Journal of Comparative Economics xxx (xxxx) xxx

Contents lists available at ScienceDirect

Journal of Comparative Economics

journal homepage: www.elsevier.com/locate/jce

Economic or political uncertainty in early life reduces later tolerance

Niclas Berggren [a,b], Andreas Bergh [c,a], Therese Nilsson [c,a,*]

[a] Research Institute of Industrial Economics (IFN), P.O. Box 55665, 102 15 Stockholm, Sweden
[b] Faculty of Business Administration, Prague University of Economics and Business, Winston Churchill Square 4, 130 67 Prague 3, Czechia
[c] Department of Economics, Lund University, P.O. Box 7082, 220 07 Lund, Sweden

ARTICLE INFO

JEL Codes:
F02
F22
Z13
Z18

Keywords:
Culture
Democracy
Formative years
Homosexuality
Risk
Socialization
Tolerance
Uncertainty
Value

ABSTRACT

This study examines whether exposure to economic-political uncertainty during formative years has enduring effects on tolerance. To quantify uncertainty, we use the World Uncertainty Index, a text-based measure of the frequency of the term "uncertain" in the country report of the Economist Intelligence Unit. We link its mean value during six age intervals to later-in-life tolerance toward gays and lesbians, using data from the European Social Survey. Employing a quasi-experimental design, we document a robust negative relationship: more uncertainty during formative years predicts diminished tolerance in adulthood. This effect appears most clearly during middle childhood (ages 6–12) and the transition to adulthood (ages 18–25). Exposure after 25 almost never has an impact. The main result is moderated by democratic quality. In countries with robust democratic traditions, procedural legitimacy and participatory socialization seem to undo the negative impact of uncertainty. These findings demonstrate that uncertainty has long-term negative cultural consequences, but also that democratic institutions foster resilience.

1. Introduction

The world is an uncertain place, but what are the consequences of this fact? We make use of new data on how economic-political uncertainty varies across time and place to provide an answer. Most studies so far have looked at *economic* ramifications of such uncertainty – for example, how investment behavior is affected – but our contribution is to investigate a potential *cultural* impact. More precisely, we ask how country-level economic-political uncertainty during one's younger, formative years affects tolerance later in life. Does early exposure to economic or political turbulence – we test different age spans from birth to the mid-30s – make people more or less tolerant as adults? This is important to clarify since tolerance is an essential characteristic in a society, being associated with a range of widely treasured outcomes, such as respect for minorities (Corneo and Jeanne, 2009), economic growth (Berggren and Elinder, 2012; Badgett et al., 2019), innovation (Audretsch et al., 2018), integration (Berggren et al., 2023), less climate skepticism (Johansson et al., 2022), and life satisfaction (Crowley and Walsh, 2024).

The intuition behind this study is that early exposure to economic-political uncertainty heightens perceived threat and pushes young people toward strategies that reduce uncertainty. The idea is that the perceived threat experienced as a result of uncertainty

* Corresponding author.
E-mail addresses: niclas.berggren@ifn.se (N. Berggren), drbergh@gmail.com (A. Bergh), therese.nilsson@nek.lu.se (T. Nilsson).

https://doi.org/10.1016/j.jce.2026.01.009
Received 21 March 2025; Received in revised form 16 January 2026; Accepted 16 January 2026

makes young people adopt norm-enforcing identities and become less accepting of people who are different. This is the essence of uncertainty-identity theory and related work on motivated social cognition. In our setting, that means that uncertainty during formative years can translate into lower tolerance toward minorities in adulthood.

As a historical illustration for the sake of intuition, consider Weimar Germany. Localities exposed to more economic distress saw larger subsequent increases in the Nazi vote share, consistent with a tightening of in-group boundaries under uncertainty (Galofré-Vilà et al., 2021). To mention a more contemporary illustration from the UK, both austerity and import-competition shocks have been linked to higher support for Brexit and to more exclusionary attitudes (Colantone and Stanig, 2018; Fetzer, 2019). These episodes are merely illustrative, but they are in line with our main idea that uncertainty can reduce future social inclusion.

However, where democratic quality is high, with features such as predictable rules, credible constraints, and open contestation for political office, events that lead to more uncertainty are seen as manageable, which dampens the threat response and preserves tolerance. Conversely, in non-democratic settings, uncertainty is more likely to be processed as danger, narrowing the circle of "us".

We use two main data sources to investigate the long-term influence of economic-political uncertainty on tolerance. The first, the World Uncertainty Index, contains quarterly data on economic-political uncertainty for up to 143 countries from 1952 onwards. The uncertainty variable is obtained from the country reports of the Economist Intelligence Unit and is the share of words that contain the word "uncertain" or any variant thereof.[1] The second, the European Social Survey (ESS), contains biannual, individual-level data for European countries from 2002 onwards. As our outcome variable, we use a dummy indicating whether the respondent "strongly agrees" that gay men and lesbians should be free to live their own life as they wish.[2] The data are a repeated cross-section, and we pool rounds 2–10 of the ESS.

In our empirical analysis, we divide respondents into six age windows and relate their adult tolerance to the average uncertainty in their country during each window (0–5, 6–12, 13–17, 18–25, 26–30, 31–35); we use a different partitioning in a robustness check. Our identification uses differences in formative-age exposure across cohorts within a country and across countries within a cohort, absorbing country and cohort fixed effects and thus applying quasi-random assignment of uncertainty at the individual level.

We document a negative and statistically significant relationship between uncertainty experienced during the formative years and adult tolerance, with the 6–12 and 18–25 age intervals being most influential. Uncertainty after age 25 is almost never related to later tolerance. The relationship is most clearly present in countries with a weak democratic tradition. In contrast, a strong democratic history gives small and imprecise estimates. These patterns are consistent with a broad interpretation of the impressionable-years hypothesis and with the idea that if changes are perceived to be manageable through procedures and popular participation, as in strong democracies, uncertainty does not reduce subsequent tolerance.

We relate to three strands of research: studies on the consequences of economic-political uncertainty, studies on crises during formative years, and studies on the determinants of tolerance. Against that background, our contributions are as follows. First, we extend the uncertainty literature beyond contemporaneous economic outcomes by studying a long-run cultural consequence of uncertainty. Second, we complement the crises and disasters literature by focusing on text-measured uncertainty rather than discrete shocks. This enables us to address how continuous variations in uncertainty, caused by myriads of events, shapes attitudes. Third, within the tolerance literature, we identify uncertainty as a determinant (to our knowledge, this factor has rarely been examined). We thereby identify a new channel through which macro characteristics map into liberal norms (e.g., Corneo and Jeanne, 2009; Berggren and Nilsson, 2013, 2014, 2015, 2021; Berggren et al., 2019, 2025). In addition, we show that the relationship is moderated by democratic quality, consistent with the idea that institutions can buffer threat perceptions.

The rest of the paper is organized as follows. We next present some of these earlier studies and offer a brief theoretical framework. After that, we specify the data and empirical method used, after which we introduce the baseline results and the results of some extended analyses. We then offer concluding remarks.

2. Consequences of uncertainty

2.1. Literature overview and our contribution

We organize the literature into three interrelated strands. First, we review work on how economic-political uncertainty affects attitudes and behavior; this strand also includes the few studies that investigate the uncertainty-tolerance link. Second, we cover research on crises and disasters and, more broadly, on collective memories and formative experiences, evidence that we think has bearing on our proposed mechanism even though it examines discrete shocks rather than continuous uncertainty. Third, we relate to studies looking at other national-level determinants of tolerance, e.g., institutions, religion, individualism and globalization, which provide the wider context within which uncertainty is processed. Taken together, these strands clarify our contribution: we show that economic-political uncertainty during formative years leaves a long-run imprint on adult tolerance and that this relationship is moderated by democratic quality.

First, there is an increasing number of studies on how economic-political uncertainty affects people's attitudes and behavior. Most

[1] Using text as data is increasingly common in economics. See Gentzkow et al. (2019).

[2] Why study tolerance toward gay people? Our theory does not distinguish this kind of tolerance from tolerance toward other groups – the reason is data availability. The ESS does not contain any other questions about tolerance. We see this as one example of how the theory of a relationship between uncertainty in formative years and tolerance can be tested, and maybe it generalizes, as suggested by Inglehart and Abramson (1999). There are ESS questions on attitudes to immigration, which, although not only as clearly about tolerance, we use in a robustness check.

of them relate to the economic sphere and tend to find that economic decision-makers become more cautious in uncertain times. For instance, higher uncertainty comes with a reduction in economic growth (Bloom, 2009; Ahir et al., 2022; Baker et al., 2024), reduced employment (Bloom, 2009), lower investment (Bloom et al., 2022), slower firm growth (Kumar et al., 2023), a reduction in trade (Matzner et al., 2023), lower household spending (Coibion et al., 2024), and less bank lending to firms (Grimme et al., 2024). We are only aware of two studies relating economic-political uncertainty to cultural and social outcomes, and thus we contribute to expanding research in this area. Two papers speak directly to uncertainty and cultural outcomes. Gozgor et al. (2021) show a negative relation to fertility, and Berggren et al. (2025) show a positive contemporaneous relation to an indicator of tolerance, the non-rejection of Jews and Muslims as neighbors. We will return to the latter study in the concluding remarks, as it is the one closest to the present study and since it finds a tolerance-enhancing effect of uncertainty, in contrast to the negative finding in the present study. In summary, existing work is largely contemporaneous and economic; the long-run cultural imprint of uncertainty during younger years is so far unexplored.

Second, our study contributes to research on how discrete shocks in formative years leave durable imprints through collective memories and cultural transmission. Event studies show that community-wide crises reshape local norms in ways consistent with cohort memory and social learning. For example, major earthquakes increased prosocial engagement and reduced routine violence (Rao et al., 2011; Alexander et al., 2020); natural-disaster exposure strengthened in-group trust but weakened outgroup trust (Schilpzand, 2023; cf. Bauer et al., 2016); a lethal storm spurred charitable giving beyond the affected locality (Méon and Verwimp, 2022); and Italian earthquakes bolstered civic capital (Buonanno et al., 2023). Such responses provide the material for "remembered" community narratives that are then transmitted through families, schools, and local associations (Schuman and Scott, 1989; Bisin and Verdier, 2001, 2011). Complementary evidence documents persistence and intergenerational transmission from historical and institutional shocks, e.g., the long-run effects of anti-Semitic mobilization and indoctrination (Voigtländer and Voth, 2012; 2015), ideological socialization via curricula (Cantoni et al., 2017), and experience-based learning from macro shocks that durably shaped preferences and beliefs (Malmendier and Nagel, 2011, 2016). Adding to this macro-shock evidence, the 2008 financial crisis was associated with a decline in institutional trust but a rise in social trust, apparently mediated by increased civic engagement (Caïs et al., 2021), and experiencing a recession at ages 18–25 predicts lower prosociality later in life for men (Bietenbeck et al., 2025). In summary, relative to these event-based contributions, our approach focuses on continually measured economic-political uncertainty rather than one salient shock, thereby capturing the background turbulence from which collective memories are formed and transmitted.[3]

Third, various national factors have been investigated for their potential to explain tolerance, including economic, legal, and political institutions, globalization, religion, individualism, and pragmatism (Corneo and Jeanne, 2009; Berggren and Nilsson 2013, 2014, 2015, 2021; Berggren et al., 2019, 2025; Williamson Kramer, 2023). However, except for Berggren et al. (2025), which studies the contemporaneous relationship between uncertainty and tolerance and uses another indicator of tolerance, these studies have not considered the role of uncertainty. In summary, country-level determinants of tolerance are well studied, but uncertainty appears only rarely as a determinant.

2.2. Theoretical considerations

Our theoretical starting point is that formative years matter: beliefs, values, and attitudes develop at a relatively young age and tend to remain comparatively stable thereafter. People are often thought to be especially impressionable between 18 and 25[4], but several studies document effects from earlier, and occasionally later, life stages as well.[5] This hypothesis rests on multiple building blocks. A key idea is that adolescence and early adulthood involve significant cognitive development (Steinberg, 2005), identity formation (Erikson, 1968), increased autonomy (Arnett, 2000), and intense emotional experiences that can have a durable impact on attitudes, values and beliefs (Larson and Richards, 1994). Also, young people are shaped by peers, mentors, and the media (Niemi and Jennings, 1991) and by collective memories that persist (Schuman and Scott, 1989).

[3] For a comprehensive overview of studies of how shocks of various kinds affect beliefs, values and attitudes, see Giuliano and Spilimbergo (2025).

[4] The impressionable-years approach has been applied, not least from Krosnick and Alwin (1989) onwards, to test whether political convictions are established during impressionable years. However, support for the impressionable years hypothesis also exists for other outcome variables, as Bietenbeck et al. (2025) and Leijen et al. (2022) demonstrate. The latter found changes in values over time in younger generations, but with each subsequently older generation these changes become smaller, suggesting that human values become engrained with age. Some other examples are given by Bergh and Öhrvall (2018), who found that social trust is a sticky personality trait among Swedish emigrants if acquired before the age of 30; Etchegaray et al. (2019), who showed that people who came of age in periods of political repression in Chile exhibited significantly higher levels of willingness to self-censor later in life; Gavresi and Litina (2023), who documented an effect of macroeconomic shocks in the age span 18–25 in the form of a greater likelihood of voting for populist parties and distrusting institutions; Fazio (2024), who identified that exposure to political protests between 18 and 25 generated higher dissatisfaction toward national governments and a higher probability of voting for populist parties; González and Simes (2023), who found that young adults who experienced a major macroeconomic crisis in Argentina had lower trust in political institutions and a greater perception of corruption among public officials decades afterwards. However, we are unaware of any "impressionable years study" of tolerance or any such study using the World Uncertainty Index.

[5] For example, Conzo and Salustri (2019) find that World War II influenced children of pre-school age (0–6) such that they experienced lower trust and social engagement throughout adulthood; and Döring et al. (2015) found "adult" value patterns in children aged 7–11. Other studies considered pre-school age as critical for the formation of enduring prosocial attitudes and attitudes toward in- and outgroups, outcomes which are arguably closely related to our outcome variable, tolerance (see Aboud, 2003; Fehr et al., 2008; Eisenberg et al., 2013; Voigtländer and Voth, 2015; Bauer et al., 2014, 2018).

If the formative-years premise is correct, the next step is to ask why economic-political uncertainty during childhood, youth, and early adulthood would influence tolerance later in life. Building on Delhey et al. (2023), uncertainty, entailing ambiguity about the world around one and one's prospects and status in it, produces anxiety that individuals try to resolve. In principle, two paths are available: a cooperative path ("we are all in it together"), which could widen circles of compassion, and an egocentric path ("focus on protecting myself and my close in-group"), which narrows them. We propose that, in typical environments, the egocentric path dominates, making lower tolerance the typical response to uncertainty in formative years.

To make this mechanism explicit, we integrate well-established insights from social psychology and sociology that specify how uncertainty reduces tolerance. First, we have identity consolidation under ambiguity. Social identity theory and the uncertainty-identity model predict that when ambiguity rises, people seek cognitive closure and social certainty in distinctive in-groups. This has the effect of strengthening identification with the in-group and of sharpening outgroup derogation (Brewer, 1999; Hogg, 2007). Zero-sum thinking then becomes more salient, where people think that gains for "them" are losses for "us". Such a mindset has been linked empirically to harder stances on immigration and minorities (Norton and Sommers, 2011; Chinoy et al., forthcoming). Under threat, people also become more accepting of authoritarian solutions that promise order (Doty et al., 1991). In such situations, they are also more likely to see others as a threat and to want to assert control over them (Duckitt, 2006).

Second, we have threat and competition. Realistic group conflict and integrated threat theory posit that perceived competition for scarce resources or for normative order, both arguably more salient under economic-political uncertainty, amplifies scapegoating and justifies exclusion of people who are different (Stephan, 2000; Nshom, 2024). Survey and experimental evidence connects macro-economic insecurity to stronger anti-immigrant sentiments (Quillian, 1995; Bianchi et al., 2018). Relatedly, the tightening of social norms is adaptive in unpredictable environments. When coordination payoffs rise, groups enforce stricter norms and punish deviance (Gelfand et al., 2011), a change that can persist and be transmitted across cohorts (Winkler, 2021). In line with this channel, disaster exposure has been shown to increase in-group trust while reducing outgroup trust (Schilpzand, 2023). Dehumanization mechanisms under threat (seeing outgroups as less than fully human) further promotes exclusion (Waytz and Epley, 2012).

Taken together, uncertainty activates identity-protection motives, threat perceptions, and zero-sum thinking that tighten group boundaries and reduce tolerance toward minorities. Drawing on Inglehart's survival/postmaterialist value shift, this implies that cohorts socialized in instability internalize stronger preferences for order and in-group protection at the expense of openness (Inglehart, 2007). These expectations match our empirical focus on continuous (not just event-based) country-level uncertainty.

Following Bisin and Verdier (2001, 2011), these shifts due to uncertainty propagate via vertical (parental) and horizontal (peers, schools, media) channels. If uncertainty raises parental threat responses or peer-group tightness, such heuristics are more likely to be internalized when identities and value priorities are still plastic (especially in middle childhood and late adolescence/early adulthood, both captured by our age intervals).

Lastly, we argue that a country's democratic tradition moderates how uncertainty is internalized through two complementary channels – one procedural and one participatory. Together, they reduce perceived arbitrariness, lower threat, and socialize citizens into rule-governed disagreement. Citizens are therefore better equipped to handle uncertainty.

The procedural channel involves legitimacy and predictability. Regular, credible elections, lawful alternation in office, checks and balances, judicial independence, and the rule of law bound the range of policy swings and provide predictable, legitimate avenues for influence. Fair procedures make citizens accept adverse outcomes more readily, as they regard the rules as legitimate, and they might also experience utility from being part of a political process under such rules (Stutzer and Frey, 2006). Recent evidence shows that procedures matter independently of outcomes. For example, experiments find that fair decision rules increase acceptance even when one loses (Martin et al., 2022); and some studies link perceived procedural fairness to political trust and compliance (Grimes, 2006; van der Meer and Hakhverdian, 2017). Deep democratic "stock" also enhances resilience (Boese et al., 2021), since that makes shocks more reversible.

The participatory channel involves socialization into forbearance. Constitutional freedom of expression and association, competitive parties, and plural media institutionalize repeated, rule-governed disagreement. Classic work ties such participation to a "participant" civic culture characterized by, among other things, respect for countervailing views and tolerance (Almond and Verba, 1963; Warren, 1993; Sullivan and Transue, 1999). Contemporary studies identify some of the micro-mechanisms behind such an effect. For example, the combination of opinion sharing and voting raises outgroup tolerance (Hu and Lee, 2018); and civic engagement and political awareness build autonomy and resilience, mediating gains in well-being (Birger Sagiv et al., 2022; Ng et al., 2025). These habits nullify zero-sum interpretations of change and ease the accommodation of minorities when uncertainty rises.[6]

In settings with weak democratic traditions, procedural guarantees are less credible and participatory safeguards are thinner. Shocks are therefore experienced as more arbitrary and uncontrollable, because "voice" is limited, alternation in office is uncertain, and legal constraints on power are weaker. At the same time, citizens have fewer routine opportunities for rule-governed disagreement (less protected expression and association), so they are less likely to acquire the habits of respect for countervailing views and forbearance that can mitigate threat. As a result, uncertainty encountered in youth and early adulthood is more likely to be internalized as a threat, leaving a more negative imprint on outgroup tolerance in adulthood.

Lastly, we present a "dual-timescale view" of uncertainty, connecting the long-term perspective of this study to previous work on short-term effects on tolerance from uncertainty. The theoretical channels above imply that uncertainty encountered during formative

[6] This logic echoes Popper's (1945) open society: public contestation – "conjectures and refutations" – fosters adaptive learning and normalizes pluralism through reasoned criticism. By emphasizing individual responsibility and civic participation, it also cultivates a sense of agency that helps citizens cope with social and economic change.

years can shift the *baseline* tolerance experienced in adulthood by affecting threat perceptions and the desire to enforce tight social norms. Such effects are persistent because they are laid down while identities, peer networks, and normative positions are still forming. By contrast, we propose that contemporaneous uncertainty faced in adulthood operates as a temporary deviation around that cohort-specific baseline. Changes in uncertainty in adulthood, when people are more secure in their social settings, can be interpreted as collective problems and, under procedural and participatory safeguards provided by democracy, can make people "come together" (Delhey et al., 2023; Berggren et al., 2025). This implies that changes in uncertainty can increase tolerance, but in a transitory way, over and above the baseline tolerance level established during the formative years. Fig. A3 in Appendix B illustrates the "dual--timescale": formative uncertainty lowers a cohort's equilibrium level of tolerance, while current shocks can push tolerance upwards for a period before reverting to the baseline. We later test this unified view by estimating a specification that includes both exposure during formative years and interview-year uncertainty in the same model (see Section 4.4).

In summary, our hypothesis is: Greater exposure to economic-political uncertainty during formative years reduces adult tolerance toward minorities, unless individuals were socialized within a strong democratic tradition that equips them to cope with uncertainty. The next section describes the data and empirical strategy used to test this claim.

3. Data and empirical strategy

3.1. Data

We use data on up to 243,598 individuals in 26 European countries experiencing measured uncertainty during the time period 1952–2020 and indicating tolerance over the period 2004–2020 (rounds 2–10 of the European Social Survey). The countries are Albania, Austria, Belgium, Bulgaria, Croatia, Czech Republic, Denmark, Finland, France, Greece, Hungary, Ireland, Israel, Italy, Latvia, Lithuania, Netherlands, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland and Türkiye.

Data on country-level uncertainty come from the World Uncertainty Index (WUI). This index measures economic and political uncertainty, as explained in detail in Ahir et al. (2018, 2022). It provides quarterly observations across 143 countries from 1952 to today and relies on the country reports from The Economist Intelligence Unit. These reports scrutinize economic and political developments, and the prevalence of the term "uncertain" and its derivatives, in relation to the total number of words, indicates the level of uncertainty. This approach benefits from uniformity and reliability, owing to consistently using a single, reputable source for all data (Ahir et al., 2022: 3–4). When using this indicator, we measure it as the average country value during the relevant age intervals of the respondents. Thus, the values for uncertainty are *not* from when the tolerance question (our outcome variable) was asked but from earlier stages in the respondents' lives.

The WUI is text-based and thus potentially sensitive to analyst subjectivity. Several features and tests mitigate this concern. The Economist Intelligence Unit uses a standardized, multi-stage editorial process with country specialists and central editors, designed to ensure accuracy, consistency, and comparability across countries and over time. Also, the WUI co-moves closely with established uncertainty proxies. In addition, alternative versions that replace "uncertain" with synonyms remain highly correlated with the baseline WUI, suggesting limited sensitivity to the choice of keyword. Moreover, coverage is wide, which is an advantage relative to many alternatives. External evidence supports the validity of the measure. For instance, studies that substitute the WUI for volatility-based measures reproduce well-documented macroeconomic relationships, which indicates predictive power. In our application, we further attenuate reporting noise by averaging WUI within cohort-by-country age windows and by using country and birth-cohort fixed effects. Taken together, these points support the use of the WUI in this setting. Further description and justification are provided in Appendix A.[7] In Fig. A4a in Appendix B, we compare uncertainty exposure across institutional environments by showing the distribution of WUI averaged over ages 0–35 separately for low- and high-democracy cohorts (where the classification is based on the cohort's mean democracy level). The two distributions largely overlap. If anything, the high-democracy distribution is slightly right-shifted, implying equal or higher average exposure there.[8]

The outcome variable is tolerance, in this case the respondent's reply to this statement in the European Social Survey (ESS): "To what extent do you agree or disagree with each of the following statements? Gay men and lesbians should be free to live their own life as they wish." We construct a dummy variable, indicating tolerance (value 1) if the respondent chose "1=Agree strongly" and 0 otherwise (including choosing any of the other numerical options 2=agree, 3=neither agree nor disagree, 4=disagree, and 5=disagree strongly). This is the only genuine tolerance question in the ESS, and it has been used a great deal in previous research. Figs. A4b and A4c provide descriptive context for the outcome. For each country, we plot tolerance by ESS round and birth-decade cohort. Levels vary markedly across countries, while within-country profiles evolve smoothly. This is consistent with our cohort-

[7] The WUI is intentionally agnostic about the sources of uncertainty. It simply aggregates references to uncertainty in EIU country reports. Accordingly, our coefficients should be interpreted as the effect of continuous economic-political uncertainty during the formative years, not the effect of any single source (e.g., policy, financial, or climate uncertainty). Constructing specific series with comparable country coverage and historical span over respondents' birth years is not easily done. We therefore retain the WUI as our measure and view decompositions as a valuable avenue for future data work rather than as part of the present analysis.

[8] This histogram is purely descriptive. It compares the unconditional distributions of cohort-level uncertainty exposure across democracy contexts, but it does not reflect how we test moderation econometrically. As detailed below, our estimates rely on split-sample regressions with country and single-year cohort fixed effects, exploiting within-country, across-cohort variation in window-specific exposures (0–5, 6–12, …, 31–35). Hence the figure provides context for the variables, whereas inference about democracy moderation comes from the fixed-effects specifications in Section 4.

exposure design and intended purely as description rather than causal evidence.

In a sensitivity test, we replace our tolerance measure with social trust, also from the ESS. It is a dummy variable that takes the value 1 if the respondent answered 7 or higher when asked: "Using this card, generally speaking, would you say that most people can be trusted, or that you can't be too careful in dealing with people? Please tell me on a score of 0 to 10, where 0 means you can't be too careful and 10 means that most people can be trusted." In another test, we replace our baseline tolerance variable by two indicators from the ESS capturing attitudes toward immigrants. One is a dummy taking the value 1 if the respondent agrees that the country should allow many immigrants of a different race/ethnic group than the majority; the other is a dummy taking the value 1 if the respondent agrees that the country's culture is enriched by immigrants.

We use a parsimonious set of control variables from the ESS at the individual level in our baseline estimations: Female (taking the value 1 if the respondent is a woman and 0 otherwise), Age and Age squared. In alternative specifications, we control for the individual level of educational attainment (tertiary or above), family income (all sources) measured in percentiles, and whether the individual defines him-/herself as religious measured as a dummy[9], all from the ESS.

At the country level, in some of our analyses, we split the sample using four indicators of democracy. First, we use the indicator of Bjørnskov and Rode (2020). It measures electoral democracy by means of a dummy that takes the value 1 if the chief executive is chosen by popular election or by a body that was itself popularly elected, the legislature is popularly elected, there is more than one party competing in the elections, and an alternation in power under electoral rules identical to the ones that brought the incumbent to office has taken place.[10] Our first democracy indicator (*Bjørnskov and Rode 1*) uses it to define "high democracy" as those with an above-average share of years in the period 1970–2020 that a country has been classified as a democracy and where "low democracy" are the countries with a below-average share.[11] Our second democracy indicator (*Bjørnskov and Rode 2*)uses the Bjørnskov and Rode data to define "high democracy" as countries that have the dummy 1 all of the years 1970–2020 and "low democracy" as countries with at least one year in which they are not coded as a democracy.[12] For our third democracy indicator (*V-Dem electoral*), we go to V-Dem (Coppedge et al., 2024: 47) and their indicator of electoral democracy. It is measured on an interval from 0 to 1 for 1970 and "seeks to embody the core value of making rulers responsive to citizens, achieved through electoral competition for the electorate's approval under circumstances when suffrage is extensive; political and civil society organizations can operate freely; elections are clean and not marred by fraud or systematic irregularities; and elections affect the composition of the chief executive of the country." [13,14] Our fourth democracy indicator (*V-Dem liberal*) is also from V-Dem and captures liberal democracy. It is also measured for 1970 on an interval from 0 to 1 and "judges the quality of democracy by the limits placed on government. This is achieved by constitutionally protected civil liberties, strong rule of law, an independent judiciary, and effective checks and balances that, together, limit the exercise of executive power. To make this a measure of liberal democracy, the index also takes the level of electoral democracy into account." (p. 48)

Regarding further country splits, we apply different indicators of economic freedom: the overall Economic Freedom of the World index from Gwartney et al. (2023), its first area (the size of government), and its second area (property rights and the legal system). These are measured for 1995 (in order to also include former post-communist countries), and the division is based on the average value. To examine whether early pro-market institutions influence the relationship between uncertainty and tolerance, we use the average value of the overall index, drawing on data from Lawson and Murphy (2019). Here, we sue the average value for 1950–1965, the total time period for which it exists, since the values are more uncertain and since there are more missing values for those data. Next, we apply a dummy indicator of whether a country is post-communist (value = 1) or not.[15] Another division is made on the basis of a country being above or below the average level of uncertainty avoidance (Hofstede 2001, 2010). This measure is based on international surveys of IBM employees conducted in the 1960s and 1970s, as well as later extensions. It ranges from 0 to 112. We apply three indicators of a lack of media freedom from V-Dem: government censoring media, media self-censorship, and media bias, each measured in 1970 on a scale from 0 to 4 in the first and last case and 0 to 3 in the middle case and with the splits being made at the mean. We also use five indicators of political-institutional safeguards from V-Dem, measured on a scale from 0–1 in 1970: rule of law, judicial constraints on the executive, freedom of expression and alternative information, freedom of association, and legislative constraints on the executive.

Descriptive statistics for the baseline analysis are presented in Table 1, while the complete descriptive statistics can be found in Table A1 in Online Appendix B. Variable definitions and sources are summarized in Table A2 in Appendix B. Table A3 in Appendix B reports correlation coefficients between the six age intervals. Correlations are modest and mainly between adjacent windows, while distant windows are near zero, indicating that exposure varies by age rather than reflecting a single common factor.

[9] We cannot include country-level religiosity as a control variable due to our use of country fixed effects.

[10] This indicator builds on the work of Cheibub et al. (2010), who provide an extensive justification for it relative to other democracy indicators.

[11] For this indicator, the low-democracy countries are Albania, Bulgaria, Croatia, Czechia, Greece, Hungary, Latvia, Lithuania, Poland, Portugal, Slovakia, Slovenia, Spain, Turkey, and Ukraine.

[12] For this indicator, the low-democracy countries are Albania, Bulgaria, Croatia, Czechia, Greece, Hungary, Latvia, Lithuania, Poland, Portugal, Slovakia, Slovenia, Spain, and Ukraine.

[13] For this indicator, as well as for the next one from V-Dem, the low-democracy countries are Albania, Bulgaria, Croatia, Czechia, Greece, Hungary, Latvia, Lithuania, Poland, Portugal, Slovakia, Slovenia, Switzerland, Turkey, and Ukraine.

[14] The year 1970 is close to the average year of birth (1969) in our data.

[15] These are Albania, Bulgaria, Croatia, Czechia, Hungary, Latvia, Lithuania, Poland, Slovakia, Slovenia, and Ukraine.

Table 1
Descriptive statistics for the baseline variables.

Variable	Observations	Mean	Std. dev.	Min	Max
Tolerance: gays and lesbians should be free to live life as they wish (strongly agree)	243,598	0.35	0.48	0	1
Age of respondent	243,598	43.31	15.70	17	81
Female	243,598	0.53	0.50	0	1
Average uncertainty 0–5	178,883	0.04	0.02	0	0.11
Average uncertainty 6–12	212,937	0.04	0.02	0	0.12
Average uncertainty 13–17	243,598	0.04	0.02	0	0.24
Average uncertainty 18–25	209,014	0.04	0.02	0	0.19
Average uncertainty 26–30	185,900	0.04	0.02	0	0.24
Average uncertainty 31–35	161,186	0.04	0.02	0	0.24

These descriptive statistics are based on the largest sample we ever use, i.e., when the treatment is uncertainty in ages 13–17. Table A1 in Online Appendix B presents complete descriptive statistics for all variables. Variable definitions and sources are summarized in Table A2 in Appendix B.

3.2. Empirical strategy

The empirical strategy for examining the role of uncertainty in shaping individual tolerance leverages differences in uncertainty in the macro environment. To determine the impact of experiences of uncertainty, we conduct regressions that account for country and cohort fixed effects, utilizing the variation in uncertainty across both birth cohorts and countries. We estimate regressions of the following form:

$$Tolerance_{ict} = \alpha + \sum_{a \in \mathscr{A}} \beta_a U_{ct}^{(a)} + X_i'\gamma + \delta_c + \delta_t + \varepsilon_{ict} \tag{1}$$

where $\mathscr{A} = \{0-5,\ 6-12,\ 13-17,\ 18-25,\ 26-30,\ 31-35\}$, and $U_{ct}^{(a)}$ is the cohort-specific exposure to uncertainty in age interval a for country c and birth cohort t (the average WUI for the calendar years when cohort t is aged a in country c). X_i contains the individual controls (female, age, age squared), δ_c are country fixed effects, δ_t are birth-cohort fixed effects, and errors are clustered at the country-by-birth-cohort level (i.e., by the unit at which the uncertainty exposure varies), to allow for arbitrary correlation within country-cohort cells.

The empirical approach enables us to isolate the influence of uncertainty at certain age periods, which can be distinguished from the effect of being at a certain stage of the life cycle and from historical events that are shared by all individuals from the same country. The identification strategy takes advantage of the fact that uncertainty varies both across time and across countries. Fig. 1 illustrates the variation in uncertainty for three selected countries: France, Greece and Sweden.

As a result of this variation, different birth cohorts in these countries will experience the country level uncertainty at a given time at different ages. Fig. 2 illustrates the variation in uncertainty at ages 0–5 in the three countries from Fig. 1; similar patterns appear for the other age intervals (figures are available on request). This allows for the use of changes in uncertainty in the macro environment within the same country to create a comparison between individuals who were impacted by this variation at different stages of life but who reside in the same social and institutional context.

4. Results

4.1. Baseline findings

Table 2 reports the baseline estimates. The key pattern is clear: average economic-political uncertainty experienced in formative years, from early childhood through early adulthood, is negatively related to expressing tolerance toward gays and lesbians in adulthood, with the largest effects for ages 6–12 and 18–25, and with little to no association after the mid-20s.[16] This pattern is consistent with attitude consolidation around the mid-20s, when identity formation and value plasticity have already peaked (Erikson, 1968; Jennings and Niemi, 1981; Schuman and Scott, 1989; Arnett, 2000; Steinberg, 2005). To get a sense of the magnitude, a one-standard-deviation increase in uncertainty during ages 6–12 is associated with roughly a 2 percentage-point (3.1% of a standard deviation) lower probability of tolerance.

Comparing this size effects to two control variables for the 6–12 interval (see Table A7 in Appendix B), the estimated effect of tertiary education is about +8.9 percentage points, so the impact of uncertainty is about one-fifth to one-quarter of the "education boost" in absolute numbers. It is also comparable to moving about two income deciles. Fig. A5 in Appendix B visualizes these standardized effect sizes.

[16] Regarding the findings for the lower age group, our findings are in line with Döring et al. (2015), who identified the presence of "adult" value patterns in middle childhood, at ages 7–11; cf. Conzo and Salustri (2019). In the full sample, neither 26–30 nor 31–35 predicts tolerance; in low-democracy countries (see below), the 26–30 window is occasionally significant, while 31–35 remains indistinguishable from zero across specifications. When we change the age intervals (into 0–12, 13–25, 26–35), we only get statistically significant estimates for the first two. Read together, these checks suggest that, in our setting, the formative influence on tolerance tapers off by the mid-20s.

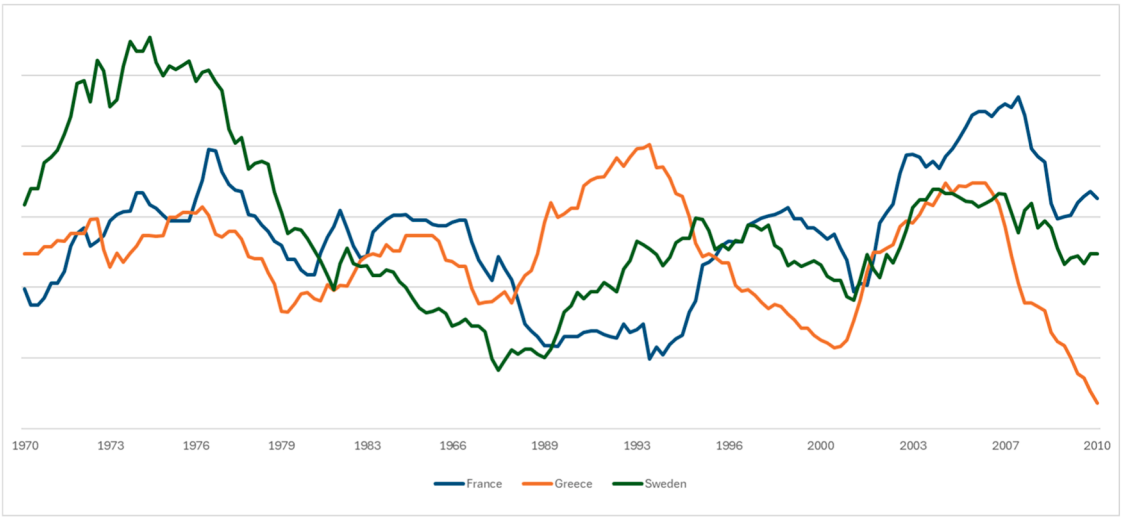

Fig. 1. The variation in uncertainty over time – three country examples.
This figure shows the variation in uncertainty in the form of five-year moving averages for France, Greece and Sweden 1970–2010. Note that we do *not* use five-year moving averages in the regression analyses.

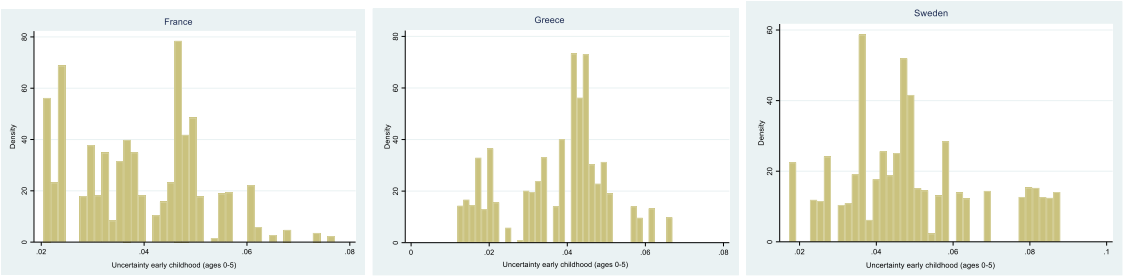

Fig. 2. The distribution of experiences of different levels of uncertainty for individuals aged 0–5 – three country examples.

As for the controls in Table 2, effect sizes are small. Tolerance is modestly higher among women and increases slightly with age.[17]

4.2. The role of democracy

As discussed in Section 2.2, we expect democracy to moderate the relationship between uncertainty and tolerance. Specifically, in countries with a strong democratic tradition (*high democracy*), tolerance should remain unaffected by uncertainty, whereas in countries with a weak democratic tradition (*low democracy*), uncertainty is expected to reduce tolerance. To test this aspect of our key hypothesis, we employ four indicators (defined in Section 3.1) to categorize countries into two groups based on their historic democracy levels. The results are presented in Table 3.

The pattern is very clear. Experiences of uncertainty are negatively related to tolerance in a robust way in countries with a weak democratic tradition only. Regarding when the influence takes place, the point estimates are largest for the 6–12 age interval, but there is an impact up until the age of 30. We conclude that a legacy of robust democratic institutions – whether electoral or liberal – appears to equip individuals with resilience, mitigating the risk of declining tolerance later in life even after experiencing earlier periods of uncertainty.[18] Looking at the effect size in column (1) for the age interval with the largest point estimate, 6–12, an increase in uncertainty by a standard deviation is associated with a reduction in the probability of being tolerant by 7.7% of a standard deviation (a 2.5 times larger effect compared to the one for the full sample).

The similarity of the results when we classify countries by electoral democracy vs. liberal democracy reflects the high overlap between these measures in our sample. Both definitions largely identify the same set of countries with a basic bundle of procedural

[17] When replacing the two age variables with log age in column (7), we get a positive point estimate (0.384), statistically significant at the 1% level.

[18] The point estimates for the two V-Dem indicators are identical because the country splits are identical, meaning that the same individuals are included in the high- and low-democracy samples for both measures.

Table 2
Baseline results.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Average uncertainty ages 0–5	-0.482**						-0.578**
	[0.219]						[0.225]
Average uncertainty ages 6–12		-0.753***					-1.001***
		[0.207]					[0.274]
Average uncertainty ages 13–17			-0.444*				-0.536*
			[0.217]				[0.263]
Average uncertainty ages 18–25				-0.528*			-0.714**
				[0.303]			[0.319]
Average uncertainty ages 26–30					-0.359		-0.320
					[0.246]		[0.243]
Average uncertainty ages 31–35						-0.338	-0.155
						[0.231]	[0.201]
Age	0.014***	0.012***	0.010***	0.007	0.008*	0.008	0.015***
	[0.003]	[0.003]	[0.004]	[0.004]	[0.004]	[0.005]	[0.003]
Age squared	-0.000***	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000*
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Female	0.091***	0.088***	0.083***	0.075***	0.072***	0.071***	0.088***
	[0.010]	[0.010]	[0.010]	[0.009]	[0.009]	[0.009]	[0.011]
Constant	-0.036	-0.013	-0.015	0.029	-0.042	-0.085	-0.053
	[0.092]	[0.102]	[0.117]	[0.140]	[0.160]	[0.184]	[0.123]
Observations	184,682	218,736	243,598	233,486	230,336	215,567	105,308
R-squared	0.131	0.134	0.136	0.139	0.141	0.143	0.118

Robust standard errors in brackets.
*** p<0.01,
** p<0.05,
* p<0.1

safeguards. In other words, once a threshold level of democratic institutionalization is in place, broadening the definition to include additional safeguards does not materially change the moderation pattern. To examine *which* safeguards that matter, we split the sample according to five different aspects of liberal democracy from V-Dem components (measured around 1970): rule of law, judicial constraints on the executive, freedom of expression and alternative information, freedom of association, and legislative constraints on the executive. For each component, we split the sample at the cross-country mean and re-estimate the baseline in the two subsamples. Across components, the qualitative pattern mirrors Table 3. The effect of formative-age uncertainty, especially at ages 6–12 (and in several cases up to the mid-20s), is negative and statistically precise in the low-safeguard subsamples, whereas it is small and imprecise in the high-safeguard subsamples (see Table A4a in Appendix B). We do not rank components against each other, both for power reasons and because these safeguards are correlated. Rather, we read the consistent attenuation in high-safeguard contexts as evidence that procedural certainty, checks on executive power, and rights of expression and association form the relevant buffer.

As a complementary institutions-related moderator, we also split the sample by country-level satisfaction with how democracy works (columns (9)–(10) of Table 3). The pattern largely mirrors the democracy split: in low-satisfaction countries, uncertainty experienced in early life is associated with lower adult tolerance – significant for ages 0–5, 6–12, 13–17, and 18–25 – whereas in high-satisfaction countries, the corresponding estimates are small and imprecise. These results reinforce the view that the institutional climate conditions how formative-age uncertainty translates into later-life tolerance, in line with our theoretical expectation.

Taken together, the splits point to a dual-buffer mechanism in line with Section 2.2: *participation* and *procedure*. Countries that clear a basic threshold of electoral democracy – broad participation, contestation, and regularized turnover – already provide enough participatory scaffolding for citizens to process uncertainty without long-run tightening of outgroup attitudes. This is why the moderation pattern looks similar when we classify by electoral vs. liberal democracy. Disaggregated safeguard evidence (rule of law, judicial constraints, freedoms of expression and association, legislative oversight) shows that procedural certainty and rights protections likewise attenuate the imprint of formative uncertainty on tolerance. In our sample, electorally democratic polities typically also meet a minimal bundle of safeguards, so either channel at or above a threshold – participatory access or procedural guarantees – substantially mutes the effect. In contrast, where both are thin, exposure to uncertainty reduces tolerance, most clearly at ages 6–12. The complementary split by satisfaction with democracy underscores that not only formal design but also perceived performance of democratic procedures shapes how formative-age uncertainty is internalized.

4.3. Extended analysis

We conduct additional exercises to investigate heterogeneous effects and robustness. For an overview of the tests, see Table 4.

First, we extend our analysis by partitioning the sample to examine whether other country-level characteristics, beyond democracy, moderate the relationship between uncertainty and tolerance. Specifically, we classify countries based on the following criteria: (i) post-communist versus non-post-communist status (to assess whether low democracy simply reflects a post-communist legacy), (ii) high versus low economic freedom (measured at two different points in time, to test whether market institutions influence individuals' responses to uncertainty), (iii) large versus small government (to evaluate whether smaller governments, by exposing individuals to

Table 3
Results when splitting the sample depending on historic democracy.

Indicator	(1) Low democracy	(2) High democracy	(3) Low democracy	(4) High democracy	(5) Low democracy	(6) High democracy	(7) Low democracy	(8) High democracy	(9) Low satisfaction with democracy	(10) High satisfaction with democracy
	Bjørnskov and Rode 1		*Bjørnskov and Rode 2*		*V-Dem electoral*		*V-dem liberal*			
Average uncertainty ages 0–5	-0.952	-0.449	-0.917	-0.441	-1.100	-0.377	-1.100	-0.377	-0.817**	-0.107
	[0.647]	[0.301]	[0.638]	[0.294]	[0.730]	[0.300]	[0.730]	[0.300]	[0.351]	[0.502]
Average uncertainty ages 6–12	-2.080***	-0.591*	-2.021***	-0.602*	-2.756**	-0.539	-2.756**	-0.539	-1.097***	-0.571
	[0.576]	[0.306]	[0.542]	[0.303]	[1.100]	[0.326]	[1.100]	[0.326]	[0.284]	[0.742]
Average uncertainty ages 13–17	-1.446***	-0.176	-1.500**	-0.169	-1.536***	-0.177	-1.536***	-0.177	-0.529**	-0.172
	[0.392]	[0.368]	[0.431]	[0.362]	[0.401]	[0.357]	[0.401]	[0.357]	[0.193]	[0.676]
Average uncertainty ages 18–25	-1.419**	-0.367	-1.501**	-0.371	-0.898**	-0.335	-0.898**	-0.335	-1.053**	0.106
	[0.464]	[0.398]	[0.500]	[0.372]	[0.348]	[0.384]	[0.348]	[0.384]	[0.355]	[0.676]
Average uncertainty ages 26–30	-0.939***	-0.100	-1.009**	-0.109	-0.800**	-0.027	-0.800**	-0.027	-0.247	-0.027
	[0.265]	[0.240]	[0.273]	[0.225]	[0.294]	[0.236]	[0.294]	[0.236]	[0.224]	[0.340]
Average uncertainty ages 31–35	-0.272	-0.142	-0.295	-0.132	-0.264	-0.132	-0.264	-0.132	0.099	-0.094
	[0.153]	[0.208]	[0.178]	[0.203]	[0.169]	[0.210]	[0.169]	[0.210]	[0.246]	[0.276]
Observations	31,251	74,057	29,776	75,532	30,038	75,270	30,038	75,270	51,073	54,235
R-squared	0.108	0.075	0.102	0.087	0.068	0.074	0.068	0.074	0.165	0.063

Robust standard errors in brackets. All columns contain the standard individual control variables from Table 2.
*** $p<0.01$,
** $p<0.05$,
* $p<0.1$

Table 4
Overview of extended analyses and robustness tests.

Test	Description	Results	Tables/figures
(1) Country-level moderators	Split by: post-communist; economic freedom (1950–1965, 1995); government size (1995); property rights/legal system; uncertainty avoidance; media censorship/self-censorship/bias; social trust.	Only historical economic freedom and government size show systematic moderation. Weaker markets and smaller government amplify the negative uncertainty-tolerance association; ages 6–12 most robust.	Tables A4b–A4c
(2) Jackknife	Leave-one-country-out re-estimation.	Estimates for formative windows (esp. 6–12) are stable and significant; later windows are insignificant.	Fig. A6; Tables A5a-A5b
(3) Alternative tolerance measures	(i) Ordered probit on 5-point tolerance item; (ii) six immigration-attitude items.	Formative-window pattern persists. Main change is lower probability of 'strongly agree'; immigration effects are smaller/less precise.	Table A6
(4) Gender	Estimate separately for males/females.	Coefficients are similar and not statistically different across genders.	Table A7, cols. (1)–(2)
(5) Exclude 1st-gen. immigrants	Drop first-generation immigrants.	Uncertainty coefficients are virtually unchanged.	Table A7, col. (3)
(6) Add individual controls, subgroup splits	Add individual-level controls (immigrant status, religiosity, tertiary education, income, child at home, partner, recent work) and split the sample by religiosity (0/1), income (deciles 1–9 vs. 9–10), and tertiary education (no/yes).	Uncertainty effects remain negative and concentrated in the formative windows (especially ages 6–12 and 18–25). Estimates are similar with added controls. In splits, effects persist across strata, somewhat larger among the non-religious, top-income deciles, and those with tertiary education. Conclusions unchanged.	Table A7, cols. (4)–(10); Table A8
(7) Extensive-margin proxy	Indicator: window WUI above country long-run mean.	Negative across windows; precision weaker (dichotomization), with 0–5 significant at 10%.	Table A9
(8) High-uncertainty subsample	Restrict to WUI > 0.05.	Coefficients are insignificant across windows; effects not driven solely by extreme uncertainty.	Table A7, col. (11)
(9) Placebo: social trust	Dependent variable: social trust.	Coefficients are small and indistinguishable from zero across windows.	Table A7, col. (12)
(10) Alternative fixed effects	Add survey-round FE; survey-year FE; country x round FE; country trends; country cohort trends.	Signs persist and formative-window pattern remains; magnitudes sometimes attenuate.	Table A10
(11) Coarser age windows	Collapse to 0–12, 13–25, 26–35 (jointly).	Negative for 0–12 and 13–25; near zero for 26–35.	Table A11
(12) Logs of uncertainty	Replace WUI levels with log(WUI).	Mirrors baseline: strongest negative for 6–12 (and next 18–25); later windows small/imprecise.	Table A12
(13) Democracy interactions	Interact democracy with each age-window exposure (with country FE) to recover implied effects in democracies vs. non-democracies.	Corroborates split-sample results: negative and precise in non-democracies (esp. 6–12, 18–25); implied effects in democracies are small/insignificant.	Table A13

WUI = World Uncertainty Index.

uncertainty with less protection, generate more adverse reactions), (iv) strong versus weak protection of property rights and legal systems (to determine whether fundamental legal institutions play a role), (v) high versus low uncertainty avoidance (to assess whether cultural attitudes toward uncertainty shape the relationship between uncertainty and tolerance), (vi) high versus low government media censorship, high versus low media self-censorship, and high versus low media bias (to test, through three different measures, whether media interference accounts for the observed negative association between uncertainty and tolerance in countries with weaker democratic traditions), and (vii) high versus low social trust. The underlying premise is that institutional, cultural, and policy differences across countries may condition individuals' ability to cope with uncertainty. As shown in Tables A4b and A4c in Appendix B, two main findings emerge. (i) Only two country-level characteristics – historical economic freedom (measured in 1950–1965) and government size (measured in 1995) – exhibit systematic differences in moderating the effect of uncertainty on tolerance. This suggests that historically weak market institutions and smaller governments amplify the negative impact of uncertainty on tolerance. (ii) The most robustly significant age interval in the uncertainty-tolerance relationship is 6–12 years.

Second, we assess the robustness of our results using a jackknife resampling approach, sequentially excluding all individuals from one country at a time. This allows us to determine whether the findings are driven by specific countries acting as outliers. Fig. A6 in Appendix B presents the variation in point estimates (solid orange lines) and the corresponding 95% confidence intervals (dashed green lines) for uncertainty during ages 6–12 (upper graph) and ages 31–35 (lower graph). The results indicate that the estimates for uncertainty exposure at younger ages remain stable and statistically significant across samples, whereas those for older ages are also stable but never reach statistical significance. Tables A5a and A5b in Appendix B provide the full results for all age intervals.

Third, we have performed two robustness exercises to assess how our results respond to alternative definitions of tolerance. First, our baseline tolerance measure is a binary indicator equal to 1 if a respondent "strongly agrees" that gays and lesbians deserve tolerance, which avoids imposing cardinality on the response scale. However, this approach discards the additional information contained in the full five-point scale (ranging from "strongly disagree" to "strongly agree"). To address this, we estimate an ordered probit model that relates each response category to the age intervals during which uncertainty was experienced. Reassuringly, even when using a categorical model, uncertainty experienced at younger ages remains significantly related to tolerance. Notably, when deriving marginal effects, we find that the "strongly agree" category exhibits a large negative effect, whereas all other categories (two of which capture intolerance) show much smaller, positive effects. This pattern suggests that, in terms of economic significance, uncertainty primarily undermines strong expressions of tolerance, while its effect on moderate responses is relatively small. Second, to

examine generalizability beyond tolerance toward gays and lesbians, we replicate the baseline specification using six ESS questions on immigration: (i) allow many immigrants of the same race/ethnic group as the majority; (ii) allow many immigrants of a different race/ethnic group than the majority; (iii) allow many immigrants from poorer countries outside Europe; (iv) immigration good for the country's economy; (v) country's cultural life enriched by immigrants; and (vi) immigrants make the country a better place to live. Results, presented in Table A6 in Appendix B, mirror the main pattern: uncertainty during the formative windows, especially 6–12 and 18–25, is associated with less favorable views of immigration, while exposures after the mid-20s show little to no relationship. Estimates are generally smaller and less precise than for our baseline tolerance indicator, which is to be expected because these immigration items bundle tolerance with beliefs about labor-market competition, welfare-state capacity, and cultural externalities. This makes them less ideal as tolerance indicators. The attenuation strengthens our interpretation that our main tolerance indicator better captures the kind of attitude covered by our theory.

Fourth, we assess gender differences by analyzing subsamples split by gender (see Table A7, columns (1) and (2), in Appendix B).[19] Although there is statistical significance for more age intervals for females when considering all age intervals collectively, the point estimates for males and females are not statistically different. Consequently, we conclude that the negative relationship between uncertainty during childhood and early adulthood and tolerance is consistent across genders.

Fifth, the baseline sample includes some first-generation immigrants residing in the various European countries. Since many of them may have spent part of their formative years in their country of origin – potentially experiencing and being shaped by the uncertainty prevailing there – their inclusion could introduce bias. Reassuringly, excluding this group (approximately 12,000 individuals) has no substantive impact on the results, as shown in column (3) of Table A7 in Appendix B (to be compared with column (1) of Table 3).

Sixth, we account for potential omitted variable bias by incorporating additional individual-level control variables beyond gender and age. Specifically, we include being a first-generation immigrant, religiosity, higher education attainment, household income, having a child at home, living with a partner and having had paid work in the last week.

In column (4) of Table A7 in Appendix B, being a first-generation immigrant is not related to the outcome variable, while the uncertainty estimates remain just about the same when controlling for immigrant status.

In column (5) of Table A7, religiosity is negatively associated with tolerance. Meanwhile, the uncertainty estimates remain almost entirely, compared to Table 3, column (1). We conclude that while religiosity plays a significant role, it does not diminish the effect of uncertainty compared to the low-democracy baseline findings.

In column (6) of Table A7, we instead include a control for tertiary education. It is positively associated with tolerance. The results remain largely consistent with those in Table 3, column (1), with the point estimates being somewhat smaller.

Next, we include household income (measured in percentiles) and find, as shown in column (7) of Table A7, that it is positively associated with tolerance but not in a statistically significant manner. The uncertainty estimates remain robust.[20]

When including having children at home (column (8) of Table A7), it is not statistically significant and changes very little. The same holds for adding having a partner (column (9) of Table A7). When adding having had paid work in the last week, this obtains marginal statistical significance and is positively related to tolerance; meanwhile, the uncertainty estimates remain virtually unchanged. Overall, these results, derived from adding a rich set of individual-level control variables, further support the conclusion that exposure to uncertainty during formative years tends to foster less tolerant attitudes toward gays and lesbians.

Seventh, we ask an "event-style" question: Is it enough that a cohort spent a given age window in an *above-average*-uncertainty environment, regardless of how intense that uncertainty was? This extensive-margin proxy relaxes the linearity implicit in our baseline continuous measure and has the advantage that "above average" is defined relative to each country's own history, putting countries on a comparable footing. Conceptually, it maps closely to our mechanism, viz., youths may change attitudes once uncertainty crosses a threshold. We define, for each age window, an indicator equal to one if the average WUI faced by the individual in that window exceeds the country's long-run WUI mean. Table A9 in Appendix B shows that the coefficients are negative across all windows. The estimate for ages 0–5 is significant at the 10% level, while the remaining windows are negative but imprecisely estimated. The weaker precision compared to our baseline reflects attenuation because dichotomization discards intensity information and compresses cross-cohort variation. Taken together, both approaches point to lower adult tolerance following higher formative-age uncertainty.

Eighth, and relatedly, we test whether our findings are driven primarily by periods of high uncertainty, as opposed to uncertainty across its full spectrum. To do this, we restrict our sample to observations where uncertainty is greater than 0.05. This threshold, while somewhat arbitrary, was selected to filter out most observations while still preserving enough data to retain statistical power. Our analysis – presented for low-democracy countries in column (7) of Table A7 in Appendix B – shows that the results are non-significant across the board. This suggests that it is not only high levels of uncertainty that drive our main results, but rather the overall variation captured by the continuous uncertainty measure.

[19] From this test onwards, we report results for the low-democracy sample, applying the *Bjørnskov and Rode 1* definition, since the analysis of Section 4.2 shows that the negative relationship between uncertainty in formative years and tolerance only applies in these countries. Results for the full sample are similar and are obtainable on request.

[20] To parallel the controls, we also split the sample by religiosity (0/1), household income (deciles 1–9 vs. 9–10), and tertiary education (no/yes); results are reported in Table A8 (Appendix B). Across all strata, the uncertainty–tolerance relationship remains negative and concentrates in the impressionable ages (6–12 and 18–25). Magnitudes are somewhat larger among the non-religious and in the top income deciles. By education, effects are present in both groups and are modestly stronger for those with tertiary education. Thus, this exercise leaves the main findings unchanged.

Ninth, we have re-estimated the benchmark specification using the ESS social-trust question ("most people can be trusted") as the dependent variable. The purpose is not to treat trust as another definition of tolerance, but to run a placebo test of discriminant validity. If formative-age uncertainty generates a diffuse social pessimism, it should depress both trust and tolerance. By contrast, our theory predicts a more specific effect: early uncertainty narrows the willingness to grant outgroups the freedom to live as they wish rather than lowering generalized expectations about others' honesty and reciprocity (Uslaner, 2002). Empirically, the trust regressions, estimated with the model, yield coefficients that are small and statistically indistinguishable from zero across age windows (Table A7 in Appendix B). In tandem with the persistent negative effects for tolerance, this pattern supports the interpretation that formative-age uncertainty operates through a tolerance channel rather than through generalized social mistrust.

Tenth, our baseline includes country fixed effects, birth-cohort fixed effects, and a flexible age profile. We test alternative fixed-effects structures. (i) Adding ESS survey-round dummies (two-year spans) absorbs interview-period shocks without disturbing the cohort–age identity; results are unchanged. (ii) Replacing cohort FE with survey-year FE confirms that the formative-window pattern is not driven by the cohort definition. (iii) Interacting country with survey round absorbs country-specific interview shocks; magnitudes attenuate but signs persist. (iv) Allowing country-specific linear time trends removes slow national drifts; the baseline pattern remains. (v) Adding country-specific linear cohort trends rules out smooth cohort drifts; estimates again closely track the baseline. Across all demanding specifications, our qualitative conclusion holds (Table A10, Appendix B). Uncertainty in formative windows, especially ages 6–12 but in most cases also 18–25, predicts lower adult tolerance, with effects disappearing from the mid-20s. Two caveats remain. First, small cohort-country shocks (examples could be curricular reforms, media campaigns, or local conflicts) may not be captured by the country-level WUI measure. Second, as a text-based index, the WUI may embed non-classical measurement error. These risks are mitigated, we argue, by various validation exercises by the constructors of the index (see Appendix A) and through the results here, that indicate stability across FE structures. We therefore interpret the uncertainty coefficients as robust associations consistent with a causal effect of formative-age uncertainty on adult tolerance.

Eleventh, to see whether our choice of age intervals drives the results, we collapse our six age windows into three – early childhood (0–12), adolescence/early young adulthood (13–25), and late young adulthood (26–35) – and re-estimate the benchmark with all three entered jointly. The results are in Table A11 in Appendix B. Results show that exposure during early childhood and adolescence/early adulthood is negatively related to adult tolerance, whereas exposure during late young adulthood is near zero and imprecise. This pattern is fully consistent with our baseline six-window specification and indicates that early childhood, adolescence, and early young adulthood constitute formative years.

Twelfth, to check whether the functional form matters, we replace the six WUI level measures in the baseline with their logs and re-estimate the benchmark (Table A12, Appendix B). The log specification closely mirrors the baseline in levels. Coefficients remain negative and are statistically significant in early childhood (0–5), late childhood (6–12), adolescence (13–17), and early adulthood (18–25), with the largest magnitudes for 6–12 and next for 18–25, while later windows (26–30, 31–35) are small and imprecise. Together with the two threshold exercises reported elsewhere (above-country-mean indicators and the high-uncertainty subsample), these results suggest a broadly monotone relationship rather than sharp nonlinear breakpoints.

Thirteenth, we estimate a model that interacts our main electoral-democracy indicator with each of the six age-window uncertainty exposures. With country fixed effects in place, the exposure coefficients capture the association in non-democracies; to compute the implied effects in democracies, one adds the interaction term (Table A13, Appendix B). The results align with the split-sample analysis: exposure in the ages 6–12 and 18–25 is, in particular, negative and precisely estimated in non-democracies, whereas the implied effects in democracies are small and statistically indistinguishable from zero throughout. We keep the split presentation in the main text because it allows all coefficients to differ across regime types and conveys the pattern more transparently; the interaction simply corroborates it.

4.4. Long-run baseline vs. short-run deviations: a unified test

To separate persistent formative-age effects of the kind identified in this paper from transient contemporaneous movements of the kind identified in Berggren (2025), we augment the baseline with a single, pooled specification that includes: (i) the six cohort-by-country averages of the WUI for ages 0–5, 6–12, 13–17, 18–25, 26–30, and 31–35, and (ii) the interview-year WUI ("current uncertainty") for the respondent's country and survey year. Controls, fixed effects, and clustering follow the baseline (country fixed effects, birth-cohort fixed effects, individual controls, standard errors clustered by country by cohort).

The findings are as follows. The interview-year WUI enters positively and significantly, while the WUI in earlier years remains negative, with ages 6–12 and 18–25 being most clearly important. Table A14 in Appendix B reports the full results, while Fig. A3 (introduced in Section 2.2) provides a conceptual illustration. Taken together, these estimates support two coexisting channels: (i) uncertainty in childhood and early adulthood lowers the baseline tolerance level, and (ii) contemporaneous uncertainty raises tolerance in the short run around that baseline. The unified model thus reconciles our long-run evidence with the positive short-run association reported elsewhere for related outcomes, in line with our theory.

5. Concluding remarks

Research on uncertainty has expanded a great deal in recent years. This is partly due to the emergence of cross-country datasets like the World Uncertainty Index, which allows researchers to delve into the consequences of economic-political uncertainty. While most studies so far have focused on economic consequences, this study adds to the small literature that has examined cultural consequences.

Using data on tolerance toward gay people from the European Social Survey, we find that uncertainty from early childhood up until

the age of 25 is negatively related to such tolerance later in life. The arguably most robust intervals are 6–12, which means that parents, teachers, peers and others in the surrounding society arguably play an important role by transmitting intolerant attitudes in uncertain times to children, and 18–25, when people form independent identities. Our findings affirm that formative years matter: that basic values and attitudes become quite persistent when formed before mature adulthood. They also confirm the theoretical idea that uncertainty results in anxiety or fear that people try to resolve by tightening social norms in the groups they mostly identify with, sticking together and taking a long-lasting, negative view toward people who are different. This, together with research finding clearly negative economic effects of economic-political uncertainty and negative cultural consequences of disasters and crises, points at the fruitfulness of trying to conceive of ways to either mitigate uncertainty or to find ways that allow people to better handle it. The results primarily apply in countries that have a weaker democratic history than other European countries, which indicates that economic-political uncertainty in such countries affects young people's values in a more intolerant direction than in consistent democracies. Democratic stability is a factor that can potentially mitigate culturally negative consequences of uncertainty by instilling resilience in young people, both for procedural and participatory reasons.

Finally, a unified test clarifies how uncertainty matters in the long and short run. When we include both formative-age uncertainty and interview-year uncertainty in the same model, the formative coefficients remain negative (especially at 6–12 and 18–25), whereas current uncertainty is positive, consistent with a short-run "coming-together" response that temporarily raises tolerance around a lower baseline. This evidence reconciles our results with findings of positive effects of uncertainty in the short run (Berggren et al., 2025).

Funding

The authors are grateful to Torsten Söderbergs stiftelse (grants E4/21, ET2/24), Länsförsäkringars forskningsfond, Anders Sandrews Stiftelse, and Jan Wallanders och Tom Hedelius stiftelse (grant P23-0186) for financial support.

CRediT authorship contribution statement

Niclas Berggren: Writing – review & editing, Writing – original draft, Project administration, Funding acquisition, Formal analysis, Conceptualization. **Andreas Bergh:** Writing – review & editing, Writing – original draft, Funding acquisition, Formal analysis, Conceptualization. **Therese Nilsson:** Writing – review & editing, Project administration, Funding acquisition, Formal analysis, Data curation, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgments

We wish to thank Joshua Ammons, Justin Callais, Lewis Davis, Eelke De Jong, Erwin Dekker, Nabamita Dutta, Edwar Enrique Escalante, Jan Fałkowski, Vincent Geloso, Kevin Grier, Robin Grier, Jerg Gutmann, Hester van Herk, Mark Koyama, Otto Lehto, Robbert Maseland, Katarzyna Metelska-Szaniawska, Peter Murrell, Colin O'Reilley, Annemiek Schilpzand, Emily Skarbek, Adam Stivers, participants in the 2024 Stephenson Institute at Wabash College workshop on institutional change in Crystal City, VA, in the 2024 conference of the Southern Economic Association in Washington, DC, in the research seminar at a 2024 CEAPS seminar at the University of Warsaw, in the 2025 workshop on culture and institutions at Radboud University Nijmegen, and in the 2025 conference of the Public Choice Society in Louisville, KY, and the Editor and three anonymous reviewers for valuable comments.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.jce.2026.01.009.

References

Aboud, Frances E., 2003. The formation of in-group favoritism and out-group prejudice in young children: Are they distinct attitudes? Developmental Psychology 39, 48–60.

Ahir, Hites, Bloom, Nicholas, Furceri, Davide, 2018. The world uncertainty index. SSRN Working Paper.

Ahir, Hites, Bloom, Nicholas, Furceri, Davide, 2022. The World Uncertainty Index. NBER Working Paper No. 29763. National Bureau of Economic Research, Cambridge, MA.

Alexander, De Juan, Pierskalla, Jan, Schwarz, Elisa, 2020. Natural disasters, aid distribution and social conflict: Micro-level evidence from the 2015 earthquake in Nepal. World Development 126, 104715.

Almond, Gabriel A., Verba, Sidney, 1963. The Civic Culture: Political Attitudes and Democracy in Five Nations. Princeton University Press, Princeton, NJ.

Arnett, Jeffrey J., 2000. Emerging adulthood: A theory of development from the late teens through the twenties. American Psychologist 55, 469–480.

Audretsch, David B., Seitz, Nikolaus, Rouch, Katherine Margaret, 2018. Tolerance and innovation: The role of institutional and social trust. Eurasian Business Review 8, 71–92.
Badgett, M.V.Lee, Waaldijk, Kees, van der Meulen Rodgers, Yana, 2019. The relationship between LGBT inclusion and economic development: Macro-level evidence. World Development 120, 1–14.
Baker, Scott R., Bloom, Nicholas, Terry, Stephen J., 2024. Using disasters to estimate the impact of uncertainty. Review of Economic Studies 91, 720–747.
Bauer, Michal, Blattman, Christopher, Chytilová, Julie, Henrich, Joseph, Miguel, Edward, Mitts, Tamar, 2016. Can war foster cooperation? Journal of Economic Perspectives 30, 249–274.
Bauer, Michal, Chytilová, Julie, Pertold-Gebicka, Barbara, 2014. Parental background and other-regarding preferences in children. Experimental Economics 17, 24–46.
Bauer, Michal, Fiala, Nathan, Levely, Ian, 2018. Trusting former rebels: An experimental approach to understanding reintegration after civil war. The Economic Journal 128, 1786–1819.
Berggren, Niclas, Bergh, Andreas, Nilsson, Therese, 2025. Periods of uncertainty are linked to greater acceptance of minorities. Journal of Comparative Economics 53, 772–785.
Berggren, Niclas, Elinder, Mikael, 2012. Is tolerance good or bad for growth? Public Choice 150, 283–308.
Berggren, Niclas, Ljunge, Martin, Nilsson, Therese, 2019. Roots of tolerance among second-generation immigrants. Journal of Institutional Economics 15, 999–1016.
Berggren, Niclas, Ljunge, Martin, Nilsson, Therese, 2023. Immigrants from more tolerant cultures integrate deeper into destination countries. Journal of Comparative Economics 51, 1095–1108.
Berggren, Niclas, Nilsson, Therese, 2013. Does economic freedom foster tolerance? Kyklos 66, 177–207.
Berggren, Niclas, Nilsson, Therese, 2014. Market institutions bring tolerance, especially where there is social trust. Applied Economics Letters 21, 1234–1237.
Berggren, Niclas, Nilsson, Therese, 2015. Globalization and the transmission of social values: The case of tolerance. Journal of Comparative Economics 43, 371–389.
Berggren, Niclas, Nilsson, Therese, 2021. Economic freedom and antisemitism. Journal of Institutional Economics 17, 289–304.
Bergh, Andreas, Öhrvall, Richard, 2018. A sticky trait: Social trust among Swedish expatriates in countries with varying institutional quality. Journal of Comparative Economics 46, 1146–1157.
Bianchi, Emily C., Hall, Erika, Lee, Sarah, 2018. Reexamining the link between economic downturns and racial antipathy: Evidence that prejudice against Blacks rises during recessions. Psychological Science 29, 1584–1597.
Bietenbeck, Jan, Sunde, Uwe, Thiemann, Petra, 2025. Recession experiences during early adulthood shape prosocial attitudes later in life. Journal of Public Economics 243, 105327.
Birger Sagiv, Irit, Goldner, Limor, Carmel, Yifat, 2022. Civic engagement in socially excluded young adults promotes well-being: The mediation of self-efficacy, meaning in life, and identity exploration. International Journal of Environmental Research and Public Health 19, 9862.
Bisin, Alberto, Verdier, Thierry, 2001. The economics of cultural transmission and the dynamics of preferences. Journal of Economic Theory 97, 298–319.
Bisin, Alberto, Verdier, Thierry, 2011. The economics of cultural transmission and socialization. In: Benhabib, Jess, Bisin, Alberto, Jackson, Matthew O. (Eds.), Handbook of Social Economics. Elsevier, Amsterdam, pp. 339–416.
Bjørnskov, Christian, Rode, Martin, 2020. Regime types and regime change: A new dataset on democracy, coups, and political institutions. The Review of International Organizations 15, 531–551.
Bloom, Nicholas, 2009. The impact of uncertainty shocks. Econometrica 77, 623–685.
Bloom, Nicholas, Davis, Steven J., Foster, Lucia S., Ohlmacher, Scott W., Saporta-Eksten, Itay, 2022. Investment and subjective uncertainty. NBER Working Paper No. 30654. National Bureau of Economic Research, Cambridge, MA.
Boese, Vanessa A., Edgell, Amanda B., Hellmeier, Sebastian, Maerz, Seraphine F., Lindberg, Staffan I., 2021. How democracies prevail: Democratic resilience as a two-stage process. Democratization 28, 885–907.
Brewer, Marilynn B., 1999. The psychology of prejudice: Ingroup love or outgroup hate? Journal of Social Issues 55, 429–444.
Buonanno, Paolo, Plevani, Giacomo, Puca, Marcello, 2023. Earthquake hazard and civic capital. European Journal of Political Economy 78, 102367.
Caïs, Jordi, Torrente, Diego, Bolancé, Catalina, 2021. The effects of economic crisis on trust: Paradoxes for social capital theory. Social Indicators Research 153, 173–192.
Cantoni, Davide, Chen, Yuyu, Yang, David Y., Yuchtman, Noam, Zhang, Y.Jane, 2017. Curriculum and ideology. Journal of Political Economy 125, 338–392.
Cheibub, José Antonio, Gandhi, Jennifer, Vreeland, James Raymond, 2010. Democracy and dictatorship revisited. Public Choice 143, 67–101.
Chinoy, Sahil, Nunn, Nathan, Sequeira, Sandra, Stantcheva, Stefanie, forthcoming. Zero-sum thinking and the roots of U.S. political differences. American Economic Review.
Coibion, Olivier, Georgarakos, Dimitris, Gorodnichenko, Yuriy, Kenny, Geoff, Weber, Michael, 2024. The effect of macroeconomic uncertainty on household spending. American Economic Review 114, 645–677.
Colantone, Italo, Stanig, Piero, 2018. Global competition and Brexit. American Political Science Review 112, 201–218.
Coppedge, Michael, Gerring, John, Knutsen, Carl Henrik, Lindberg, Staffan I., Teorell, Jan, Altman, David, Angiolillo, Fabio, Bernhard, Michael, Borella, Cecilia, Cornell, Agnes, Fish, M.Steven, Fox, Linnea, Gastaldi, Lisa, Gjerløw, Haakon, Glynn, Adam, God, Good, Ana, Grahn, Sandra, Hicken, Allen, Kinzelbach, Katrin, Marquardt, Kyle, L., McMann, Kelly, Mechkova, Valeriya, Neundorf, Anja, Paxton, Pamela, Pemstein, Daniel, Rydén, Oskar, von Römer, Johannes, Seim, Brigitte, Sigman, Rachel, Skaaning, Svend-Erik, Staton, Jeffrey, Sundström, Aksel, Tzelgov, Eitan, Uberti, Luca, Wang, Yi-ting, Wig, Tore, Ziblatt, Daniel, 2024. V-Dem codebook v14. Varieties of Democracy (V-Dem) Project, Gothenburg.
Corneo, Giacomo, Jeanne, Olivier, 2009. A theory of tolerance. Journal of Public Economics 93, 691–702.
Crowley, Frank, Walsh, Edel, 2024. Tolerance, social capital, and life satisfaction: A multilevel model from transition countries in the European Union. Review of Social Economy 82, 23–50.
Delhey, Jan, Steckermeier, Leonie C., Boehnke, Klaus, Deutsch, Franziska, Eichhorn, Jan, Kühnen, Ulrich, Welzel, Christian, 2023. Existential insecurity and trust during the COVID-19 pandemic: The case of Germany. Journal of Trust Research 13, 140–163.
Döring, Anna, Schwartz, Shalom H., Cieciuch, Jan, Groenen, Patrick J.F., Glatzel, Valentina, Harasimczuk, Justyna, Janowicz, Nicole, Nyagolova, Maya, Scheefer, E. Rebecca, Allritz, Matthias, Milfont, Taciano L., Bilsky, Wolfgang, 2015. Cross-cultural evidence of value structures and priorities in childhood. British Journal of Psychology 106, 675–699.
Doty, Richard M., Peterson, Bonie T., Winter, David G., 1991. Threat and authoritarianism in the United States: 1978-1987. Journal of Personality and Social Psychology 61, 629–640.
Duckitt, John, 2006. Differential effects of right-wing authoritarianism and social dominance orientation on outgroup attitudes and their mediation by threat from and competitiveness to outgroups. Personality and Social Psychology Bulletin 32, 684–696.
Eisenberg, Nancy, Spinrad, Tracy L., Morris, Amanda S., 2013. Prosocial development. In: Zelazo, Philip David (Ed.), The Oxford Handbook of Developmental Psychology, Vol. 2: Self and Other. Oxford University Press, Oxford, pp. 300–325.
Erikson, Erik H., 1968. Identity: Youth and crisis. W. W. Norton & Co., New York, NY.
Etchegaray, Nicolle, Scherman, Andrés, Valenzuela, Sebastián, 2019. Testing the hypothesis of impressionable years with willingness to self-censor in Chile. International Journal of Public Opinion Research 31, 331–348.
Fazio, Andrea, 2024. Protests, long-term preferences, and populism: Evidence from 1968 in Europe. Oxford Economic Papers 76, 920–944.
Fehr, Ernst, Bernhard, Helen, Rockenbach, Bettina, 2008. Egalitarianism in young children. Nature 454, 1079–1083.
Fetzer, Thiemo, 2019. Did austerity cause Brexit? American Economic Review 109, 3849–3886.
Galofré-Vilà, Gregori, Meissner, Christopher M., McKee, Martin, Stuckler, David, 2021. Austerity and the rise of the Nazi Party. The Journal of Economic History 81, 81–113.
Gavresi, Despina, Litina, Anastasia, 2023. Past exposure to macroeconomic shocks and populist attitudes in Europe. Journal of Comparative Economics 51, 989–1010.

Gelfand, Michele J., Raver, Jana L., Nishii, Lisa, Leslie, Lisa M., Lun, Janetta, Lim, Beng Chong, Duan, Lili, Aycan, A., Ang, Michele, 2011. Differences between tight and loose cultures: A 33-nation study. Science 332, 1100–1104.
Gentzkow, Matthew, Kelly, Bryan, Taddy, Matt, 2019. Text as data. Journal of Economic Literature 57, 535–574.
González, Fernando, A.I., Simes, Horacio, 2023. Impressionable years and trust in institutions: Microeconomic evidence from Argentina. Studies in Microeconomics 13, 348–368.
Gozgor, Giray, Bilgin, Mehmet Huseyin, Rangazas, Peter, 2021. Economic uncertainty and fertility. Journal of Human Capital 15, 373–399.
Giuliano, Paola, Spilimbergo, Antonio, 2025. Aggregate shocks and the formation of preferences and beliefs. Journal of Economic Literature 63, 542–597.
Grimes, Marcia, 2006. Organizing consent: The role of procedural fairness in political trust and compliance. European Journal of Political Research 45, 285–315.
Grimme, Christian, Henzel, Steffen, R., 2024. Uncertainty and credit conditions: Non-linear evidence from firm-level data. International Review of Economics & Finance 93, 1307–1323.
Gwartney, James D., Lawson, Robert A., Hall, Joshua C., Murphy, Robert H., 2023. Economic Freedom of the World: 2023 Annual Report. Fraser Institute, Vancouver.
Hofstede, Geert, 2001. Culture's Consequences: Comparing Values, Behaviors, Institutions and Organizations across Nations. Sage Publications, Thousand Oaks, CA.
Hofstede, Geert, Hofstede, Gert Jan, Minkov, Michael, 2010. Cultures and Organizations: Software of the Mind: Intercultural Cooperation and Its Importance for Survival. McGraw-Hill, New York, NY.
Hogg, Michael A., 2007. Uncertainty-identity theory. Advances in Experimental Social Psychology 39, 69–126.
Hu, Fei, Lee, I-Ching, 2018. Democratic systems increase outgroup tolerance through opinion sharing and voting: An international perspective. Frontiers in Psychology 9, 2151.
Inglehart, Ronald, 2007. Modernization, Cultural Change, and Democracy: The Human Development Sequence. Cambridge University Press, New York, NY.
Inglehart, Ronald, Abramson, Paul R., 1999. Measuring postmaterialism. American Political Science Review 93, 665–677.
Jennings, M.Kent, Niemi, Richard G., 1981. Generations and Politics: A Panel Study of Young Adults and their Parents. Princeton University Press, Princeton, NJ.
Johansson, Alva, Berggren, Niclas, Nilsson, Therese, 2022. Intolerance predicts climate skepticism. Energy Economics 105, 105719.
Krosnick, Jon A., Alwin, Duane F., 1989. Aging and susceptibility to attitude change. Journal of Personality and Social Psychology 57, 416–425.
Kumar, Saten, Gorodnichenko, Yuriy, Coibion, Olivier, 2023. The effect of macroeconomic uncertainty on firm decisions. Econometrica 91, 1297–1332.
Larson, Reed, Richards, Maryse H., 1994. Divergent Realities: The Emotional Lives of Mothers, Fathers, and Adolescents. Basic Books, New York, NY.
Lawson, Robert A., Murphy, Ryan H., 2019. Economic freedom of the world in the 1950s and 1960s. In: Gwartney, James D., Lawson, Robert A., Hall, Joshua C., Murphy, Ryan H. (Eds.), Economic Freedom of the World: 2019 Edition. Fraser Institute, Vancouver, pp. 189–198.
Leijen, Ingmar, van Herk, Hester, Bardi, Anat, 2022. Individual and generational value change in an adult population: A 12-year longitudinal panel study. Scientific Reports 12, 17844.
Malmendier, Ulrike, Nagel, Stefan, 2011. Depression babies: Do macroeconomic experiences affect risk taking? Quarterly Journal of Economics 126, 373–416.
Malmendier, Ulrike, Nagel, Stefan, 2016. Learning from inflation experiences. Quarterly Journal of Economics 131, 53–87.
Martin, Aaron, Mikołajczak, Gosia, Orr, Raymond, 2022. Does process matter? Experimental evidence on the effect of procedural fairness on citizens' evaluations of policy outcomes. International Political Science Review 43, 103–117.
Matzner, Anna, Mayer, Birgit, Oberhofer, Harald, 2023. Trade in times of uncertainty. The World Economy 46, 2564–2597.
Méon, Pierre-Guillaume, Verwimp, Philip, 2022. Pro-social behavior after a disaster: Evidence from a storm hitting an open-air festival. Journal of Economic Behavior & Organization 198, 493–510.
Ng, Tin Y., Ng, Ting K., Siu, Oi L., 2025. Enhancing mental well-being in university students through multicomponent low intensity positive education and the mediating role of civic engagement. Scientific Reports 15, 20871.
Niemi, Richard G., Jennings, M.Kent, 1991. Issues and inheritance in the formation of party identification. American Journal of Political Science 35, 970–988.
Norton, Michael I., Sommers, Samuel R., 2011. Whites see racism as a zero-sum game that they are now losing. Perspectives on Psychological Science 6, 215–218.
Nshom, Elvis, 2024. Realistic group conflict theory. In: Nshom, Elvis, Croucher, Stephen (Eds.), Research Handbook on Communication and Prejudice. Edward Elgar Publishing, Cheltenham, pp. 150–160.
Popper, Karl R., 1945. The Open Society and Its Enemies. Routledge & Kegan Paul, London.
Quillian, Lincoln, 1995. Prejudice as a response to perceived group threat: Population composition and anti-immigrant and racial prejudice in Europe. American Sociological Review 60, 586–611.
Rao, Li-Lin, Han, Ru, Ren, Xiao-Peng, Bai, Xin-Wen, Zheng, Rui, Liu, Huan, Wang, Zuo-Jun, Li, Jin-Zhen, Zhang, Kan, Li, Shu, 2011. Disadvantage and prosocial behavior: The effects of the Wenchuan earthquake. Evolution and Human Behavior 32, 63–69.
Schilpzand, Annemiek, 2023. The impact of natural disasters on social capital: An analysis of ingroup and outgroup trust. International Journal of Disaster Risk Reduction 95, 103860.
Schuman, Howard, Scott, Jacqueline, 1989. Generations and collective memories. American Sociological Review 54, 359–381.
Steinberg, Laurence, 2005. Cognitive and affective development in adolescence. Trends in Cognitive Sciences 9, 69–74.
Stephan, Walter G., 2000. An integrated threat theory of prejudice. In: Oskamp, S. (Ed.), Reducing Prejudice and Discrimination. Lawrence Erlbaum Associates, Mahwah, pp. 23–45.
Stutzer, Alois, Frey, Bruno S., 2006. Political participation and procedural utility: An empirical study. European Journal of Political Research 45, 391–418.
Sullivan, John L., Transue, John E., 1999. The psychological underpinnings of democracy: A selective review of research on political tolerance, interpersonal trust, and social capital. Annual Review of Psychology 50, 625–650.
Uslaner, Eric M., 2002. The Moral Foundations of Trust. Cambridge University Press, Cambridge.
van der Meer, Tom W.G., Hakhverdian, Armen, 2017. Political trust as the evaluation of process and performance: A cross-national study of 42 European countries. Political Studies 65, 81–102.
Voigtländer, Nico, Voth, Hans-Joachim, 2012. Persecution perpetuated: The medieval origins of anti-Semitic violence in Nazi Germany. Quarterly Journal of Economics 127, 1339–1392.
Voigtländer, Nico, Voth, Hans-Joachim, 2015. Nazi indoctrination and anti-Semitic beliefs in Germany. Proceedings of the National Academy of Sciences of the United States of America 112, 7931–7936.
Warren, Mark E., 1993. Can participatory democracy produce better selves? Psychological dimensions of Habermas's discursive model of democracy. Political Psychology 14, 209–234.
Waytz, Adam, Epley, Nicholas, 2012. Social connection enables dehumanization. Journal of Experimental Social Psychology 48, 70–76.
Williamson, Kramer, Claudia, 2023. Individualism and racial tolerance. Public Choice 197, 347–370.
Winkler, Max, 2021. Do disasters affect the tightness of social norms? Mimeo. Department of Human Evolutionary Biology, Harvard University, Cambridge, MA.