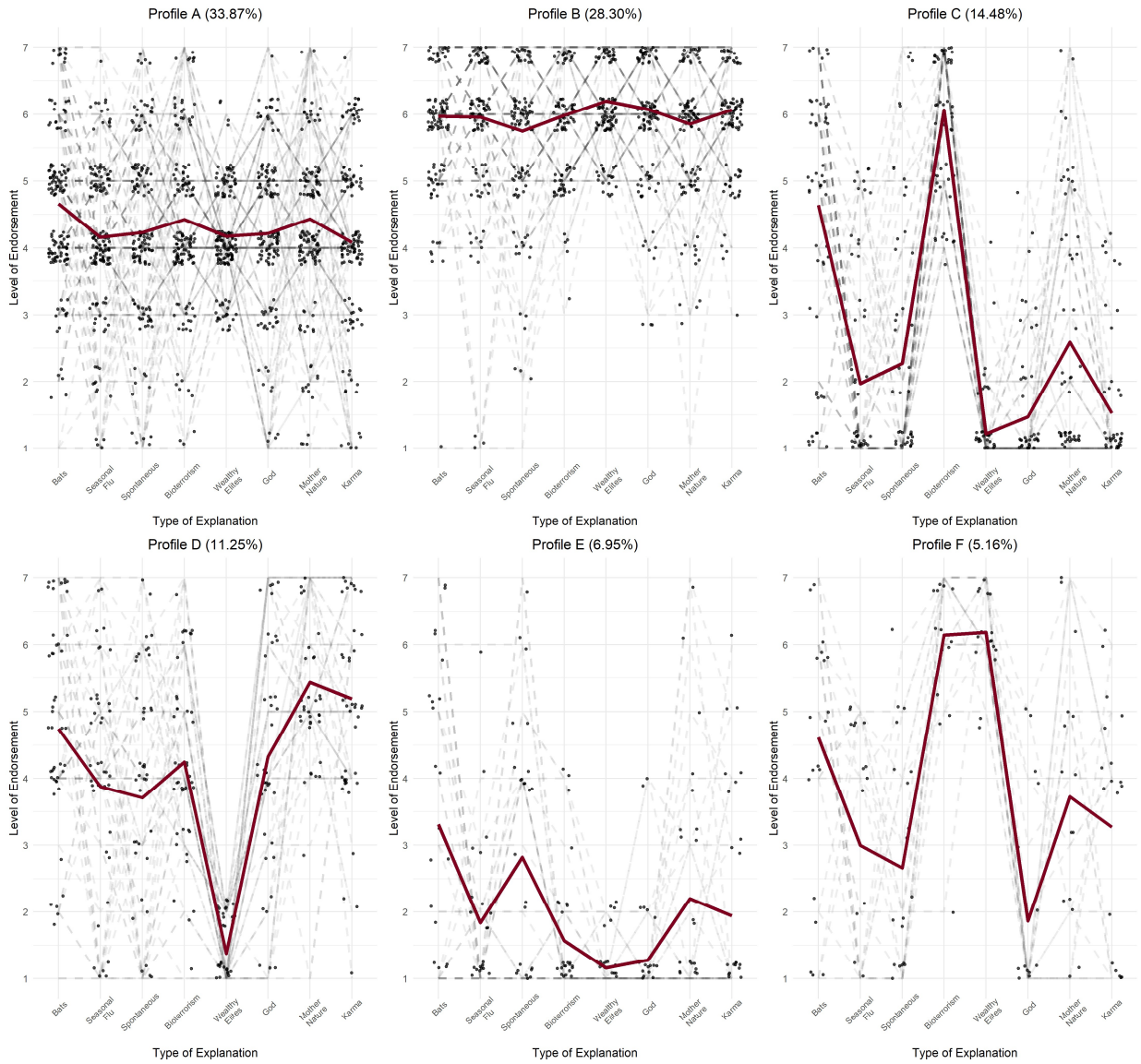


Figure S9. Raw Data of Explanation Endorsement and Mean Levels of Endorsement for Each Latent Profile within Israel

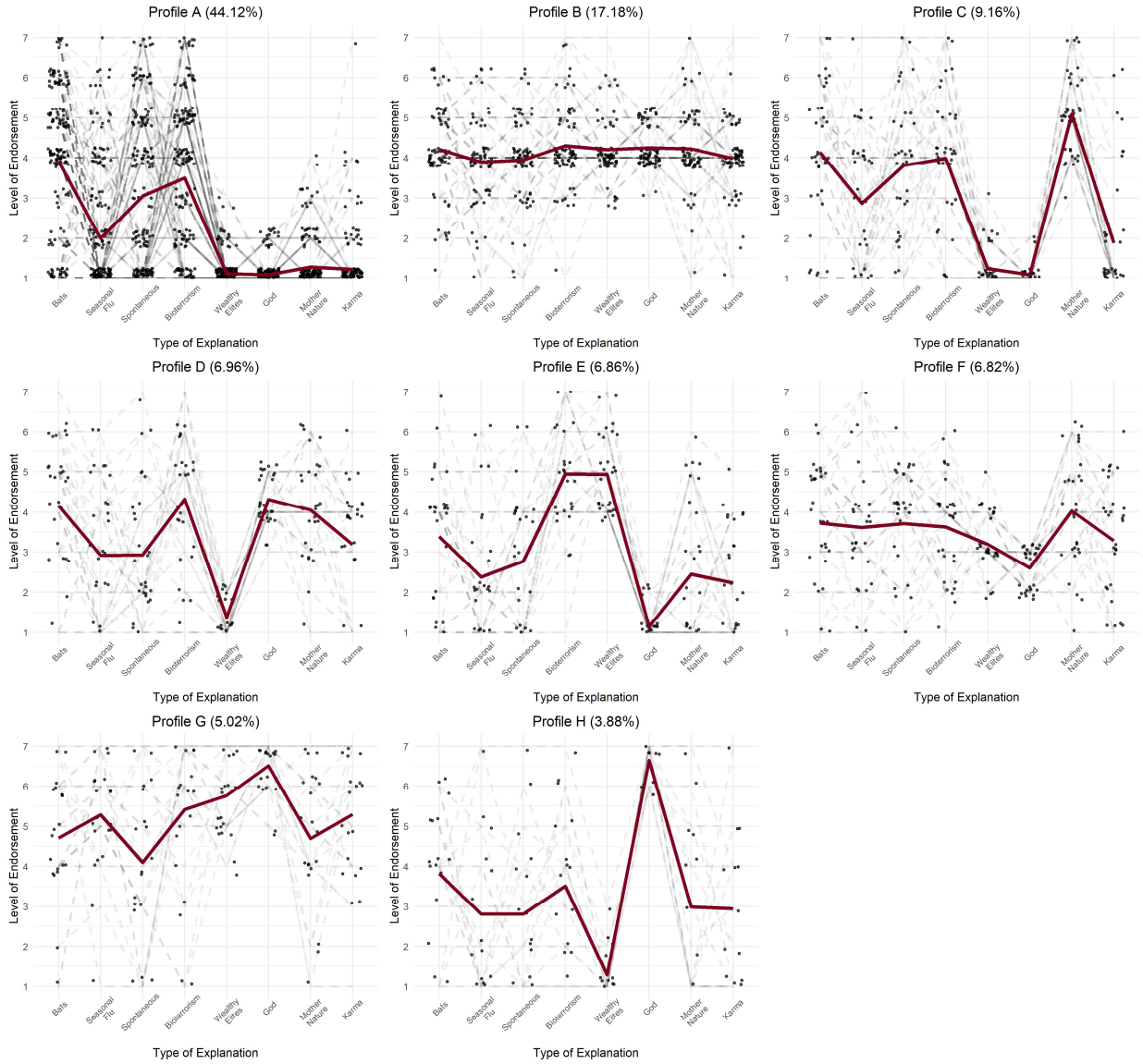


Figure S10. Raw Data of Explanation Endorsement and Mean Levels of Endorsement for Each Latent Profile within Japan

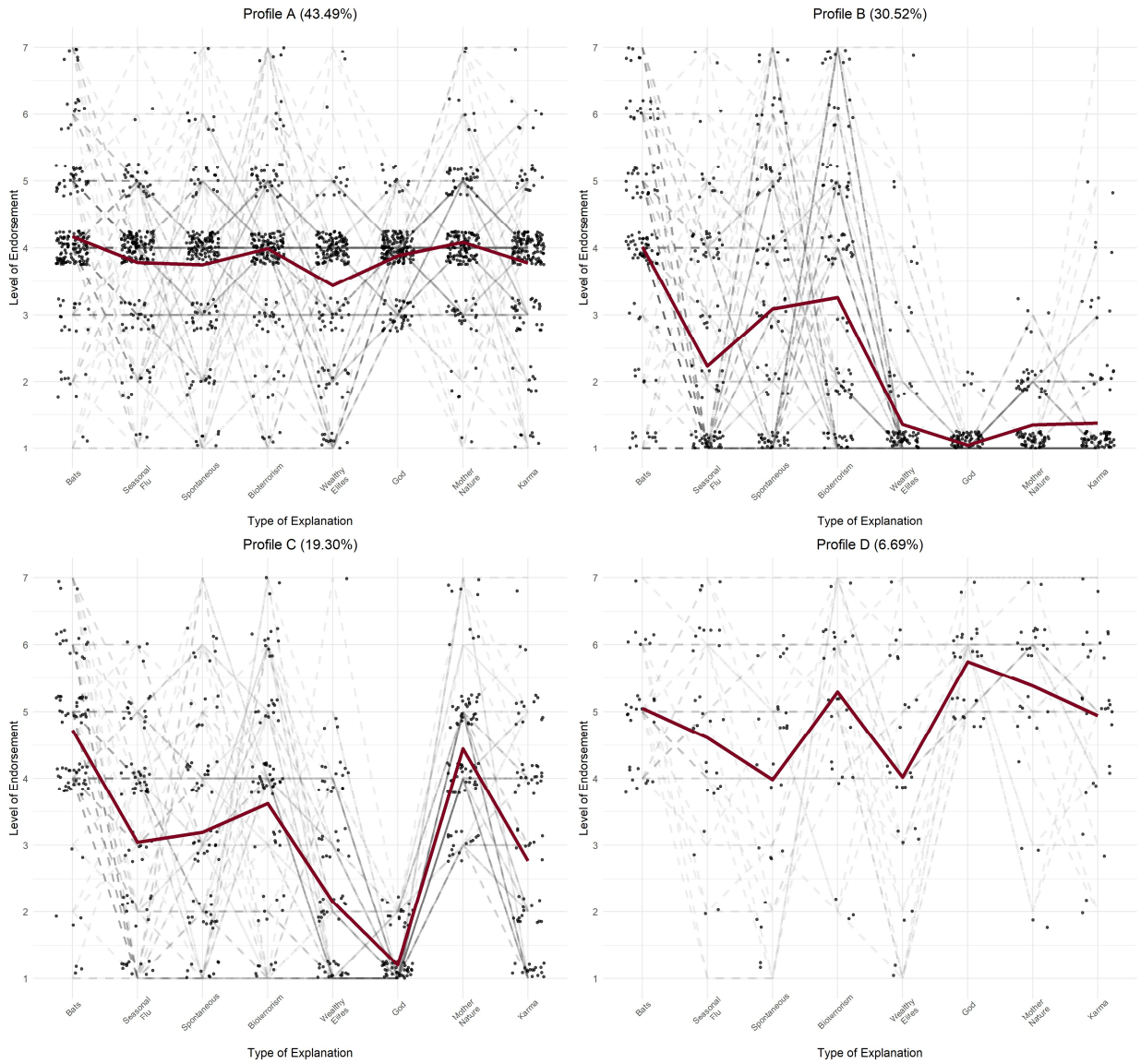


Figure S11. Raw Data of Explanation Endorsement and Mean Levels of Endorsement for Each Latent Profile within Mexico

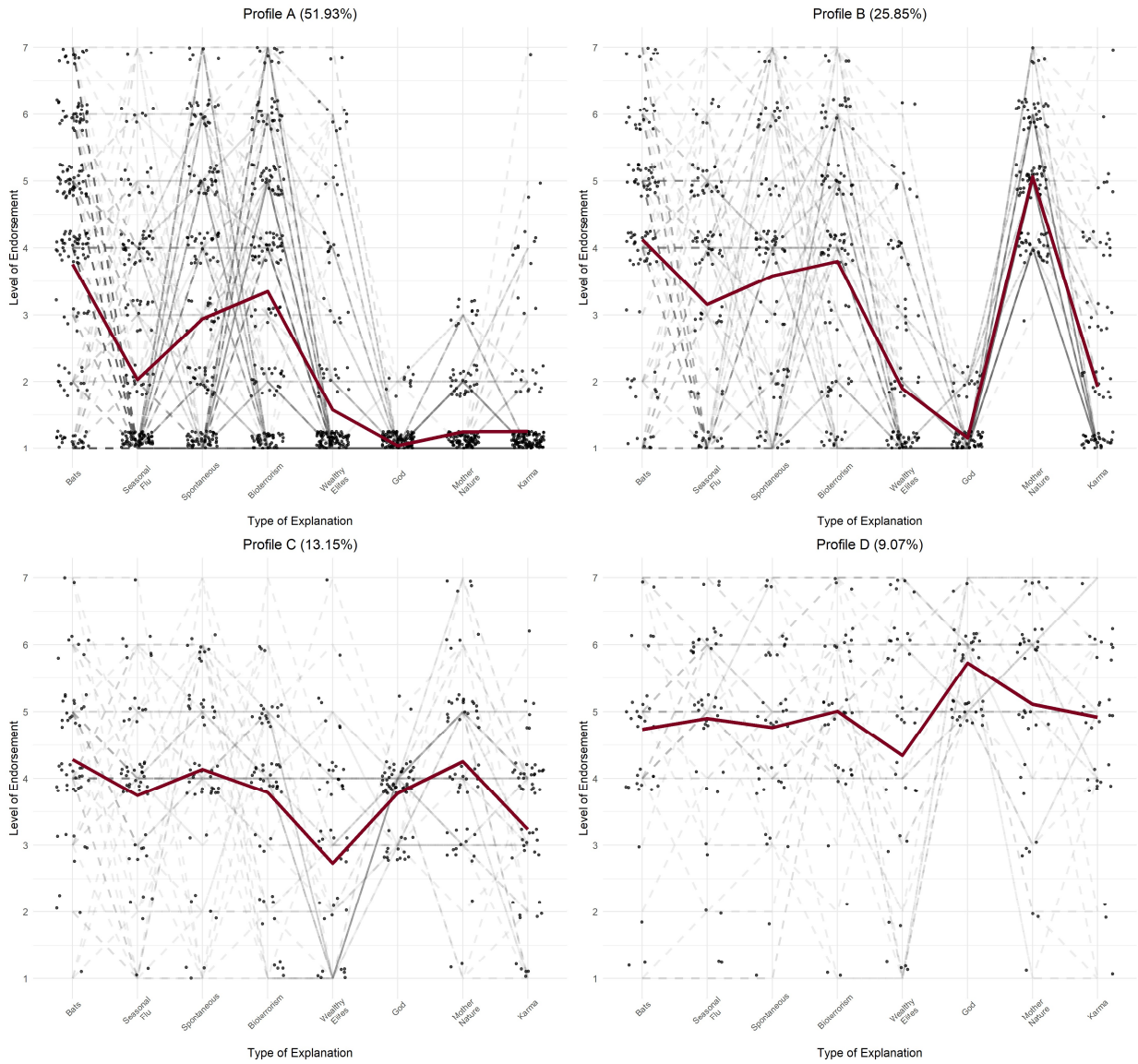


Figure S12. Raw Data of Explanation Endorsement and Mean Levels of Endorsement for Each Latent Profile within Russia

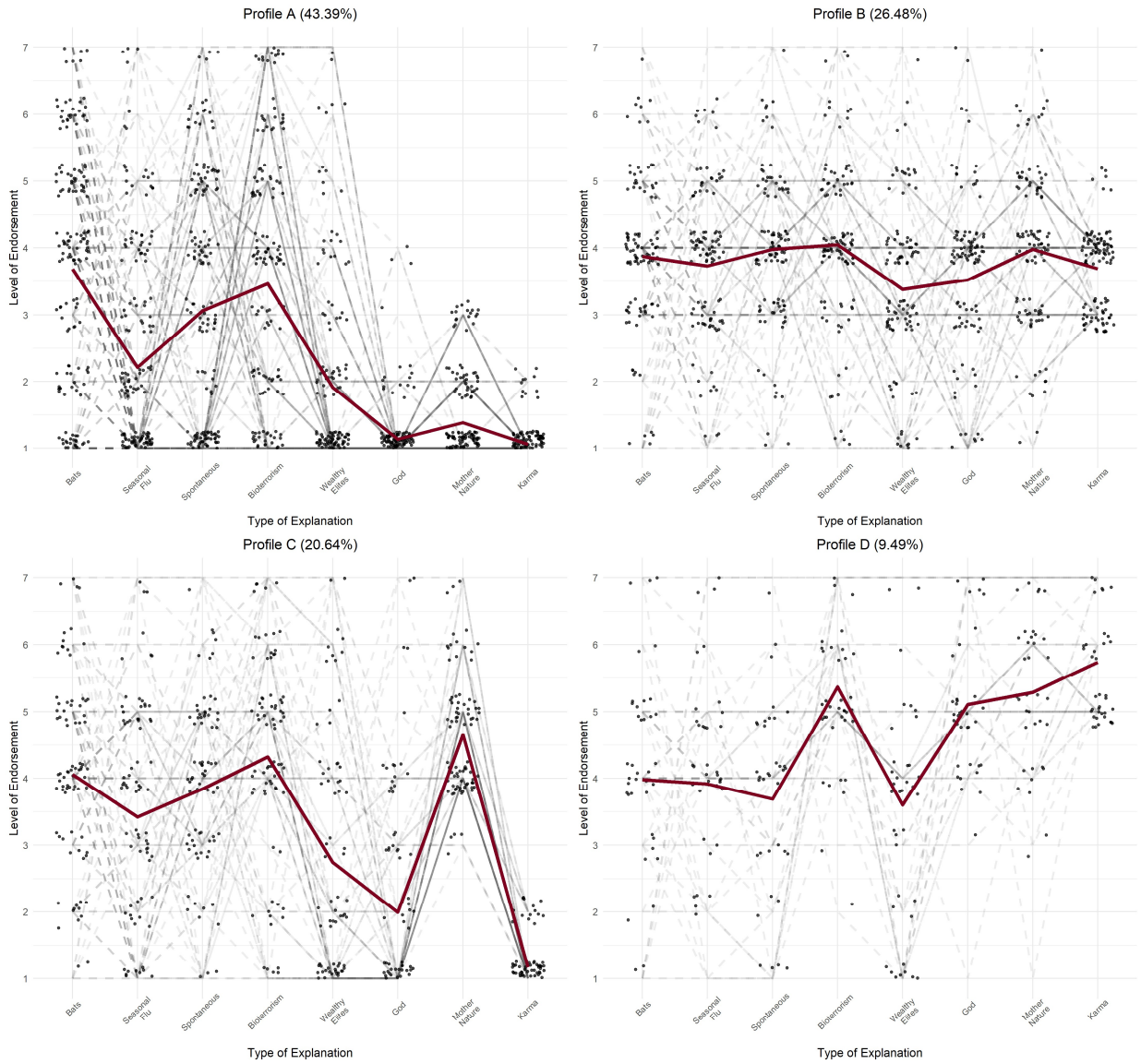


Figure S13. Raw Data of Explanation Endorsement and Mean Levels of Endorsement for Each Latent Profile within South Africa

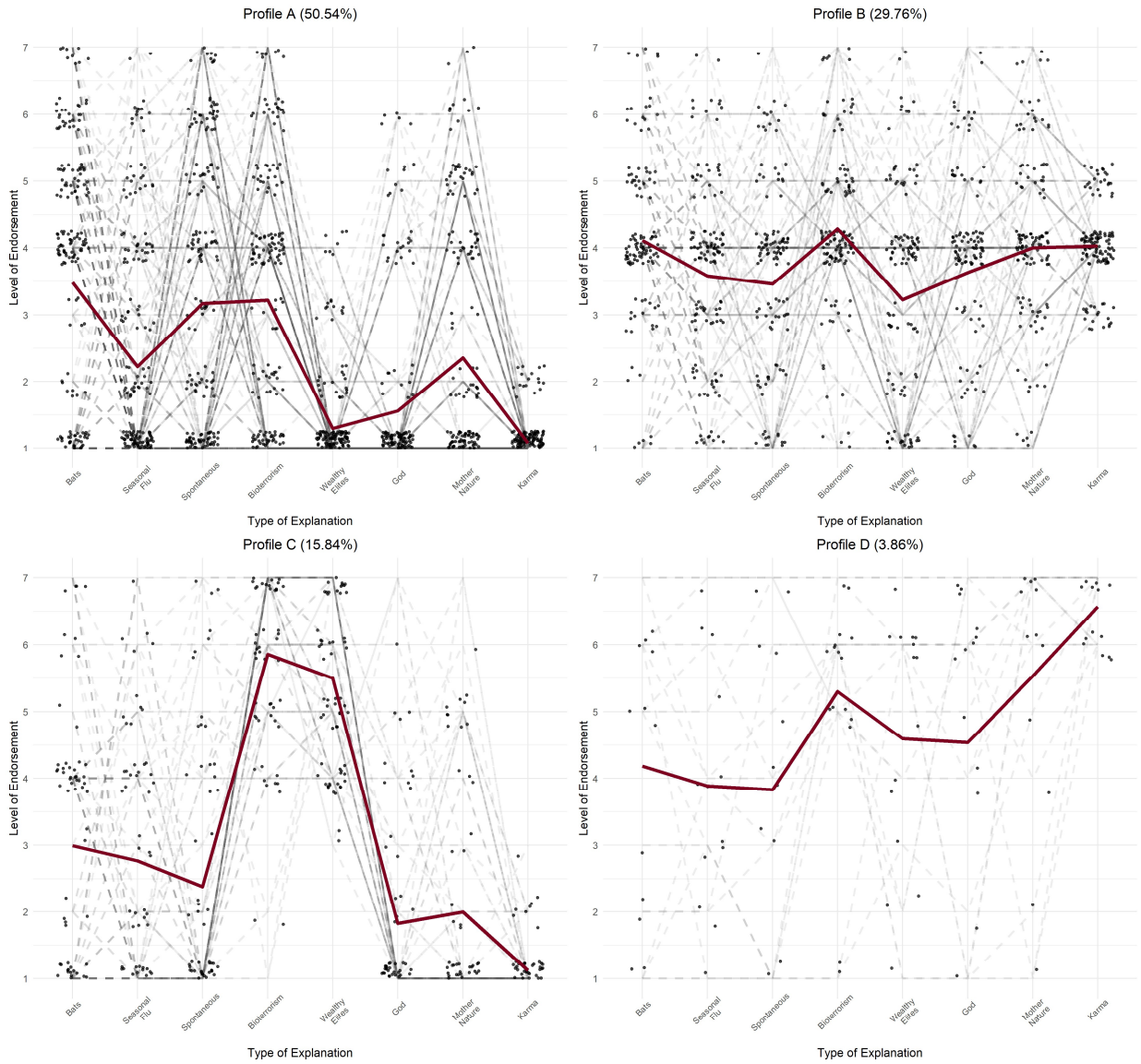


Figure S14. Raw Data of Explanation Endorsement and Mean Levels of Endorsement for Each Latent Profile within United Kingdom

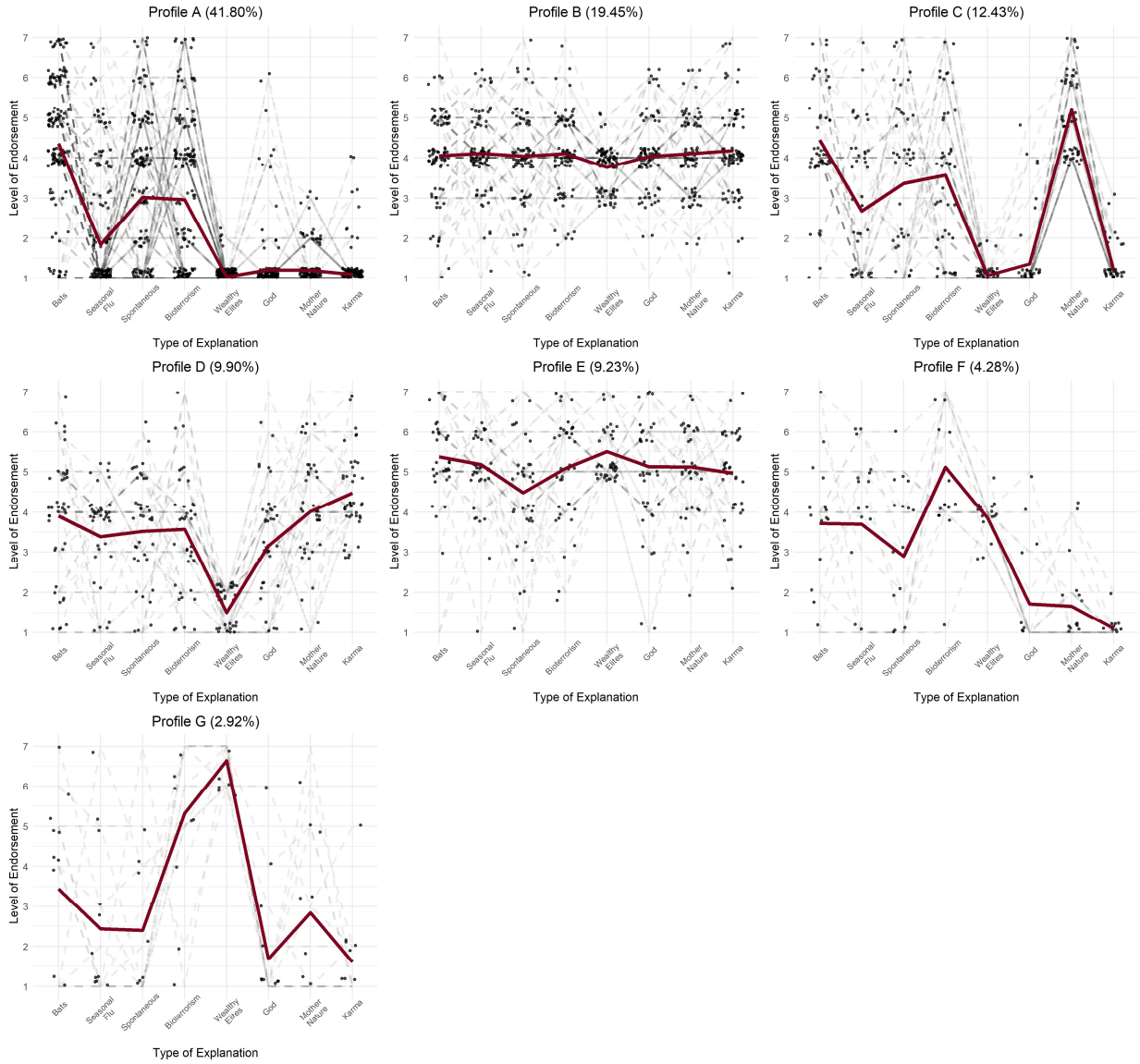


Figure S15. Raw Data of Explanation Endorsement and Mean Levels of Endorsement for Each Latent Profile within United States

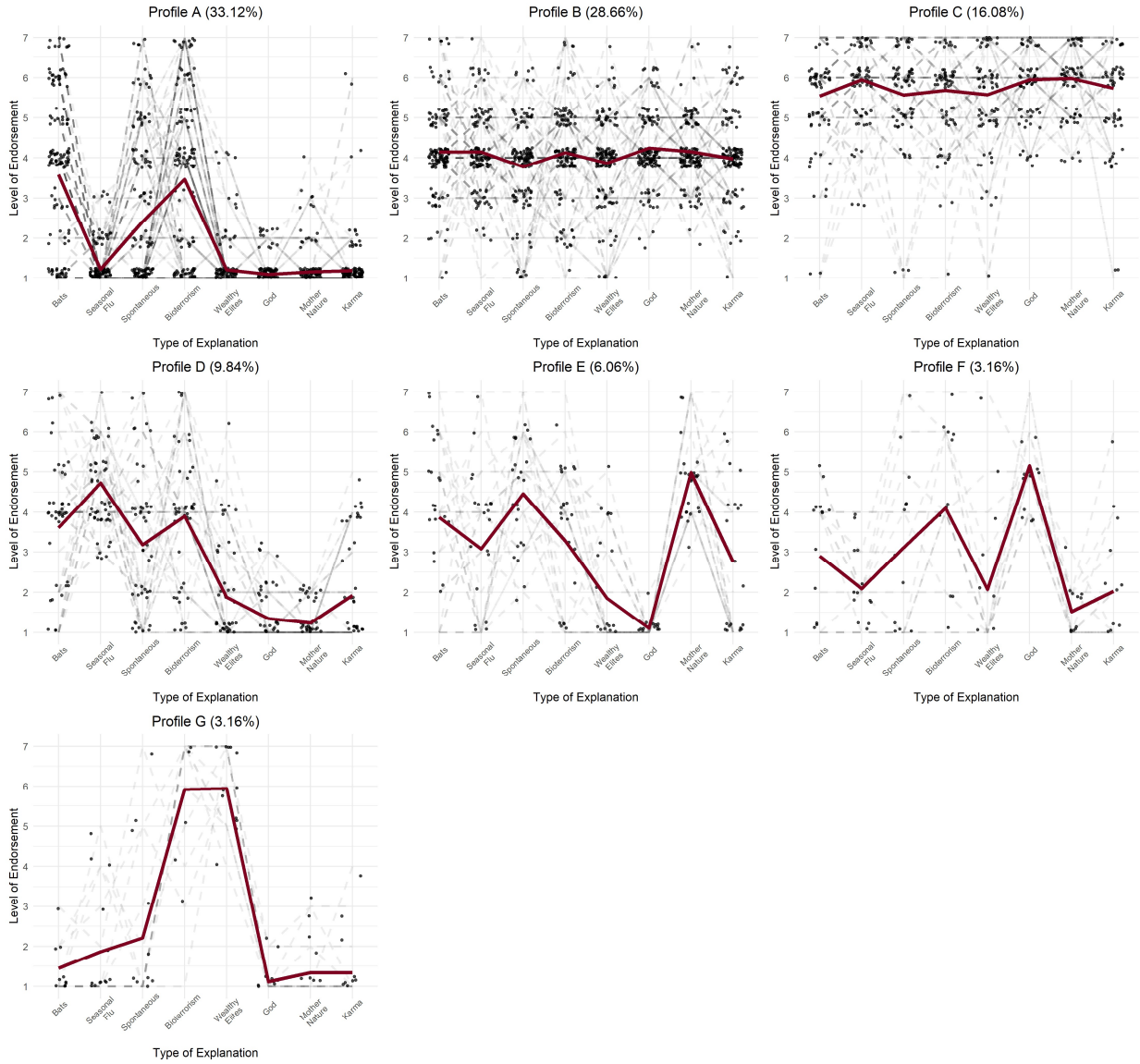


Table S1. Sociodemographic Characteristics of Participants

	BZ (N=432)	CH (N=445)	GM (N=441)	IN (N=429)	IS (N=436)	JP (N=434)	MX (N=441)	RU (N=429)	SA (N=444)	UK (N=429)	US (N=471)	Overall (N=4831)
Age (continuous)												
Mean (SD)	42.2 (14.1)	35.1 (9.84)	43.9 (16.6)	42.7 (14.6)	38.3 (14.5)	44.5 (15.9)	42.8 (14.3)	43.2 (14.1)	43.5 (15.9)	44.1 (16.4)	45.5 (17.8)	42.4 (15.3)
Median [Min, Max]	41.0 [18.0, 72.0]	34.0 [18.0, 71.0]	42.0 [18.0, 85.0]	41.0 [18.0, 80.0]	36.0 [18.0, 82.0]	44.0 [18.0, 88.0]	40.0 [18.0, 74.0]	43.0 [18.0, 74.0]	42.5 [18.0, 80.0]	42.0 [18.0, 81.0]	41.0 [18.0, 86.0]	40.0 [18.0, 88.0]
Missing	19 (4.4%)	27 (6.1%)	17 (3.9%)	11 (2.6%)	17 (3.9%)	16 (3.7%)	20 (4.5%)	10 (2.3%)	24 (5.4%)	11 (2.6%)	18 (3.8%)	190 (3.9%)
Age Group												
18-29	106 (24.5%)	125 (28.1%)	105 (23.8%)	86 (20.0%)	136 (31.2%)	96 (22.1%)	86 (19.5%)	80 (18.6%)	97 (21.8%)	92 (21.4%)	96 (20.4%)	1105 (22.9%)
30-39	90 (20.8%)	164 (36.9%)	81 (18.4%)	104 (24.2%)	116 (26.6%)	81 (18.7%)	120 (27.2%)	113 (26.3%)	97 (21.8%)	97 (22.6%)	100 (21.2%)	1163 (24.1%)
40-49	66 (15.3%)	92 (20.7%)	71 (16.1%)	81 (18.9%)	78 (17.9%)	79 (18.2%)	57 (12.9%)	65 (15.2%)	74 (16.7%)	67 (15.6%)	92 (19.5%)	822 (17.0%)
50+	151 (35.0%)	37 (8.3%)	167 (37.9%)	147 (34.3%)	89 (20.4%)	162 (37.3%)	158 (35.8%)	161 (37.5%)	152 (34.2%)	162 (37.8%)	165 (35.0%)	1551 (32.1%)
Missing	19 (4.4%)	27 (6.1%)	17 (3.9%)	11 (2.6%)	17 (3.9%)	16 (3.7%)	20 (4.5%)	10 (2.3%)	24 (5.4%)	11 (2.6%)	18 (3.8%)	190 (3.9%)
Gender												
Male	202 (46.8%)	211 (47.4%)	209 (47.4%)	211 (49.2%)	210 (48.2%)	205 (47.2%)	208 (47.2%)	210 (49.0%)	205 (46.2%)	208 (48.5%)	222 (47.1%)	2301 (47.6%)
Female	210 (48.6%)	207 (46.5%)	212 (48.1%)	207 (48.3%)	205 (47.0%)	210 (48.4%)	211 (47.8%)	206 (48.0%)	211 (47.5%)	208 (48.5%)	228 (48.4%)	2315 (47.9%)

	BZ (N=432)	CH (N=445)	GM (N=441)	IN (N=429)	IS (N=436)	JP (N=434)	MX (N=441)	RU (N=429)	SA (N=444)	UK (N=429)	US (N=471)	Overall (N=4831)
Other	1 (0.2%)	0 (0%)	3 (0.7%)	0 (0%)	4 (0.9%)	3 (0.7%)	2 (0.5%)	3 (0.7%)	4 (0.9%)	2 (0.5%)	3 (0.6%)	25 (0.5%)
Missing	19 (4.4%)	27 (6.1%)	17 (3.9%)	11 (2.6%)	17 (3.9%)	16 (3.7%)	20 (4.5%)	10 (2.3%)	24 (5.4%)	11 (2.6%)	18 (3.8%)	190 (3.9%)
Education												
High School or Less	161 (37.3%)	34 (7.6%)	41 (9.3%)	40 (9.3%)	87 (20.0%)	126 (29.0%)	0 (0%)	37 (8.6%)	168 (37.8%)	146 (34.0%)	105 (22.3%)	945 (19.6%)
Post High School, no University Degree	124 (28.7%)	56 (12.6%)	177 (40.1%)	28 (6.5%)	86 (19.7%)	0 (0%)	0 (0%)	142 (33.1%)	120 (27.0%)	77 (17.9%)	104 (22.1%)	914 (18.9%)
University Degree	59 (13.7%)	279 (62.7%)	29 (6.6%)	117 (27.3%)	111 (25.5%)	205 (47.2%)	0 (0%)	144 (33.6%)	82 (18.5%)	101 (23.5%)	105 (22.3%)	1232 (25.5%)
Some Graduate School or Graduate Degree	68 (15.7%)	41 (9.2%)	73 (16.6%)	231 (53.8%)	125 (28.7%)	27 (6.2%)	0 (0%)	95 (22.1%)	46 (10.4%)	70 (16.3%)	103 (21.9%)	879 (18.2%)
Other	0 (0%)	0 (0%)	98 (22.2%)	0 (0%)	8 (1.8%)	56 (12.9%)	0 (0%)	0 (0%)	0 (0%)	19 (4.4%)	0 (0%)	181 (3.7%)
Do not know	1 (0.2%)	0 (0%)	2 (0.5%)	2 (0.5%)	2 (0.5%)	4 (0.9%)	0 (0%)	1 (0.2%)	3 (0.7%)	5 (1.2%)	2 (0.4%)	22 (0.5%)
Missing	19 (4.4%)	35 (7.9%)	21 (4.8%)	11 (2.6%)	17 (3.9%)	16 (3.7%)	441 (100%)	10 (2.3%)	25 (5.6%)	11 (2.6%)	52 (11.0%)	658 (13.6%)
Political Orientation - Economic Issues												
Liberal	160 (37.0%)	260 (58.4%)	117 (26.5%)	132 (30.8%)	151 (34.6%)	56 (12.9%)	150 (34.0%)	67 (15.6%)	118 (26.6%)	105 (24.5%)	130 (27.6%)	1446 (29.9%)

	BZ (N=432)	CH (N=445)	GM (N=441)	IN (N=429)	IS (N=436)	JP (N=434)	MX (N=441)	RU (N=429)	SA (N=444)	UK (N=429)	US (N=471)	Overall (N=4831)
Moderate	66 (15.3%)	80 (18.0%)	121 (27.4%)	65 (15.2%)	79 (18.1%)	144 (33.2%)	102 (23.1%)	134 (31.2%)	100 (22.5%)	103 (24.0%)	115 (24.4%)	1109 (23.0%)
Conservative	153 (35.4%)	84 (18.9%)	114 (25.9%)	175 (40.8%)	165 (37.8%)	132 (30.4%)	111 (25.2%)	90 (21.0%)	162 (36.5%)	146 (34.0%)	183 (38.9%)	1515 (31.4%)
Uncertain	45 (10.4%)	8 (1.8%)	83 (18.8%)	52 (12.1%)	33 (7.6%)	97 (22.4%)	68 (15.4%)	134 (31.2%)	56 (12.6%)	71 (16.6%)	31 (6.6%)	678 (14.0%)
Missing	8 (1.9%)	13 (2.9%)	6 (1.4%)	5 (1.2%)	8 (1.8%)	5 (1.2%)	10 (2.3%)	4 (0.9%)	8 (1.8%)	4 (0.9%)	12 (2.5%)	83 (1.7%)
Political Orientation - Social Issues												
Liberal	155 (35.9%)	307 (69.0%)	118 (26.8%)	133 (31.0%)	174 (39.9%)	57 (13.1%)	154 (34.9%)	70 (16.3%)	112 (25.2%)	121 (28.2%)	143 (30.4%)	1544 (32.0%)
Moderate	66 (15.3%)	69 (15.5%)	125 (28.3%)	72 (16.8%)	80 (18.3%)	131 (30.2%)	97 (22.0%)	145 (33.8%)	112 (25.2%)	106 (24.7%)	124 (26.3%)	1127 (23.3%)
Conservative	147 (34.0%)	47 (10.6%)	116 (26.3%)	165 (38.5%)	148 (33.9%)	145 (33.4%)	110 (24.9%)	73 (17.0%)	150 (33.8%)	136 (31.7%)	164 (34.8%)	1401 (29.0%)
Uncertain	56 (13.0%)	9 (2.0%)	76 (17.2%)	54 (12.6%)	26 (6.0%)	96 (22.1%)	70 (15.9%)	137 (31.9%)	62 (14.0%)	62 (14.5%)	28 (5.9%)	676 (14.0%)
Missing	8 (1.9%)	13 (2.9%)	6 (1.4%)	5 (1.2%)	8 (1.8%)	5 (1.2%)	10 (2.3%)	4 (0.9%)	8 (1.8%)	4 (0.9%)	12 (2.5%)	83 (1.7%)
Religiosity												
Religious	194 (44.9%)	38 (8.5%)	122 (27.7%)	280 (65.3%)	110 (25.2%)	27 (6.2%)	148 (33.6%)	87 (20.3%)	233 (52.5%)	93 (21.7%)	213 (45.2%)	1545 (32.0%)
Spiritual, but not religious	165 (38.2%)	148 (33.3%)	77 (17.5%)	123 (28.7%)	116 (26.6%)	98 (22.6%)	211 (47.8%)	219 (51.0%)	162 (36.5%)	115 (26.8%)	165 (35.0%)	1599 (33.1%)
Not religious	65 (15.0%)	249 (56.0%)	234 (53.1%)	21 (4.9%)	204 (46.8%)	304 (70.0%)	69 (15.6%)	119 (27.7%)	44 (9.9%)	218 (50.8%)	85 (18.0%)	1612 (33.4%)

	BZ (N=432)	CH (N=445)	GM (N=441)	IN (N=429)	IS (N=436)	JP (N=434)	MX (N=441)	RU (N=429)	SA (N=444)	UK (N=429)	US (N=471)	Overall (N=4831)
Missing	8 (1.9%)	10 (2.2%)	8 (1.8%)	5 (1.2%)	6 (1.4%)	5 (1.2%)	13 (2.9%)	4 (0.9%)	5 (1.1%)	3 (0.7%)	8 (1.7%)	75 (1.6%)

Note. All education values for Mexico are treated as missing due to a survey error.

Table S2. Means and Standard Deviations of Origin Belief Items

Variables	BZ	CH	GM	IN	IS	JP	MX	RU	SA	UK	US	Overall Sample
A research lab that was genetically engineered as a biological weapon												
Mean	3.87	3.79	3.60	4.97	3.94	3.78	3.67	3.97	4.03	3.67	4.14	3.95
SD	2.11	1.85	2.06	1.72	1.82	1.75	2.04	1.91	2.03	1.92	1.95	1.96
Punishment from God for sinful behavior												
Mean	2.51	2.78	2.09	4.03	2.45	2.62	1.85	2.32	2.33	2.36	2.93	2.57
SD	1.97	1.86	1.74	2.14	1.89	1.64	1.57	1.73	1.83	1.77	2.07	1.92
A virus transmitted from bats												
Mean	4.09	4.03	4.21	4.94	3.99	4.29	4.01	3.84	3.62	4.30	3.99	4.12
SD	1.93	1.72	1.90	1.72	1.79	1.44	1.95	1.71	1.95	1.75	1.85	1.83
A warning from Mother Nature for human actions on the environment												
Mean	3.12	4.42	3.01	4.49	2.83	3.41	2.98	3.12	2.91	2.97	3.04	3.30
SD	2.13	1.79	2.04	1.96	1.90	1.70	2.06	1.85	1.99	1.96	2.04	2.03
Electromagnetic fields caused by 5G and wireless technology												
Mean	1.87	2.54	2.03	3.71	2.16	2.63	1.90	1.96	2.15	2.23	2.86	2.37
SD	1.52	1.85	1.63	2.12	1.66	1.55	1.56	1.38	1.63	1.71	2.00	1.78
Seasonal Flu												
Mean	2.77	3.28	2.75	4.10	2.80	3.22	2.81	3.03	2.78	2.95	3.32	3.07
SD	1.79	1.81	1.88	2.01	1.78	1.59	1.90	1.73	1.80	1.84	2.03	1.88
COVID-19 is not real because it is a plot from wealthy elites to control the world												
Mean	2.02	2.76	2.20	3.90	2.32	2.59	2.06	2.63	2.66	2.31	2.95	2.58
SD	1.66	1.89	1.75	2.13	1.72	1.57	1.69	1.81	2.00	1.76	2.02	1.89
There is no reason why the pandemic occurred, it just happens												
Mean	3.20	3.75	3.48	4.14	3.33	3.45	3.43	3.52	3.15	3.42	3.52	3.49
SD	1.99	1.80	2.02	1.99	1.87	1.69	2.07	1.80	2.04	1.82	1.97	1.93
Karmic retribution for our past behaviors												
Mean	2.08	3.45	2.35	4.21	2.37	2.92	2.02	2.22	2.17	2.41	2.91	2.65
SD	1.71	1.92	1.84	2.05	1.72	1.64	1.62	1.67	1.65	1.81	2.01	1.90

Variables	BZ	CH	GM	IN	IS	JP	MX	RU	SA	UK	US	Overall Sample
Witchcraft												
Mean	1.55	2.24	1.85	3.65	2.08	2.17	1.49	1.64	1.71	2.10	2.61	2.10
SD	1.32	1.73	1.52	2.13	1.63	1.49	1.21	1.13	1.45	1.68	1.98	1.70

Table S3. Model Fit Indices for Number of Latent Profiles for Each Country

Number of Classes	LL	FP	AIC	BIC	SABIC	Entropy	LMR LRT (*p*)	BLRT (*p*)
Brazil								
2	-6833.748	25	13717.496	13819.207	13739.871	.959	<.001	<.001
3	**-6686.688**	**34**	**13441.376**	**13579.703**	**13471.806**	**.993**	**.0002**	**<.001**
4	-6581.428	43	13248.856	13423.799	13287.341	.986	<.001	<.001
China								
2	-6785.837	25	13621.675	13724.127	13644.788	.880	<.001	<.001
3	-6642.843	34	13353.687	13493.021	13385.120	.933	<.001	<.001
4	-6538.480	43	13162.959	13339.176	13202.713	.902	<.001	<.001
5	-6484.929	52	13073.859	13286.959	13121.933	.879	.3060	<.001
6	**-6393.848**	**61**	**12909.697**	**13159.679**	**12966.091**	**.918**	**.0070**	**<.001**
7	-6355.687	70	12851.375	13138.240	12916.090	.904	.0604	<.001
8	-6320.482	79	12798.965	13122.713	12872.001	.913	.3241	<.001
9	-6286.045	88	12748.090	13108.721	12829.447	.914	.3043	<.001
Germany								
2	-6762.356	25	13574.712	13676.938	13597.600	.965	<.001	<.001
3	-6623.873	34	13315.746	13454.774	13346.874	.971	.1122	<.001
4	-6465.010	43	13016.019	13191.848	13055.386	.980	.0037	<.001
5	**-6392.784**	**52**	**12889.567**	**13102.198**	**12937.174**	**.950**	**.0473**	**<.001**
India								
2	-6691.905	25	13433.810	13535.347	13456.012	.864	<.001	<.001
3	-6500.888	34	13069.776	13207.866	13099.970	.859	.0004	<.001
4	-6429.059	43	12944.119	13118.761	12982.305	.887	.0022	<.001
5	-6379.781	52	12863.562	13074.757	12909.740	.931	.4396	<.001
6	**-6318.402**	**61**	**12758.804**	**13006.553**	**12812.975**	**.934**	**.0058**	**<.001**
7	-6272.571	70	12685.141	12969.443	12747.305	.913	.0136	<.001
8	-6238.804	79	12635.608	12956.463	12705.764	.894	.7584	<.001
9	-6195.849	88	12567.698	12925.106	12645.846	.916	.2116	<.001
Israel								
2	-6593.715	25	13237.430	13339.371	13260.034	.937	.0003	<.001
3	-6477.594	34	13023.189	13161.829	13053.931	.977	.0299	<.001
4	-6405.575	43	12897.149	13072.488	12936.028	.976	.0197	<.001
5	-6295.025	52	12694.050	12906.087	12741.067	.970	.0246	<.001
6	-6232.128	61	12586.256	12834.992	12641.410	.979	.0551	<.001
7	-6170.648	70	12481.296	12766.731	12544.587	.980	.3562	<.001
8	**-6116.530**	**79**	**12391.059**	**12713.193**	**12462.489**	**.967**	**.4127**	**1.000**
9	-6081.502	88	12339.004	12697.836	12418.570	.934	.3797	1.000
Japan								
2	-6151.615	25	12353.229	12455.055	12375.719	.956	<.001	<.001
3	-6046.866	34	12161.733	12300.216	12192.319	.973	.0267	<.001
4	**-5934.005**	**43**	**11954.010**	**12129.151**	**11992.692**	**.950**	**.0003**	**<.001**

Mexico								
2	-6680.287	25	13410.573	13512.799	13433.461	.987	<.001	<.001
3	-6502.801	34	13073.603	13212.630	13104.730	.995	.0001	<.001
4	**-6375.872**	**43**	**12837.744**	**13013.573**	**12877.111**	**.968**	**.0060**	**<.001**
5	-6323.986	52	12751.972	12964.603	12799.579	.955	.1882	<.001
Russia								
2	-6454.353	25	12958.707	13060.243	12980.908	.929	.0014	<.001
3	-6329.147	34	12726.294	12864.384	12756.488	.979	.0028	<.001
4	**-6225.775**	**43**	**12537.550**	**12712.193**	**12575.736**	**.951**	**<.001**	**<.001**
5	-6147.878	52	12399.757	12610.952	12445.935	.964	.0157	<.001
6	-6080.017	61	12282.033	12529.782	12336.204	.973	.2195	<.001
South Africa								
2	-6991.381	25	14032.762	14135.158	14055.819	.971	.0001	<.001
3	-6835.881	34	13739.762	13879.020	13771.119	.997	<.001	<.001
4	**-6729.053**	**43**	**13544.106**	**13720.227**	**13583.764**	**.960**	**.0090**	**<.001**
5	-6658.192	52	13420.384	13633.367	13468.342	.959	.0098	<.001
United Kingdom								
2	-6383.586	25	12817.171	12918.708	12839.373	.954	<.001	<.001
3	-6258.694	34	12585.389	12723.478	12615.582	.979	.0089	<.001
4	-6173.412	43	12432.824	12607.467	12471.010	.974	.0123	<.001
5	-6097.524	52	12299.048	12510.244	12345.227	.959	.2405	<.001
6	-6009.885	61	12141.770	12389.519	12195.941	.982	.0468	<.001
7	**-5924.956**	**70**	**11989.913**	**12274.215**	**12052.077**	**.971**	**.5116**	**<.001**
United States								
2	-7122.823	25	14295.647	14399.518	14320.173	.946	<.001	<.001
3	-6901.085	34	13870.170	14011.435	13903.525	.939	.0213	<.001
4	-6803.588	43	13693.177	13871.835	13735.361	.958	.2779	<.001
5	-6709.777	52	13523.553	13739.606	13574.567	.960	.0672	<.001
6	-6644.452	61	13410.904	13664.350	13470.747	.952	.0958	<.001
7	**-6594.879**	**70**	**13329.759**	**13620.599**	**13398.431**	**.957**	**.2870**	**<.001**
8	-6540.873	79	13239.745	13567.979	13317.248	.974	.1803	<.001
9	-6479.585	88	13135.170	13500.797	13221.502	.963	.2190	<.001

Note. All models assume homoscedasticity which allows means to be freely estimated, but constrains the variances and covariances to be equal. Bold text indicates the final class solution selected. LL = Loglikelihood. FP = Free Parameters. AIC = Akaike information criterion. BIC = Bayesian information criterion. SABIC = sample-sized-adjusted BIC. LMR-LRT = Adjusted Lo-Mendell-Rubin Likelihood Ratio Test. BLRT = Bootstrap Likelihood Ratio Test.

Table S4. Row Proportions for Each Latent Profile grouped by Demographic Variables for the Brazil Sample

Variable Category	Profile A	Profile B	Profile C
Age Group			
18-29	0.68	0.27	0.05
30-39	0.72	0.24	0.03
40-49	0.65	0.27	0.08
50+	0.70	0.24	0.07
NA	1.00	0.00	0.00
Gender			
Female	0.72	0.24	0.04
Male	0.66	0.27	0.07
Other	1.00	0.00	0.00
NA	1.00	0.00	0.00
Education			
High School or Less	0.62	0.32	0.06
Post High School, no University Degree	0.74	0.23	0.02
University Degree	0.73	0.17	0.10
Some Graduate School or Graduate Degree	0.72	0.22	0.06
Other	0.00	0.00	0.00
Do not know	1.00	0.00	0.00
NA	1.00	0.00	0.00
Political Orientation - Economic Issues			
Liberal	0.69	0.26	0.06
Moderate	0.67	0.30	0.03
Conservative	0.71	0.24	0.06
Uncertain	0.76	0.18	0.07
NA	1.00	0.00	0.00
Political Orientation - Social Issues			
Liberal	0.70	0.25	0.05

Variable Category	Profile A	Profile B	Profile C
Moderate	0.73	0.24	0.03
Conservative	0.67	0.27	0.07
Uncertain	0.75	0.20	0.05
NA	1.00	0.00	0.00
Religiosity			
Religious	0.65	0.29	0.06
Spiritual, but not religious	0.73	0.23	0.04
Not religious	0.75	0.17	0.08
NA	1.00	0.00	0.00
Vaccination Status			
No	0.72	0.24	0.04
Yes	0.70	0.24	0.06
Mask Wearing Frequency			
Never	0.53	0.40	0.07
Semifrequent	0.65	0.26	0.09
Frequent	0.71	0.24	0.05

Note. The proportions are based on assigned likely latent class membership, not estimated posterior probabilities.

Table S5. Row Proportions for Each Latent Profile grouped by Demographic Variables for the China Sample

Variable Category	Profile A	Profile B	Profile C	Profile D	Profile E	Profile F
Age Group						
18-29	0.26	0.18	0.26	0.13	0.06	0.11
30-39	0.29	0.22	0.13	0.21	0.09	0.06
40-49	0.39	0.21	0.10	0.10	0.14	0.07
50+	0.32	0.16	0.19	0.03	0.22	0.08
NA	0.33	0.30	0.22	0.04	0.04	0.07
Gender						
Female	0.33	0.16	0.18	0.13	0.10	0.10
Male	0.28	0.23	0.16	0.16	0.10	0.06
Other	0.00	0.00	0.00	0.00	0.00	0.00
NA	0.33	0.30	0.22	0.04	0.04	0.07
Education						
High School or Less	0.15	0.29	0.21	0.12	0.15	0.09
Post High School, no University Degree	0.41	0.18	0.14	0.07	0.12	0.07
University Degree	0.32	0.18	0.16	0.16	0.10	0.08
Some Graduate School or Graduate Degree	0.27	0.24	0.22	0.15	0.05	0.07
Other	0.00	0.00	0.00	0.00	0.00	0.00
Do not know	0.00	0.00	0.00	0.00	0.00	0.00
NA	0.29	0.29	0.23	0.03	0.06	0.11
Political Orientation - Economic Issues						
Liberal	0.35	0.16	0.20	0.13	0.07	0.11
Moderate	0.30	0.34	0.09	0.10	0.12	0.05
Conservative	0.19	0.21	0.19	0.20	0.19	0.01
Uncertain	0.25	0.25	0.00	0.38	0.12	0.00
NA	0.38	0.23	0.23	0.00	0.00	0.15
Political Orientation - Social Issues						

Variable Category	Profile A	Profile B	Profile C	Profile D	Profile E	Profile F
Liberal	0.34	0.16	0.20	0.11	0.08	0.09
Moderate	0.30	0.30	0.09	0.13	0.12	0.06
Conservative	0.11	0.34	0.11	0.26	0.19	0.00
Uncertain	0.11	0.11	0.11	0.56	0.11	0.00
NA	0.38	0.23	0.23	0.00	0.00	0.15
Religiosity						
Religious	0.21	0.24	0.05	0.34	0.11	0.05
Spiritual, but not religious	0.30	0.18	0.20	0.12	0.13	0.07
Not religious	0.33	0.20	0.18	0.12	0.08	0.09
NA	0.30	0.40	0.10	0.10	0.00	0.10
Vaccination Status						
No	0.19	0.26	0.17	0.08	0.21	0.09
Yes	0.32	0.20	0.17	0.15	0.08	0.08
Mask Wearing Frequency						
Never	0.09	0.45	0.18	0.09	0.09	0.09
Semifrequent	0.23	0.41	0.09	0.19	0.06	0.03
Frequent	0.33	0.16	0.19	0.13	0.11	0.09

Note. The proportions are based on assigned likely latent class membership, not estimated posterior probabilities.

Table S6. Row Proportions for Each Latent Profile grouped by Demographic Variables for the Germany Sample

Variable Category	Profile A	Profile B	Profile C	Profile D	Profile E
Age Group					
18-29	0.32	0.27	0.13	0.16	0.11
30-39	0.38	0.26	0.16	0.11	0.09
40-49	0.42	0.27	0.15	0.08	0.07
50+	0.71	0.11	0.10	0.05	0.03
NA	0.41	0.12	0.29	0.18	0.00
Gender					
Female	0.48	0.21	0.15	0.10	0.05
Male	0.53	0.20	0.11	0.08	0.09
Other	0.33	0.00	0.00	0.67	0.00
NA	0.41	0.12	0.29	0.18	0.00
Education					
High School or Less	0.34	0.27	0.12	0.07	0.20
Post High School, no University Degree	0.52	0.21	0.15	0.07	0.05
University Degree	0.41	0.17	0.10	0.21	0.10
Some Graduate School or Graduate Degree	0.66	0.14	0.07	0.05	0.08
Other	0.49	0.22	0.14	0.12	0.02
Do not know	0.00	0.00	0.00	0.50	0.50
NA	0.33	0.14	0.29	0.24	0.00
Political Orientation - Economic Issues					
Liberal	0.64	0.12	0.09	0.13	0.02
Moderate	0.60	0.14	0.14	0.09	0.02
Conservative	0.32	0.30	0.17	0.09	0.12
Uncertain	0.41	0.28	0.13	0.06	0.12
NA	0.33	0.17	0.17	0.33	0.00
Political Orientation - Social Issues					
Liberal	0.69	0.10	0.10	0.09	0.01

Variable Category	Profile A	Profile B	Profile C	Profile D	Profile E
Moderate	0.50	0.18	0.14	0.11	0.07
Conservative	0.35	0.28	0.15	0.09	0.12
Uncertain	0.43	0.28	0.16	0.07	0.07
NA	0.33	0.17	0.17	0.33	0.00
Religiosity					
Religious	0.39	0.31	0.11	0.07	0.12
Spiritual, but not religious	0.31	0.30	0.09	0.19	0.10
Not religious	0.62	0.12	0.16	0.08	0.03
NA	0.50	0.12	0.12	0.25	0.00
Vaccination Status					
No	0.32	0.28	0.21	0.11	0.08
Yes	0.60	0.16	0.09	0.09	0.06
Mask Wearing Frequency					
Never	0.20	0.35	0.15	0.25	0.05
Semifrequent	0.37	0.34	0.11	0.11	0.08
Frequent	0.54	0.17	0.14	0.09	0.06

Note. The proportions are based on assigned likely latent class membership, not estimated posterior probabilities.

Table S7. Row Proportions for Each Latent Profile grouped by Demographic Variables for the India Sample

Variable Category	Profile A	Profile B	Profile C	Profile D	Profile E	Profile F
Age Group						
18-29	0.41	0.20	0.15	0.14	0.08	0.02
30-39	0.27	0.40	0.11	0.12	0.07	0.03
40-49	0.40	0.41	0.06	0.06	0.02	0.05
50+	0.34	0.20	0.20	0.10	0.09	0.07
NA	0.36	0.00	0.27	0.27	0.09	0.00
Gender						
Female	0.35	0.38	0.06	0.11	0.06	0.04
Male	0.34	0.20	0.22	0.10	0.08	0.05
Other	0.00	0.00	0.00	0.00	0.00	0.00
NA	0.36	0.00	0.27	0.27	0.09	0.00
Education						
High School or Less	0.32	0.40	0.10	0.05	0.12	0.00
Post High School, no University Degree	0.36	0.25	0.11	0.14	0.07	0.07
University Degree	0.32	0.21	0.21	0.11	0.10	0.06
Some Graduate School or Graduate Degree	0.36	0.32	0.12	0.11	0.04	0.05
Other	0.00	0.00	0.00	0.00	0.00	0.00
Do not know	0.50	0.50	0.00	0.00	0.00	0.00
NA	0.36	0.00	0.27	0.27	0.09	0.00
Political Orientation - Economic Issues						
Liberal	0.24	0.37	0.17	0.11	0.06	0.05
Moderate	0.40	0.18	0.18	0.14	0.08	0.02
Conservative	0.38	0.27	0.13	0.10	0.07	0.06
Uncertain	0.42	0.25	0.08	0.12	0.08	0.06
NA	0.60	0.00	0.20	0.20	0.00	0.00
Political Orientation - Social Issues						

Variable Category	Profile A	Profile B	Profile C	Profile D	Profile E	Profile F
Liberal	0.26	0.38	0.14	0.11	0.08	0.03
Moderate	0.40	0.07	0.24	0.12	0.08	0.08
Conservative	0.38	0.32	0.12	0.08	0.05	0.05
Uncertain	0.37	0.24	0.11	0.15	0.09	0.04
NA	0.60	0.00	0.20	0.20	0.00	0.00
Religiosity						
Religious	0.33	0.36	0.11	0.10	0.06	0.04
Spiritual, but not religious	0.39	0.14	0.20	0.14	0.07	0.07
Not religious	0.29	0.10	0.33	0.05	0.24	0.00
NA	0.60	0.00	0.20	0.20	0.00	0.00
Vaccination Status						
No	0.46	0.07	0.18	0.12	0.13	0.03
Yes	0.33	0.32	0.14	0.11	0.06	0.05
Mask Wearing Frequency						
Never	0.50	0.25	0.00	0.00	0.25	0.00
Semifrequent	0.48	0.32	0.05	0.03	0.05	0.07
Frequent	0.33	0.28	0.16	0.12	0.07	0.04

Note. The proportions are based on assigned likely latent class membership, not estimated posterior probabilities.

Table S8. Row Proportions for Each Latent Profile grouped by Demographic Variables for the Israel Sample

Variable Category	Profile A	Profile B	Profile C	Profile D	Profile E	Profile F	Profile G	Profile H
Age Group								
18-29	0.33	0.18	0.07	0.07	0.10	0.11	0.07	0.07
30-39	0.40	0.20	0.09	0.09	0.09	0.07	0.02	0.03
40-49	0.50	0.19	0.09	0.06	0.03	0.03	0.08	0.03
50+	0.58	0.09	0.12	0.04	0.03	0.04	0.06	0.02
NA	0.59	0.24	0.12	0.00	0.00	0.06	0.00	0.00
Gender								
Female	0.45	0.13	0.11	0.07	0.07	0.07	0.07	0.02
Male	0.41	0.21	0.07	0.07	0.07	0.07	0.03	0.06
Other	0.75	0.00	0.25	0.00	0.00	0.00	0.00	0.00
NA	0.59	0.24	0.12	0.00	0.00	0.06	0.00	0.00
Education								
High School or Less	0.39	0.21	0.10	0.03	0.07	0.07	0.06	0.07
Post High School, no University Degree	0.35	0.19	0.12	0.05	0.12	0.08	0.05	0.06
University Degree	0.47	0.14	0.09	0.08	0.05	0.07	0.07	0.04
Some Graduate School or Graduate Degree	0.52	0.16	0.08	0.10	0.05	0.06	0.03	0.00
Other	0.12	0.12	0.00	0.25	0.25	0.00	0.00	0.25
Do not know	0.00	0.50	0.00	0.00	0.00	0.00	0.50	0.00
NA	0.59	0.24	0.12	0.00	0.00	0.06	0.00	0.00
Political Orientation - Economic Issues								
Liberal	0.56	0.09	0.15	0.05	0.05	0.05	0.04	0.02
Moderate	0.47	0.25	0.05	0.05	0.08	0.06	0.03	0.01
Conservative	0.35	0.20	0.07	0.09	0.08	0.08	0.05	0.07
Uncertain	0.24	0.24	0.09	0.09	0.03	0.09	0.15	0.06

Variable Category	Profile A	Profile B	Profile C	Profile D	Profile E	Profile F	Profile G	Profile H
NA	0.62	0.12	0.12	0.00	0.00	0.12	0.00	0.00
Political Orientation - Social Issues								
Liberal	0.59	0.10	0.11	0.03	0.05	0.05	0.03	0.02
Moderate	0.34	0.21	0.11	0.11	0.07	0.09	0.06	0.00
Conservative	0.34	0.22	0.05	0.09	0.09	0.07	0.05	0.08
Uncertain	0.27	0.23	0.12	0.08	0.04	0.12	0.12	0.04
NA	0.62	0.12	0.12	0.00	0.00	0.12	0.00	0.00
Religiosity								
Religious	0.25	0.21	0.05	0.12	0.05	0.07	0.12	0.13
Spiritual, but not religious	0.36	0.23	0.09	0.08	0.13	0.07	0.03	0.00
Not religious	0.58	0.12	0.11	0.04	0.04	0.06	0.02	0.01
NA	0.50	0.17	0.17	0.00	0.00	0.17	0.00	0.00
Vaccination Status								
No	0.16	0.29	0.06	0.09	0.15	0.12	0.07	0.06
Yes	0.49	0.15	0.10	0.07	0.05	0.06	0.05	0.04
Mask Wearing Frequency								
Never	0.24	0.19	0.05	0.05	0.10	0.14	0.19	0.05
Semifrequent	0.17	0.34	0.07	0.13	0.10	0.13	0.04	0.03
Frequent	0.51	0.14	0.10	0.06	0.06	0.05	0.04	0.04

Note. The proportions are based on assigned likely latent class membership, not estimated posterior probabilities.

Table S9. Row Proportions for Each Latent Profile grouped by Demographic Variables for the Japan Sample

Variable Category	Profile A	Profile B	Profile C	Profile D
Age Group				
18-29	0.39	0.34	0.18	0.09
30-39	0.44	0.30	0.17	0.09
40-49	0.53	0.25	0.19	0.03
50+	0.41	0.28	0.25	0.07
NA	0.44	0.44	0.06	0.06
Gender				
Female	0.47	0.26	0.20	0.07
Male	0.39	0.33	0.20	0.07
Other	0.67	0.00	0.33	0.00
NA	0.44	0.44	0.06	0.06
Education				
High School or Less	0.41	0.29	0.22	0.07
Post High School, no University Degree	0.00	0.00	0.00	0.00
University Degree	0.44	0.27	0.21	0.07
Some Graduate School or Graduate Degree	0.41	0.37	0.15	0.07
Other	0.46	0.32	0.16	0.05
Do not know	0.50	0.25	0.25	0.00
NA	0.44	0.44	0.06	0.06
Political Orientation - Economic Issues				
Liberal	0.25	0.39	0.29	0.07
Moderate	0.47	0.26	0.21	0.06
Conservative	0.42	0.31	0.19	0.08
Uncertain	0.51	0.29	0.15	0.05
NA	0.40	0.20	0.20	0.20
Political Orientation - Social Issues				
Liberal	0.26	0.32	0.30	0.12

Variable Category	Profile A	Profile B	Profile C	Profile D
Moderate	0.50	0.27	0.18	0.04
Conservative	0.39	0.31	0.22	0.08
Uncertain	0.51	0.30	0.14	0.05
NA	0.40	0.20	0.20	0.20
Religiosity				
Religious	0.30	0.33	0.33	0.04
Spiritual, but not religious	0.42	0.21	0.23	0.13
Not religious	0.45	0.32	0.18	0.05
NA	0.60	0.20	0.20	0.00
Vaccination Status				
No	0.45	0.29	0.21	0.05
Yes	0.39	0.32	0.18	0.11
Mask Wearing Frequency				
Never	0.44	0.35	0.17	0.04
Semifrequent	0.38	0.25	0.27	0.11
Frequent	0.44	0.29	0.20	0.07

Note. The proportions are based on assigned likely latent class membership, not estimated posterior probabilities.

Table S10. Row Proportions for Each Latent Profile grouped by Demographic Variables for the Mexico Sample

Variable Category	Profile A	Profile B	Profile C	Profile D
Age Group				
18-29	0.52	0.23	0.13	0.12
30-39	0.49	0.23	0.13	0.14
40-49	0.47	0.30	0.18	0.05
50+	0.57	0.27	0.10	0.06
NA	0.40	0.30	0.25	0.05
Gender				
Female	0.53	0.26	0.12	0.09
Male	0.52	0.25	0.12	0.10
Other	0.50	0.00	0.50	0.00
NA	0.40	0.30	0.25	0.05
Education				
High School or Less	0.00	0.00	0.00	0.00
Post High School, no University Degree	0.00	0.00	0.00	0.00
University Degree	0.00	0.00	0.00	0.00
Some Graduate School or Graduate Degree	0.00	0.00	0.00	0.00
Other	0.00	0.00	0.00	0.00
Do not know	0.00	0.00	0.00	0.00
NA	0.52	0.26	0.13	0.09
Political Orientation - Economic Issues				
Liberal	0.54	0.23	0.14	0.09
Moderate	0.48	0.34	0.15	0.03
Conservative	0.44	0.23	0.13	0.20
Uncertain	0.68	0.19	0.10	0.03
NA	0.40	0.50	0.10	0.00
Political Orientation - Social Issues				
Liberal	0.55	0.25	0.12	0.08

Variable Category	Profile A	Profile B	Profile C	Profile D
Moderate	0.43	0.34	0.15	0.07
Conservative	0.48	0.20	0.15	0.17
Uncertain	0.66	0.21	0.11	0.01
NA	0.40	0.50	0.10	0.00
Religiosity				
Religious	0.45	0.29	0.17	0.09
Spiritual, but not religious	0.50	0.25	0.14	0.10
Not religious	0.74	0.20	0.01	0.04
NA	0.46	0.31	0.15	0.08
Vaccination Status				
No	0.54	0.25	0.13	0.08
Yes	0.51	0.26	0.13	0.09
Mask Wearing Frequency				
Never	0.53	0.27	0.07	0.13
Semifrequent	0.32	0.12	0.35	0.21
Frequent	0.54	0.27	0.11	0.08

Note. The proportions are based on assigned likely latent class membership, not estimated posterior probabilities.

Table S11. Row Proportions for Each Latent Profile grouped by Demographic Variables for the Russia Sample

Variable Category	Profile A	Profile B	Profile C	Profile D
Age Group				
18-29	0.51	0.28	0.15	0.06
30-39	0.40	0.31	0.19	0.11
40-49	0.54	0.18	0.20	0.08
50+	0.39	0.25	0.25	0.12
NA	0.40	0.40	0.20	0.00
Gender				
Female	0.46	0.26	0.18	0.11
Male	0.41	0.27	0.23	0.09
Other	1.00	0.00	0.00	0.00
NA	0.40	0.40	0.20	0.00
Education				
High School or Less	0.43	0.24	0.24	0.08
Post High School, no University Degree	0.42	0.32	0.13	0.13
University Degree	0.44	0.24	0.22	0.10
Some Graduate School or Graduate Degree	0.44	0.22	0.28	0.05
Other	0.00	0.00	0.00	0.00
Do not know	1.00	0.00	0.00	0.00
NA	0.40	0.40	0.20	0.00
Political Orientation - Economic Issues				
Liberal	0.51	0.16	0.25	0.07
Moderate	0.40	0.29	0.20	0.10
Conservative	0.38	0.34	0.21	0.07
Uncertain	0.46	0.23	0.19	0.12
NA	0.75	0.25	0.00	0.00
Political Orientation - Social Issues				
Liberal	0.51	0.19	0.24	0.06

Variable Category	Profile A	Profile B	Profile C	Profile D
Moderate	0.37	0.28	0.21	0.14
Conservative	0.44	0.33	0.21	0.03
Uncertain	0.45	0.26	0.18	0.11
NA	0.75	0.25	0.00	0.00
Religiosity				
Religious	0.38	0.32	0.13	0.17
Spiritual, but not religious	0.38	0.30	0.22	0.10
Not religious	0.58	0.14	0.24	0.03
NA	0.50	0.50	0.00	0.00
Vaccination Status				
No	0.44	0.29	0.19	0.09
Yes	0.43	0.22	0.23	0.11
Mask Wearing Frequency				
Never	0.52	0.29	0.13	0.06
Semifrequent	0.33	0.27	0.29	0.10
Frequent	0.44	0.26	0.20	0.10

Note. The proportions are based on assigned likely latent class membership, not estimated posterior probabilities.

Table S12. Row Proportions for Each Latent Profile grouped by Demographic Variables for the South Africa Sample

Variable Category	Profile A	Profile B	Profile C	Profile D
Age Group				
18-29	0.44	0.35	0.13	0.07
30-39	0.41	0.34	0.21	0.04
40-49	0.46	0.36	0.15	0.03
50+	0.61	0.21	0.16	0.01
NA	0.58	0.25	0.08	0.08
Gender				
Female	0.48	0.34	0.14	0.04
Male	0.52	0.27	0.19	0.03
Other	0.75	0.00	0.25	0.00
NA	0.58	0.25	0.08	0.08
Education				
High School or Less	0.45	0.35	0.18	0.03
Post High School, no University Degree	0.48	0.28	0.22	0.03
University Degree	0.54	0.30	0.13	0.02
Some Graduate School or Graduate Degree	0.70	0.20	0.02	0.09
Other	0.00	0.00	0.00	0.00
Do not know	0.33	0.33	0.33	0.00
NA	0.60	0.24	0.08	0.08
Political Orientation - Economic Issues				
Liberal	0.62	0.19	0.14	0.04
Moderate	0.48	0.33	0.16	0.03
Conservative	0.46	0.32	0.17	0.05
Uncertain	0.43	0.39	0.16	0.02
NA	0.62	0.25	0.12	0.00
Political Orientation - Social Issues				
Liberal	0.65	0.19	0.10	0.06

Variable Category	Profile A	Profile B	Profile C	Profile D
Moderate	0.48	0.36	0.13	0.03
Conservative	0.45	0.29	0.23	0.04
Uncertain	0.40	0.42	0.16	0.02
NA	0.62	0.25	0.12	0.00
Religiosity				
Religious	0.48	0.33	0.16	0.04
Spiritual, but not religious	0.51	0.26	0.19	0.04
Not religious	0.66	0.27	0.05	0.02
NA	0.40	0.40	0.20	0.00
Vaccination Status				
No	0.44	0.32	0.20	0.04
Yes	0.64	0.25	0.09	0.03
Mask Wearing Frequency				
Never	0.33	0.17	0.50	0.00
Semifrequent	0.47	0.29	0.21	0.03
Frequent	0.51	0.30	0.15	0.04

Note. The proportions are based on assigned likely latent class membership, not estimated posterior probabilities.

Table S13. Row Proportions for Each Latent Profile grouped by Demographic Variables for the United Kingdom Sample

Variable Category	Profile A	Profile B	Profile C	Profile D	Profile E	Profile F	Profile G
Age Group							
18-29	0.27	0.33	0.08	0.10	0.15	0.04	0.03
30-39	0.24	0.28	0.11	0.11	0.15	0.05	0.05
40-49	0.42	0.22	0.04	0.12	0.09	0.06	0.04
50+	0.60	0.07	0.20	0.07	0.02	0.02	0.01
NA	0.45	0.09	0.09	0.27	0.00	0.09	0.00
Gender							
Female	0.37	0.21	0.14	0.10	0.10	0.05	0.04
Male	0.46	0.19	0.12	0.09	0.09	0.03	0.02
Other	0.50	0.00	0.00	0.50	0.00	0.00	0.00
NA	0.45	0.09	0.09	0.27	0.00	0.09	0.00
Education							
High School or Less	0.38	0.18	0.13	0.08	0.11	0.08	0.03
Post High School, no University Degree	0.49	0.18	0.10	0.09	0.06	0.03	0.04
University Degree	0.51	0.16	0.12	0.12	0.05	0.01	0.03
Some Graduate School or Graduate Degree	0.30	0.31	0.11	0.07	0.16	0.01	0.03
Other	0.26	0.11	0.37	0.05	0.11	0.11	0.00
Do not know	0.20	0.40	0.00	0.40	0.00	0.00	0.00
NA	0.45	0.09	0.09	0.27	0.00	0.09	0.00
Political Orientation - Economic Issues							
Liberal	0.46	0.11	0.18	0.10	0.09	0.03	0.04
Moderate	0.42	0.20	0.13	0.12	0.05	0.06	0.03
Conservative	0.40	0.26	0.11	0.08	0.10	0.03	0.03
Uncertain	0.38	0.17	0.10	0.11	0.15	0.06	0.03

Variable Category	Profile A	Profile B	Profile C	Profile D	Profile E	Profile F	Profile G
NA	0.50	0.25	0.00	0.25	0.00	0.00	0.00
Political Orientation - Social Issues							
Liberal	0.43	0.15	0.17	0.11	0.09	0.03	0.02
Moderate	0.39	0.26	0.12	0.08	0.07	0.04	0.04
Conservative	0.41	0.21	0.12	0.09	0.11	0.04	0.03
Uncertain	0.44	0.15	0.10	0.11	0.10	0.08	0.03
NA	0.50	0.25	0.00	0.25	0.00	0.00	0.00
Religiosity							
Religious	0.30	0.22	0.06	0.13	0.24	0.03	0.02
Spiritual, but not religious	0.41	0.21	0.14	0.11	0.05	0.04	0.03
Not religious	0.47	0.18	0.15	0.07	0.05	0.05	0.03
NA	0.33	0.33	0.00	0.33	0.00	0.00	0.00
Vaccination Status							
No	0.20	0.31	0.07	0.10	0.14	0.10	0.08
Yes	0.47	0.17	0.14	0.10	0.08	0.03	0.02
Mask Wearing Frequency							
Never	0.42	0.24	0.08	0.05	0.08	0.08	0.05
Semifrequent	0.30	0.33	0.08	0.09	0.13	0.05	0.02
Frequent	0.45	0.15	0.15	0.11	0.08	0.04	0.03

Note. The proportions are based on assigned likely latent class membership, not estimated posterior probabilities.

Table S14. Row Proportions for Each Latent Profile grouped by Demographic Variables for the United States Sample

Variable Category	Profile A	Profile B	Profile C	Profile D	Profile E	Profile F	Profile G
Age Group							
18-29	0.21	0.50	0.10	0.04	0.07	0.04	0.03
30-39	0.15	0.30	0.35	0.13	0.05	0.02	0.00
40-49	0.26	0.22	0.25	0.15	0.03	0.03	0.05
50+	0.57	0.18	0.03	0.10	0.06	0.04	0.03
NA	0.17	0.44	0.11	0.11	0.11	0.00	0.06
Gender							
Female	0.33	0.31	0.11	0.13	0.07	0.03	0.03
Male	0.35	0.24	0.22	0.08	0.04	0.04	0.03
Other	0.00	0.67	0.00	0.33	0.00	0.00	0.00
NA	0.17	0.44	0.11	0.11	0.11	0.00	0.06
Education							
High School or Less	0.25	0.35	0.13	0.12	0.05	0.05	0.05
Post High School, no University Degree	0.34	0.36	0.08	0.09	0.05	0.05	0.05
University Degree	0.39	0.21	0.16	0.12	0.07	0.03	0.02
Some Graduate School or Graduate Degree	0.42	0.19	0.25	0.09	0.05	0.00	0.00
Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Do not know	0.00	0.50	0.50	0.00	0.00	0.00	0.00
NA	0.21	0.35	0.17	0.10	0.10	0.04	0.04
Political Orientation - Economic Issues							
Liberal	0.39	0.19	0.25	0.08	0.06	0.03	0.00
Moderate	0.33	0.37	0.10	0.08	0.06	0.03	0.03
Conservative	0.36	0.23	0.16	0.13	0.03	0.04	0.05
Uncertain	0.03	0.58	0.00	0.16	0.16	0.03	0.03

Variable Category	Profile A	Profile B	Profile C	Profile D	Profile E	Profile F	Profile G
NA	0.08	0.50	0.17	0.17	0.08	0.00	0.00
Political Orientation - Social Issues							
Liberal	0.38	0.20	0.22	0.09	0.07	0.02	0.01
Moderate	0.36	0.33	0.10	0.10	0.05	0.02	0.03
Conservative	0.34	0.26	0.16	0.10	0.04	0.05	0.04
Uncertain	0.04	0.57	0.07	0.14	0.11	0.04	0.04
NA	0.08	0.50	0.17	0.17	0.08	0.00	0.00
Religiosity							
Religious	0.28	0.30	0.24	0.10	0.03	0.02	0.03
Spiritual, but not religious	0.35	0.30	0.09	0.10	0.08	0.05	0.03
Not religious	0.45	0.21	0.09	0.12	0.07	0.02	0.04
NA	0.12	0.50	0.12	0.12	0.12	0.00	0.00
Vaccination Status							
No	0.21	0.43	0.14	0.09	0.05	0.03	0.05
Yes	0.40	0.20	0.17	0.11	0.06	0.03	0.02
Mask Wearing Frequency							
Never	0.39	0.26	0.02	0.16	0.03	0.03	0.10
Semifrequent	0.30	0.34	0.10	0.10	0.08	0.03	0.04
Frequent	0.33	0.27	0.21	0.09	0.05	0.03	0.01

Note. The proportions are based on assigned likely latent class membership, not estimated posterior probabilities.

Table S15. Comparisons of the Empty Model and the Predictor Models

Predictor Variable	*N*	Type of Model	# of Free Parameters	Loglikelihood	AIC	BIC
Age	4641	Empty	6	-7966.754	15945.507	15984.163
		Predictor	24	-7886.099	15820.197	15974.822
Gender	4641	Empty	6	-7966.754	15945.507	15984.163
		Predictor	18	-7959.475	15954.950	16070.918
Education	4173	Empty	6	-7204.155	14420.310	14458.329
		Predictor	36	-7127.123	14326.247	14554.357
Political Orientation – Social Issues	4748	Empty	6	-8137.046	16286.092	16324.885
		Predictor	24	-8041.886	16131.772	16286.944
Political Orientation – Economic Issues	4748	Empty	6	-8137.046	16286.092	16324.885
		Predictor	24	-8052.560	16153.119	16308.291
Religiosity	4756	Empty	6	-8147.217	16306.434	16345.237
		Predictor	24	-7997.196	16030.392	16146.801
Country	4831	Empty	6	-8269.813	16551.627	16590.524
		Predictor	66	-7866.952	15865.904	16293.770

Table S16. Manual R3STEP Process: Age as a Predictor of the Latent Profiles

	30-39 years			40-49 years			50+ years		
Profile Comparison	β	*SE*	*p*	β	*SE*	*p*	β	*SE*	*p*
A to B	-0.094	0.121	0.438	-0.065	0.129	0.613	**-0.824**	**0.115**	**0.000**
A to C	0.216	0.157	0.170	0.007	0.176	0.969	-0.104	0.144	0.472
A to D	0.074	0.165	0.653	0.004	0.179	0.983	-0.269	0.151	0.073
A to E	-0.030	0.167	0.859	-0.042	0.180	0.814	**-0.490**	**0.155**	**0.002**
A to F	**0.502**	**0.157**	**0.001**	0.177	0.177	0.317	**-1.010**	**0.180**	**0.000**
A to G	-0.175	0.239	0.465	-0.358	0.273	0.189	**-0.790**	**0.231**	**0.001**

Note: 18-29 years was the referent group for the age variable. Profile A is the referent group for the latent profile comparisons. Bolded text indicates significance. β = Coefficient estimate. *SE* = standard error. *P* = p-values

Table S17. Manual R3STEP Process: Gender as a Predictor of the Latent Profiles

	Male			Other		
Profile Comparison	β	*SE*	*p*	β	*SE*	*p*
A to B	-0.074	0.085	0.381	-0.896	0.742	0.228
A to C	-0.191	0.107	0.074	-0.135	0.667	0.839
A to D	-0.094	0.113	0.403	-0.405	0.806	0.616
A to E	-0.021	0.117	0.856	0.665	0.557	0.233
A to F	-0.111	0.116	0.339	**-18.307**	**0.742**	**0.000**
A to G	0.074	0.177	0.676	**-23.023**	**0.742**	**0.000**

Note: Male was the referent group for the gender variable. Profile A is the referent group for the latent profile comparisons. Bolded text indicates significance. β = Coefficient estimate. *SE* = standard error. *P* = p-values

Table S18. Manual R3STEP Process: Education as a Predictor of the Latent Profiles

	Post High School			University Degree			Post-University			Other			Do not know		
Profile Comparison	β	*SE*	*p*	β	*SE*	*p*	β	*SE*	*p*	β	*SE*	*p*	β	*SE*	*p*
A to B	**-0.373**	**0.132**	**0.005**	-0.115	0.124	0.354	-0.195	0.133	0.140	-0.167	0.226	0.460	0.849	0.671	0.206
A to C	-0.195	0.184	0.288	**0.487**	**0.161**	**0.002**	-0.129	0.187	0.489	0.340	0.276	0.218	0.427	0.979	0.663
A to D	-0.086	0.164	0.598	**-0.397**	**0.171**	**0.020**	**-0.573**	**0.190**	**0.003**	-0.141	0.295	0.633	-0.276	1.181	0.815
A to E	-0.225	0.179	0.207	0.022	0.167	0.895	-0.359	0.191	0.060	-0.265	0.327	0.418	1.264	0.746	0.090
A to F	**-0.568**	**0.218**	**0.009**	0.337	0.178	0.058	**0.654**	**0.177**	**0.000**	**-1.706**	**0.715**	**0.017**	**1.557**	**0.744**	**0.036**
A to G	**-0.698**	**0.247**	**0.005**	**-0.883**	**0.255**	**0.001**	**-0.906**	**0.277**	**0.001**	-0.794	0.495	0.109	**-16.240**	**0.510**	**0.000**

Note: High school or less was the referent group for the education variable. Profile A is the referent group for the latent profile comparisons. Bolded text indicates significance. β = Coefficient estimate. *SE* = standard error. *P* = p-values

Table S19. Manual R3STEP Process: Political Orientation – Social Issues as a Predictor of the Latent Profiles

	Moderate			Conservative			Undecided		
Profile Comparison	β	*SE*	*p*	β	*SE*	*p*	β	*SE*	*p*
A to B	**0.735**	**0.119**	**0.000**	**0.752**	**0.113**	**0.000**	**0.684**	**0.134**	**0.000**
A to C	-0.203	0.133	0.126	**-0.632**	**0.140**	**0.000**	**-0.744**	**0.185**	**0.000**
A to D	0.293	0.152	0.055	**0.323**	**0.144**	**0.025**	0.232	0.176	0.187
A to E	**0.466**	**0.155**	**0.003**	0.297	0.152	0.051	**0.381**	**0.179**	**0.033**
A to F	**-0.521**	**0.182**	**0.004**	**0.426**	**0.134**	**0.002**	-0.327	0.200	0.101
A to G	0.445	0.249	0.074	**0.648**	**0.229**	**0.005**	0.382	0.286	0.183

Note: Liberal was the referent group for the political orientation – social issues variable. Profile A is the referent group for the latent profile comparisons. Bolded text indicates significance. β = Coefficient estimate. *SE* = standard error. *P* = p-values

Table S20. Manual R3STEP Process: Political Orientation – Economic Issues as a Predictor of the Latent Profiles

	Moderate			Conservative			Undecided		
Profile Comparison	β	*SE*	*p*	β	*SE*	*p*	β	*SE*	*p*
A to B	**0.701**	**0.121**	**0.000**	**0.682**	**0.115**	**0.000**	**0.751**	**0.136**	**0.000**
A to C	-0.280	0.134	0.037	**-0.659**	**0.137**	**0.000**	**-0.747**	**0.137**	**0.000**
A to D	0.213	0.157	0.175	0.300	0.144	0.037	0.324	0.176	0.066
A to E	0.193	0.160	0.228	0.263	0.148	0.074	0.279	0.182	0.125
A to F	**-0.496**	**0.179**	**0.006**	**0.286**	**0.136**	**0.036**	-0.180	0.192	0.351
A to G	0.072	0.266	0.785	**0.652**	**0.221**	**0.003**	0.175	0.301	0.559

Note: Liberal was the referent group for the political orientation – economic issues variable. Profile A is the referent group for the latent profile comparisons. Bolded text indicates significance. β = Coefficient estimate. *SE* = standard error. *P* = p-values

Table S21. Manual R3STEP Process: Religiosity as a Predictor of the Latent Profiles

	Spiritual, but not religious			Not Religious		
Profile Comparison	β	*SE*	*p*	β	*SE*	*p*
A to B	-0.172	0.105	0.100	**-0.574**	**0.103**	**0.000**
A to C	**0.567**	**0.142**	**0.000**	0.567	0.141	0.123
A to D	0.071	0.137	0.603	**-0.494**	**0.141**	**0.000**
A to E	-0.098	0.137	0.472	**-0.818**	**0.148**	**0.000**
A to F	**-1.141**	**0.143**	**0.000**	**-1.877**	**0.163**	**0.000**
A to G	**-0.674**	**0.201**	**0.001**	**-1.604**	**0.244**	**0.000**

Note: Religious was the referent group for the religiosity variable. Profile A is the referent group for the latent profile comparisons. Bolded text indicates significance. β = Coefficient estimate. *SE* = standard error. *P* = p-values

Table S22. Manual R3STEP Process: Country as a Predictor of the Latent Profiles

Profile Comparison	Country	β	*SE*	*p*
A to B	BZ	**-0.620**	**0.203**	**0.002**
A to C	BZ	**1.558**	**0.361**	**0.000**
A to D	BZ	-0.043	-0.043	0.878
A to E	BZ	**1.226**	**0.292**	**0.000**
A to F	BZ	**-1.311**	**0.306**	**0.000**
A to G	BZ	0.672	0.353	0.057
A to B	CH	**0.695**	**0.204**	**0.001**
A to C	CH	**2.954**	**0.363**	**0.000**
A to D	CH	**0.787**	**0.295**	**0.008**
A to E	CH	**1.756**	**0.315**	**0.000**
A to F	CH	**0.649**	**0.236**	**0.006**
A to G	CH	-0.044	0.535	0.935
A to B	GM	**-0.761**	**0.195**	**0.000**
A to C	GM	**1.396**	**0.358**	**0.000**
A to D	GM	0.050	0.261	0.849
A to E	GM	0.219	0.326	0.503
A to F	GM	**-1.385**	**0.289**	**0.000**
A to G	GM	-0.192	0.402	0.634
A to B	IN	**1.144**	**0.206**	**0.000**
A to C	IN	**1.853**	**0.404**	**0.000**
A to D	IN	**1.013**	**0.300**	**0.001**
A to E	IN	**1.576**	**0.340**	**0.000**
A to F	IN	**1.833**	**0.216**	**0.000**
A to G	IN	**1.389**	**0.392**	**0.000**
A to B	IS	**-0.356**	**0.181**	**0.049**
A to C	IS	**0.920**	**0.378**	**0.015**
A to D	IS	-0.024	0.268	0.929
A to E	IS	0.527	0.313	0.092
A to F	IS	**-1.145**	**0.272**	**0.000**
A to G	IS	0.132	0.378	0.727
A to B	JP	**0.634**	**0.171**	**0.000**
A to C	JP	**1.566**	**0.370**	**0.000**
A to D	JP	0.044	0.294	0.882
A to E	JP	**1.101**	**0.308**	**0.000**
A to F	JP	**-1.508**	**0.374**	**0.000**
A to G	JP	-0.396	0.488	0.418
A to B	MX	**-1.192**	**0.218**	**0.000**
A to C	MX	**1.502**	**0.355**	**0.000**
A to D	MX	0.162	0.254	0.524
A to E	MX	0.238	0.322	0.460
A to F	MX	**-1.399**	**0.285**	**0.000**
A to G	MX	-0.714	0.461	0.122

A to B	RU	0.001	0.177	0.998
A to C	RU	**1.130**	**0.377**	**0.003**
A to D	RU	**0.699**	**0.245**	**0.004**
A to E	RU	**0.601**	**0.320**	**0.060**
A to F	RU	**-2.010**	**0.420**	**0.000**
A to G	RU	0.110	0.396	0.781
A to B	SA	-0.319	0.194	0.099
A to C	SA	**1.333**	**0.372**	**0.000**
A to D	SA	**1.068**	**0.236**	**0.000**
A to E	SA	**1.022**	**0.303**	**0.001**
A to F	SA	**-1.106**	**0.294**	**0.000**
A to G	SA	0.426	0.376	0.256
A to B	UK	-0.155	0.179	0.385
A to C	UK	**1.305**	**0.366**	**0.000**
A to D	UK	-0.292	0.294	0.321
A to E	UK	**0.673**	**0.311**	**0.030**
A to F	UK	**-0.966**	**0.265**	**0.000**
A to G	UK	-0.553	0.466	0.466

Note: United States was the referent group for the country variable. Profile A is the referent group for the latent profile comparisons. Bolded text indicates significance. β = Coefficient estimate. *SE* = standard error. *P* = p-values