The Cultural Divide*

Klaus Desmet Romain Wacziarg
SMU, NBER and CEPR UCLA and NBER

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Abstract

We study cultural convergence and divergence in the United States over time. Using the General Social Survey, we document the evolution of cultural divides between groups, defined according to 11 identity cleavages (gender, religion, race, income, region, education...). Between-group heterogeneity is small: the United States is very pluralistic, but this is primarily due to within-group heterogeneity. On average, between-group heterogeneity fell from 1972 to the late 1990s, and grew thereafter. We interpret these findings using a model of cultural change where intergenerational transmission and forces of social influence determine the distribution of cultural traits in society.

*Desmet: Department of Economics and Cox School of Business, Southern Methodist University, 3300 Dyer, Dallas, TX 75205, kdesmet@smu.edu; Wacziarg: UCLA Anderson School of Management, 110 Westwood Plaza, Los Angeles CA 90095, wacziarg@ucla.edu. We thank Omer Ali for outstanding research assistance. We also thank Alberto Alesina, Raquel Fernández, Kai Gehring, Paola Giuliano, Ricardo Perez-Truglia, Fabio Schiantarelli, Jesse Shapiro, Francesco Trebbi and seminar participants at numerous universities for useful comments.
1 Introduction

Many scholars and commentators have argued that the United States faces a growing cultural divide along lines of race, geography, gender, age, income and other dimensions. These growing disagreements go hand in hand with a fraying social fabric, growing dysfunction in the political arena, and the disintegration of social capital. Others have argued that the greater availability of information and exchange facilitated by travel and exposure to different cultures have brought about cultural convergence, so that cultural heterogeneity between groups is becoming smaller as cultural traits diffuse throughout society.\(^1\) Which view is correct?

In this paper, we conduct a systematic quantitative study of cultural convergence and divergence in the United States over time. We assess whether cultural values - or \textit{memes} - have grown more or less heterogeneous across groups defined according to 11 identity cleavages, among which are gender, religion, ethnic origin, family income quintiles, geographic region and education levels.\(^2\) We use the General Social Survey (GSS), a survey of norms, values and attitudes, spanning 1972 to 2016. We consider a wide range of memes covering religious beliefs and practices, confidence in institutions, preferences over public policies, moral values and attitudes, measures of trust and life satisfaction, and tolerance for alternative viewpoints and lifestyles.

We use two classes of measures of cultural heterogeneity. The first captures \textit{overall heterogeneity}, describing, for each meme, the likelihood that two randomly chosen individuals surveyed in the GSS will have a different cultural trait. The second is a measure of \textit{heterogeneity between groups}, capturing the degree of fixation of memetic traits onto group identity. A high degree of fixation indicates that memes are highly group-specific, while a low degree of fixation indicates that the distribution of memes within each group closely resembles that in society overall. Rising fixation, in this context, would be associated with a growing cultural divide between groups.

We find that the overall degree of cultural heterogeneity in the United States is remarkably stable when averaging heterogeneity across all available memes. We find evidence that average cultural heterogeneity fell slightly between 1972 and 1993, and rose slightly thereafter. These average tendencies mask interesting variation across questions. For some questions, such as several questions on sexual behavior and public policies, there is growing social consensus. For others, such as questions on gun laws and confidence in some civic institutions, we find growing disagreements. Some of these dynamics can be understood as transitions from one end of the belief spectrum to the other. For instance, on the issue of marijuana legalization, attitudes have moved from generalized disapproval to majority approval, so heterogeneity rose and is now falling. Overall, we find some evidence of a systematic tendency toward greater heterogeneity after 1993 when averaging over all available memes, yet on many issues heterogeneity changes little.

\(^{1}\) On the first view, prominent enunciations include Putnam (2000) and Murray (2013). Commentary along these lines among pundits and journalists are too numerous to list. The second view is more closely associated with modernization theory - see for instance Inglehart (1997) and Ritzer (2011), pointing, respectively, to rising incomes and globalization as powerful forces for cultural homogenization.

\(^{2}\) The term "meme" was coined by Richard Dawkins (1989) to describe a cultural trait, much like a gene is a genetic trait. A meme can take on several variants, for instance the meme "belief in God" could take on variants "yes" or "no". A person's culture, in our terminology, is simply that person's vector of memetic traits.
Across all identity cleavages, the level of between-group heterogeneity is extremely small: we find
that most heterogeneity in cultural traits occurs within, not between, groups. The United States is
an extremely pluralistic country in terms of cultural attitudes and values, but this diversity is not
primarily the result of cultural divides between groups.

The time path of these cultural divides between groups displays interesting patterns. We find
evidence of falling between-group heterogeneity from 1972 to the late 1990s, and growing divides
thereafter, but only for some cleavages and only for some memes. Average heterogeneity has risen
across religious identities since the mid-1990s, and across education levels, income quintiles, ethnic
groups and racial groups since the early 2000s. The same trend is particularly pronounced across
groups defined by political party self-identification. The cultural divide across party self-identification
started to gradually increase at the end of the 1990s, and rose sharply in the first half of the 2000s. Of
course, this may reflect the ability of individuals to more easily self-identify with a party that closely
matches their cultural beliefs (sorting) rather than cultural change within groups predefined by party
identification.3 In many cases, the most recent levels of between-group heterogeneity do not surpass
levels reached in the early 1970s. We also find stable or falling cultural heterogeneity across different
regions of the United States, across urban categories, across age groups, and across genders. Some
of these findings come as a surprise in light of the public pronouncements concerning growing divides
across some of these identity cleavages.

How can we interpret these results in light of the popular commentary on the fraying social and
cultural fabric of the United States? We hypothesize that several forces are at play, and may operate
differently depending on specific memes and specific identity cleavages. To understand these forces,
one needs to form a picture of how memes change over time. To do so, we propose a model of cultural
change. In our model, three forces explain the distribution of memes across and within groups and its
dynamics: intergenerational transmission, social conformism and the emergence of cultural innovations.
First, an individual’s vector of memes originates, with variation, from intergenerational transmission.
Second, agents tend to conform to the majority memes of their own group. Third, innovations in
values (particularly values initially held by a minority) can occur and spread through social influence.
These three forces determine the dynamics of cultural change in the model.

Our model provides simple comparative statics to understand the dynamics of cultural change in
light of characteristics of memes and characteristics of identity cleavages. We use the model as a lens
through which we interpret our empirical results. A crucial distinction is whether social influence
occurs mostly within or across identity cleavages. This depends on the manner in which members
of society interact across and within groups. Our model helps characterize conditions under which
the emergence of new communication technologies reinforce within-group conformism and weaken
between-group interactions. This is important to understand the differential dynamics of the cultural
divide across cleavages. It may help understand why, for instance, the cultural divide across Party
ID is going up while divisions between rural and urban areas are diminishing. These dynamics can
be affected by the possible sorting of people with different memes into specific identities, a possibility

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3For instance, the gradual realignment of Southern Democrats with the Republican Party over time may imply greater
fixation of political preferences on party identification.
that we explicitly allow for in our model. We also discuss how cultural divides may change differently across question categories. For instance, the emergence of cultural innovations such as greater social acceptance for gay marriage or marijuana legalization can lead to greater cultural divides if adopted at different rates across identity cleavages.


Drawing on the aforementioned literature on the evolution of cultural traits, social scientists have also studied heterogeneity in cultural traits, which is our main focus here. An important recent contribution by Alesina, Tabellini and Trebbi (2017) studies cultural heterogeneity in Europe using two waves of the World Values Survey. Like us, Alesina, Tabellini and Trebbi (2017) are interested in characterizing cultural convergence or divergence. However, their focus is on the evolution of cultural differences between European countries, using heterogeneity between US states as a point of comparison. Instead, we focus on the US, consider a wide range of eleven identity cleavages, use a distinct measurement framework and interpret our findings through the lens of a model of cultural evolution.

Also relevant is Bertrand and Kamenica (2018), a paper written contemporaneously with ours. Using a machine learning algorithm to a variety of survey data, this paper analyzes how well someone’s culture or consumption behavior predicts their gender, race, income, education and political ideology. Our approach to the cultural divide is different along a number of dimensions. First, while Bertrand and Kamenica (2018) consider other sources of data on culture and behavior besides the GSS – including surveys on consumer behavior and time use patterns – we analyze the cultural divide along a broader set of identity cleavages (including urbanicity, ethnic origin, region, age, religion and work status). Second, their measurement framework differs from ours: they use machine learning to quantify the extent to which a person’s identity can be correctly classified by knowing that person’s culture and behavior. In contrast, we calculate how predictive identity is for cultural values. Third, we propose a conceptual framework to help us interpret why some divides have deepened and others have not. Fourth, we emphasize that it is difficult to understand the dynamics of the cultural divide between groups without paying attention to the evolution of overall cultural heterogeneity in society. For instance, when certain values become more acceptable in society at large, they often diffuse at different rates in different groups, giving rise to a deeper divide. Finally, our results differ. While they
find that over the past half century, with the exception of political ideology, the cultural divide has
not greatly deepened, we find that along some cleavages or for some values, the cultural divide has
actually diminished, while on some others it has followed a U-shaped or increasing pattern.

Our work is also related to research on cultural and political polarization in the United States
(DiMaggio, Evans and Bryson, 1996, McCarty, Poole and Rosenthal, 2006, Fiorina and Abrams, 2008,
Gentzkow, Shapiro and Taddy, 2016, Boxell, Gentzkow and Shapiro, 2017). Finally, the present study
shares its measurement approach with a recent literature on the measurement of cultural heterogeneity
at the individual-level rather than at the group level, using either genetic or memetic data (Ashraf
and Galor 2013, Desmet, Ortuño-Ortín and Wacziarg, 2017).

2 Measurement and Data

2.1 Measurement Approach

To capture cultural heterogeneity and the cultural divide between identity cleavages, we start from
the measurement framework in Desmet, Ortuño-Ortín and Wacziarg (2017). Consider \( c = 1, ..., C \)
identity cleavages that each consist of groups \( k_c = 1, ..., K_c \). Consider also \( m = 1, ..., M \) memes that
each can take on values \( i_m = 1, ..., I_m \). For instance, \( c \) could be gender \((k_c = \text{male, female})\) and \( m \)
could be belief in God \((i_m = \text{yes, no})\). We denote by \( s^{i_m} \) the share of the total population that holds
variant \( i_m \) of meme \( m \), and by \( s_{k_c} \) the share of group \( k_c \) in the total population. We denote by \( s_{k_c}^{i_m} \)
the share of group \( k_c \) (defined over cleavage \( c \)) that holds variant \( i_m \) of meme \( m \). For instance, this
could be the share of males that believe in God.

Overall heterogeneity is simply memetic fractionalization over the whole population. For meme \( m \):

\[
CF^m = 1 - \sum_{i_m=1}^{I_m} (s^{i_m})^2
\]

Averaging over memes, we get average memetic fractionalization - the probability that two randomly
chosen individuals from the entire sample hold a different variant of a randomly drawn memetic trait:

\[
CF = \frac{1}{M} \sum_{m=1}^{M} CF^m = 1 - \frac{1}{M} \sum_{m=1}^{M} \sum_{i_m=1}^{I_m} (s^{i_m})^2
\]

\( CF \) is a measure of memetic heterogeneity in the entire population, regardless of identity cleavages.

To derive a measure of the cultural divide between groups, we calculate \( F_{ST} \) measures of memetic
fixation. Heuristically, \( F_{ST} \) captures the share of heterogeneity that occurs between groups defined
by identity cleavages (Wright, 1949; Cavalli-Sforza et al., 1994; Desmet, Ortuño-Ortín and Wacziarg,
2017). We start by defining heterogeneity in meme \( m \) within group \( k_c \):

\[
CF_{k_c}^m = 1 - \sum_{i_m=1}^{I_m} (s_{k_c}^{i_m})^2
\]
Taking the weighted average over groups for a given identity cleavage $c$, we obtain the average within-group heterogeneity for meme $m$, $CF^m_c$:

$$CF^m_c = \sum_{k_c=1}^{K_c} s_{k_c} CF^m_{k_c}$$  (4)

Finally $F_{ST}$ for meme $m$ defined over cleavage $c$ is simply the share of the total heterogeneity that is not attributable to within-group heterogeneity:

$$(F_{ST})^m_c = 1 - \frac{CF^m_c}{CF^m}$$  (5)

$(F_{ST})^m_c$ takes on values between 0 and 1. When $(F_{ST})^m_c = 0$, group identity carries no information concerning an individual’s cultural value. When $(F_{ST})^m_c = 1$, knowing a person’s identity is equivalent to knowing their value, i.e. the meme is perfectly fixated on groups.$^4$ As was the case for $CF^m$, $(F_{ST})^m_c$ can be averaged over all memes $m$ to obtain the expected cultural divide between groups defined over cleavage $c$.

$F_{ST}$ is subject to a well-known theoretical drawback: it relies on an additive decomposition of total fractionalization into within-group and between-group components, in a context where the sum of these measures is bounded above by 1. This introduces dependence between overall heterogeneity and between-group heterogeneity (Jost, 2008). An alternative measure of between-group heterogeneity not subject to this drawback is the $\chi^2$ index used by Desmet, Ortuño-Ortín and Wacziarg (2017).$^5$ In that paper, the correlation between $F_{ST}$ and $\chi^2$ is 98%, so that in practice it matters little which one is used. Due to its more widespread use in the literature and its intuitive interpretation, we focus here on $F_{ST}$.

2.2 Data

Selection of questions. We use survey data from 31 waves of the General Social Survey (GSS) between 1972 and 2016. The universe of all GSS questions across all waves includes 5,895 fields, but many of these questions were asked only once, either in special modules of the GSS appearing only in a single wave, or as time-specific questions (e.g. about a given presidential election). The first filter that we apply is therefore to require that a given question be asked in at least two different waves, in order to obtain some time-series variation. This leaves us with 2,363 questions.

Among these, questions fall into various types. To capture a respondent’s vector of memes, we need to consider the universe of questions that refer to values and attitudes. To this end, we classified each question into one of three types: 1) questions clearly about the respondent’s attitudes and values (820 questions), 2) factual questions that can be considered to reflect the values of the respondent, for instance, "do you have a gun in your home?" or "how often do you attend religious services?" (272 questions) 3) Questions not related to the respondent’s values, including those that relate to facts

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$^4$ $(F_{ST})^m_c = 1$ can only happen when the number of identity groups $K_c$ is at least as large as the number of possible cultural values $I_m$, and there is no within-group heterogeneity in values.

$^5$ $\chi^2$ captures the information content of a person’s identity in terms of that person’s cultural values (Cover and Thomas, 2006). This index will take on high values when cultural traits are very group-specific.
about other people (the respondent’s spouse, parents, etc.), the respondent’s education when younger, as well as identity or demographic questions. For the purpose of determining the set of cultural memes used in the analysis, we only retain questions of the first two types.\(^6\) This results in a set of 1,092 questions.

**Baseline set of questions.** The frequency with which these 1,092 questions were asked over time is highly variable. Some were asked more or less continuously across all waves while others were asked for only a small subset of waves. For our baseline exercise, we require as long a time series as possible over a common set of questions, to ensure the comparability of the measures of cultural diversity across time. The questions that are asked regularly in the GSS are also more likely to reflect important, salient societal and cultural issues - trust, life satisfaction, attitudes toward fundamental civil rights like freedom of speech, etc.

There is a trade-off: the higher the frequency over which the measures are computed, the smaller the set of common questions across successive observations. To achieve balance between these considerations, we group the survey data into either two-wave sets or five-year sets and keep questions that were asked at least once in each grouping (Appendix Table A1 displays these groupings). This amounts to keeping questions asked at least once every two waves, or at least once in any five-year period. In the end, we are left with 76 memes when requiring questions to be asked every two waves, and 96 memes when requiring questions to be asked at least once in each five-year interval. These questions are listed in the Appendix Table A2. We use the 76 questions obtained from the two-wave groupings as our baseline set, since it provides higher frequency for the heterogeneity measures, i.e. 16 groupings computed from 31 waves.\(^7\) We use the expanded set of questions obtained from the five-year groupings for robustness checks presented in the Appendix (this gives 9 time periods). It is important to emphasize that both the wording of each question \(m\) and the number of possible answers in the GSS \((i_m)\) do not vary across time.

**Question entry and exit.** The analysis of cultural heterogeneity over questions that enter or exit the survey at a given point in time could also be interesting. Many of these fleeting questions are asked only episodically in special GSS modules devoted to deeper investigations of topical subjects. But some questions may also enter or exit the survey depending on the degree of social consensus. Of particular concern is the exit of questions for which a social consensus has developed, and the entry of questions that are characterized by emerging divides. Entry and exit of questions along those lines cause opposing biases on \(CF\) (it is hard to form priors on the direction of the bias on \(F_{ST}\)).

To address these issues, we conduct a systematic analysis of question entry and exit. In an extension to our baseline exercise, we include questions that enter and exit in our measures of overall and cross-group heterogeneity, to assess the effect they have on the dynamics of the cultural divide. The analysis proceeds in two ways. First, we calculate the heterogeneity indices over the full set of 1,092 questions. Of course, the indices are based on sets of questions that vary greatly through time, so this exercise

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\(^6\) All of the 11 identity traits are drawn from answers to questions of the third type.

\(^7\) Of these 76 questions, 64 are unambiguously about values and attitudes, while 12 are factual questions that we classified as reflecting the respondent’s values, such as those on gun ownership or church attendance.
is the polar opposite of our baseline analysis based on a time-invariant set of questions. Second, we focus more specifically on questions that appeared repeatedly in the survey and then were permanently removed, and conversely questions that did not appear and then were consistently included.

To do so, we apply a simple algorithm: we divide the sample period into two subperiods (1972-1989, i.e. 16 waves, and 1990-2016, i.e. 15 waves). Next, we identify questions asked at least five times in the first subperiod and never in the second ("exit" questions). There are 21 such questions. For instance, a question on whether birth control information should be available (pill) is asked in five waves in the 1970s and early 1980s, and is then permanently dropped. Conversely, we identify questions never asked in the first subperiod, and asked at least five times in the second ("entry" questions). There are 60 such questions. For instance, a question about affirmative action in hiring and promoting women (fehire) appears first in 1996 and is asked in almost every wave thereafter.

We observe that in the universe of questions on cultural values that are asked at least twice, the number of questions that enter or exit as defined above is rather limited (7.5% of the questions). Most questions appear only episodically, without a systematic pattern of sustained entry or exit. Having identified the set of questions that persistently enter and exit the survey, we can examine if their inclusion in our indices of average heterogeneity affects the dynamics we describe. We do so below in Section 3.5.

**Question categories and types.** Questions come in different categories and types. We rely on the question categories provided by the GSS to classify questions. Broad categories include civil liberties, current affairs, gender and marriage, politics, religion and spirituality. These are further divided into finer subcategories. For instance, gender and marriage includes questions on children and working, on marriage, and on sex and sexual orientation. Questions are either binary or answered on a scale. In our baseline set of 76 questions, 26 are binary (yes/no, agree/disagree) and 50 admit answers that can be ordered on a scale. In 35 cases, the scale admits 3 answers, and in the remainder, 4 or more possible answers.

**Identity cleavages.** We consider 11 identity cleavages to compute the $F_{ST}$ indices. These cleavages are characteristics of the respondents also observed in the GSS survey waves. They are labeled age, education, ethnicity, family income, gender, party ID, race, region, religion, urbanicity and work status. These cleavages admit anywhere from two values (gender) to nine values (region, ethnicity), with the modal number of categories equal to five. Comparisons of the level of cultural divisions across cleavages are more reliable when the number of categories is relatively similar. However, most of our focus is on the dynamics of the measures of heterogeneity through time, not on comparisons of their average levels across cleavages. Table A3 in the Appendix displays the cleavages and corresponding categories.
3 The Evolution of Cultural Divides in the United States

3.1 The Evolution of Overall Heterogeneity

Figure 1 displays the time path of $CF$, averaged over the 76 baseline questions, and the first columns of Table 1 show the underlying numbers. We find that average $CF$ varies between 0.482 (in 1993) and 0.500 (1976). There is a U-shaped pattern over the sample period: overall heterogeneity declined between the early 1970s and the mid-1990s and grew back to its initial level by the end of the period.\(^8\) This average over all questions masks some underlying heterogeneity. Panel A of Table 2 breaks down the dynamics by question. We find that 14.5\% of the questions display a significant U-shaped pattern (with the minimum reached some time between 1980 and 2005). Heterogeneity is declining for 29\% of the questions and increasing for 25\% of them. The rest is either hump-shaped or flat. This finding of a substantial degree of heterogeneity in the dynamics of cultural diversity across questions will be echoed when discussing fixation measures, highlighting the fact that generalizations about cultural diversity are hard to draw.

Table 3 characterizes the dynamics of $CF$ by question category and subcategory. Overall there is a lot of variation in the dynamics of $CF$ across question categories. We tend to find U-shaped or increasing paths for questions on crime, economic well-being and life satisfaction, and decreasing heterogeneity on questions regarding free speech.

3.2 The Evolution of Cultural Fixation by Identity Cleavage

For each of the 11 cleavages, Figure 2 displays the time path of $F_{ST}$, averaged over all questions (the underlying data is in Table 1). Figure 2 reveals an interesting ranking of cleavages by level of fixation, some of them surprising in light of public commentary on the cultural divide. The biggest cultural divides are between groups defined by educational attainment, family income quintiles and religion. The smallest divides are between genders, races and urbanicity. But across all cleavages, the absolute level of fixation is very low, on the order of 1 – 3\%. The high level of cultural pluralism in the US, then, is not primarily due to diversity between identity cleavages, but mostly due to diversity within identity categories.

These levels of cultural fixation change substantially through time. On average, one can discern an overall U-shaped pattern, whereby cultural divides decreased between 1972 and the late 1990s, and rose thereafter.\(^9\) Yet this masks very different patterns across cleavages. These are easiest to see in Figure 3, which plots the dynamics of average $F_{ST}$ cleavage by cleavage. For instance average $F_{ST}$ for Party ID is relatively flat through the mid-1990s, starts to gradually increase in the late 1990s, and

\(^8\)The overall variation can reflect a substantial change in the underlying shares of respondents giving a specific answer to a question. For instance, consider a binary question. With a $CF$ of 0.5, response shares would be equally divided between both possible answers. Then a change in $CF$ to 0.482 represents a shift in answer shares of 9.5\% (shares of 40.5\% to 59.5\% for each possible answer). More generally, given the specific distribution of the number of possible answers among our baseline set of 76 questions, the theoretical maximal average level of $CF$ is 0.63. The United States appears to be quite culturally diverse overall, but there is room for that diversity to grow.

\(^9\)A simple average of cultural fixation across the 11 identity cleavages reaches a minimum in 1997, and starts to increase in 2001.
then accelerates in the 2000s, reaching its maximum in 2016. Of course, it is possible that people with
given Party IDs have grown culturally more distinct, or that people with distinct beliefs have sorted
more effectively into different party IDs. A similar pattern is found for religion, and to a weaker extent
for ethnicity. Other cleavages display flatter or mild U-shaped patterns: family income, education and
race. Finally, some cleavages show declining levels of cultural fixation, though the decline typically
flattens at the end of the sample: age, urbanicity, region, and work status. Average $F_{ST}$ for gender is
mildly hump-shaped around a very low level. The latter patterns are once again surprising in light of
many commentators’ priors on rising divides across urban categories, genders, regions of the US and
employment status.

### 3.3 The Dynamics of $F_{ST}$ Across Questions

**Types of dynamics by cleavage.** Table 2, Panel B classifies the types of dynamics of $F_{ST}$ across
questions for each cleavage. The first observation is that, across all 11 cleavages, about 50% of the
questions display no clear direction over time: the dynamics are flat. For the remaining questions that
do display significant patterns, we largely confirm the dynamics of average $F_{ST}$ displayed in Figure 3.
For instance, for 48.7% of the questions, $F_{ST}$ based on Party ID displays a significant U-shaped pattern
over the sample period, with an additional 6.6% of the questions displaying a strictly increasing trend.
Similarly for religion, $F_{ST}$ is U-shaped for 34.2% of the questions, and increasing for 5.3% of them.
Positive trends are weaker for race and ethnicity, with a combined share of U-shaped and increasing
patterns equal to 36.8% and 32.9%, respectively. For region, urbanicity and age, we see high shares of
declining $F_{ST}$ indices (respectively 34.2%, 27.6% and 31.6%). Finally for gender, we see a combined
share of hump-shaped and declining $F_{ST}$ dynamics equal to 29.0%.

**Types of dynamics by question category.** Table 4 classifies the types of dynamics within ques-
tion categories and sub-categories, for all 11 cleavages. We rely on the nomenclature of questions
provided by the GSS. This gives five broad categories (civil liberties, current affairs, gender & mar-
riage, politics, and religion & spirituality) that are further divided into sub-categories. For instance,
for civil liberties there are 23 questions, and 11 cleavages: when we state that 19.76% of the dynamics
are U-shaped we mean that 50 out of 11 $\times$ 23 series have U-shaped dynamics. We find again
that a generally large share of the questions display flat dynamics of $F_{ST}$. But interesting patterns
emerge nonetheless. For instance, for free speech, a large percentage of the question-cleavage cat-
egories (52.5%) display significantly decreasing levels of $F_{ST}$. These same questions, incidentally, tend
to display a decreasing $CF$, indicating that between-group diversity is decreasing faster than overall
diversity. Another notable category is the set of questions on crime, where we find on the contrary
that fixation is either U-shaped or increasing in about 42.7% of the cases. A similar pattern is found
for questions on sex and sexual orientation, with a combined share of U-shaped and increasing $F_{ST}$
indices equal to 49.1%.

**Heterogeneity across questions.** Appendix Figure A1 graphically displays the distribution of
$F_{ST}$ across questions for each cleavage and for different wave groupings. Three observations are in
order. First, the modal level of $F_{ST}$ across cleavages is consistent with the averages discussed above -
for instance the $F_{ST}$ for gender tends to be low across all questions and the $F_{ST}$ for education tends to be higher. Second, for each cleavage, most of the density is concentrated tightly around the mode. The $F_{ST}$ rarely exceeds 0.1, indicating that for most cleavage-meme pairings, within-group variation is a very large share of total cultural variation. A rare exception is for the religious cleavage, where a single question registers a high level of $F_{ST}$. That specific question is fund ("how fundamentalist is the respondent currently" - in terms of religion). This question is an outlier, and not a particularly surprising one given the close link between the meme (fundamentalism) and the cleavage (religion). A detailed look at this question reveals that Catholics tend to answer "moderate", Jews and those with no religion tend to answer "liberal" and Protestants tend to be divided between "fundamentalist" (about 50%), liberal (about 25%) and moderate (about 25%).

Third, the time evolution of the distributions confirms our previous findings. For example, the distribution of $F_{ST}$ for the political party ID cleavage has been moving rightward since the beginning of the 2000s.

**The most divisive questions.** Appendix Table A4 displays the most divisive questions for each cleavage. Panel A displays the five questions with the highest $F_{ST}$ averaged over all 16 available wave groupings. Even the most divisive questions have $F_{ST}$ levels on the order of 10 – 12% (one exception is fund, already discussed above, with an average religion $F_{ST}$ of 42.3%). The pattern of most divisive questions is also interesting, and is largely in line with what one would expect a priori. For instance, along the Party ID cleavage, the most divisive questions have to do with government spending policies - toward Blacks, healthcare and welfare - as well as confidence in the federal government. These clearly reflect differences in political platforms across parties, so it makes sense that they would be the most divisive. Along the educational cleavage, the most divisive questions tend to be about civil liberties - particularly regarding free speech. Along the rural-urban divide the most divisive questions concern gun ownership. Finally, the single most divisive issue between genders is the question about whether the respondent is afraid to walk at night in their neighborhood ($F_{ST}$ = 11.3%).

Panel B of Appendix Table A4 shows that the single most divisive question for each cleavage tends to remain relatively stable over time. For instance, for religion the question about the respondent’s degree of fundamentalism is the most divisive question in every single year. Such temporal stability in the most divisive issue or type of issue exists for most other cleavages. For example, across the racial cleavage, questions about government spending to improve the lives of Black people (natrace), racial segregation (raclive), and approval of police violence (polhitok) alternate as the most divisive over the years.

### 3.4 Analysis of the Level of $F_{ST}$

Table 5 carries out a regression analysis of variation in the level of $F_{ST}$. We pooled all of the $F_{ST}$ measures across cleavages, questions and periods (with 76 questions, 16 periods and 11 cleavages, this gives us 13,376 observations). Each panel reports results on each of three sets of regressors: cleavage type, question category or subcategory, and time period (these are all entered simultaneously). We largely confirm previous observations. Looking at Panel A, we replicate the ordering of $F_{ST}$ magnitudes

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10 However, excluding the question fund when calculating average $F_{ST}$ for the religious cleavage does not in any way change the dynamics of the religious divide, which has been on the rise since the mid-1990s.
across cleavages. The average level of $F_{ST}$ is elevated for age, education, family income and religion, and is low for race, urbanicity and gender (the latter is the smallest, and hence is the excluded category). In sum, the ranking of $F_{ST}$ magnitudes across cleavages is consistent with that displayed in Figure 2. Panel B analyzes the level of fixation by question category (column 1) and subcategory (column 2), finding that across all cleavages, $F_{ST}$ tends to be higher for free speech questions, sex and sexual orientation, and religious affiliation and behaviors. $F_{ST}$ tends to be low for national spending, children and working, and confidence and power (the cultural divide on questions on marriage is the smallest of all, which is why it is our excluded category). Finally, Panel C looks at time effects by including a dummy for each of the 16 periods (excluding the one that starts in 1972, which is the excluded category). We find a U-shaped pattern similar to the general pattern displayed in Figure 2: cultural fixation across all questions and cleavages tends to fall until the late 1990s, and to rise in the 2000s (the minimum is reached for the 1996-1998 wave grouping). Of course, these average level differences mask a lot of heterogeneity across time and cleavages, already discussed previously.

### 3.5 Robustness and Extensions

**Alternative frequency.** Appendix Tables A5-A8 and Figures A2-A4 replicate our baseline analysis with the set of questions that appear in the GSS at least once every five years. The frequency of observations is correspondingly coarser (9 time periods instead of 16), but the number of questions is expanded (96 rather than 76). We uncover dynamics that are unchanged compared to the baseline exercise: CF displays a U-shaped pattern over time while the increase in $F_{ST}$ in the later part of the period is particularly pronounced for Party ID and religion, as before. We continue to find flat or decreasing cultural divides between age groups, genders, regions, work status and urban categories. For the remaining cleavages the pattern is U-shaped, with divides by the end of the sample period mostly returning to the level of the early 1970s. The analysis of the dynamics of cultural divides across question categories (Appendix Tables A7 and A8) reveals no new insight compared to the baseline. We conclude that expanding the set of questions by reducing the frequency of observations leads to findings that are very similar to the baseline.

**The role of changing group shares.** Our measures of cultural fixation could change through time either because the distribution of memes within groups changes, or because the relative sizes of the groups themselves change. Indeed, in equation (4), each group’s within-group heterogeneity is weighted by the group’s share ($s_k c$) in order to calculate a measure of average within-group variation. Variation in $s_k c$ could drive changes in $F_{ST}$. For some cleavages, like gender, this is not an issue: group shares tend to be stable through time by construction. For others, such as religion, ethnic origin, employment status, etc., there is more scope for time variation due to demographic change.

To isolate the role of changing within-group meme distributions from that of changing group shares, we compute alternative measures of fixation. Simply dropping the weights in equation (4) is not a solution because it could result in $F_{ST}$ measures not bounded by 0 and 1. Instead, our algorithm consists of down-weighing individual observations pertaining to groups with higher group shares (compared to the base year) when calculating both CF and within-group fractionalization. As such, this algorithm, outlined formally in Empirical Appendix A1, keeps the weight of each group
constant across time at a baseline level corresponding to the initial distribution of group shares.

These alternative $F_{ST}$ measures display time evolutions that are independent of changes in group shares and reflect only within-group changes in the distribution of memes. Their time paths are displayed in Appendix Figure A5. The dynamics are very similar to those in Figure 3. This indicates that most of the time variation in cultural fixation is not due to changes in group composition. There is one exception: religion. When correcting for changes in group shares, the religion $F_{ST}$ displays flat rather than increasing levels of fixation in the second half of the period. For this cleavage, changes in group shares over time do affect the dynamics of the cultural divide. The main change in that period is the decline of the share of respondents who are Protestant and the concurrent increase in the share of those with "no religion".

**Question entry and exit.** Appendix Figures A6 and A7 display the dynamics of $CF$ and $F_{ST}$ incorporating questions that are not asked uniformly throughout the sample period. The first panel of each row replicates results using the baseline set of 76 questions asked at least once every two waves. The second panel shows these series obtained from the most expansive set of questions (1,092 questions asked at least in two waves of the GSS). The third panel displays the evolution of $CF$ and $F_{ST}$ for the baseline set of 76 questions, augmented with 21 questions that permanently exited the survey at some point, and 60 questions that were at first never asked, and then asked consistently.

Figure A6 shows that findings regarding $CF$ are quite different across the first two panels: with the expanded set of questions, the average level of $CF$ is higher, indicating that questions asked only episodically tend to be more divisive. The dynamics of $CF$ are also different: in the second panel, the series rises monotonically from the start of the sample period, going from about 0.5 to about 0.6.

In contrast, our findings for $F_{ST}$ broadly confirm the baseline results. We expected the $F_{ST}$ series to display more volatility than those based on a common set of questions, because the averages are constructed on a constantly changing set of questions, most of which are only asked episodically. However, this was not the case: comparing the first and second panels of each row of Figure A7, we see almost identical levels and dynamic paths for $F_{ST}$ across most cleavages. The only exception is for gender where we see a more pronounced rise in $F_{ST}$ early in the period (still from a very low level), and a stabilization rather than a fall in more recent times.

The baseline set of 76 questions and the expansive set of 1,092 questions represent polar opposite choices along a spectrum. The third panels of Figures A6 and A7 represent a compromise between the two extremes. Here, we find that the dynamics of both cultural heterogeneity and the cultural divides are almost the same as in the baseline. Thus, our baseline results are not affected by possible bias stemming from the fact that exiting questions could be more consensual, and entering questions more divisive.

In sum, a consideration of any question asked at least twice, and the inclusion of questions that systematically enter or exit the survey, do not change the basic findings reported in Section 3.1 regarding the levels and changes in cultural divides over time ($F_{ST}$). We do find a more pronounced rise in overall cultural heterogeneity ($CF$) using the most expansive set of questions, compared the the baseline series based on 76 questions.
3.6 Alternative Approach Based on Regressions

As an alternative approach to assessing the dynamics of the cultural divide, we use a regression approach. For each meme \(m\) at time \(t\), we run a regression of the following form:

\[
y = \alpha + \sum_{c=1}^{11} \sum_{k_c=1}^{K_c - 1} \beta_{k_c} D_{k_c} + \varepsilon
\]

where \(y\) is the response of an individual to meme \(m\) at time \(t\), \(\alpha\) is a constant, \(D_{k_c}\) is a dummy variable taking on a value of 1 if the individual is in cleavage category \(k_c\), and \(\varepsilon\) is an error term. With 16 time periods and 76 memes, this means we are running 1,216 regressions. We record the total \(R^2\) from each of these regressions, a measure of the informativeness of all identity cleavages together, in terms of cultural memes. We then calculate the partial \(R^2\) due to each set of cleavage dummies. To do so, we rerun the above regressions excluding the set of dummies for the cleavage of interest (this is an additional 1,216 regressions for each of 11 cleavages). We refer to the \(R^2\) from these regressions as the restricted \(R^2\). For each meme \(i\) at time \(t\), we then take the difference between the total \(R^2\) and the restricted \(R^2\), giving us the partial \(R^2\) for the corresponding cleavage. For each time \(t\), we then average the total and the partial \(R^2\) over all memes.

This approach is related to measuring fixation using \(F_{ST}\). The greater the explanatory power of an identity cleavage for cultural values, the higher the corresponding partial \(R^2\) in the above regression. Similarly, the \(F_{ST}\) for that cleavage will tend to be relatively high. One advantage of the \(R^2\) approach is that all identity cleavages are entered jointly, so we are controlling for the effect of other cleavages when assessing the explanatory power of a particular cleavage.

The results are presented in Table 6 and displayed graphically in Figures 4 and A8. The overall \(R^2\), i.e. the joint explanatory power of all cleavages, displays a U-shaped pattern and is minimized for the 1996-1998 wave grouping (Figure 4). The level of the \(R^2\) itself is modest, going from 15.5% in 1972-1973 to 11.4% in 1996-1998 and back to 15.1% in 2016. The ability of cleavages overall to explain answers to these 76 GSS questions therefore has increased starting in the early 2000s, indicating growing cultural divides in the last decade and a half.

However, this average pattern masks interesting differences cleavage by cleavage. These differences largely replicate those found for \(F_{ST}\), confirming that the average partial \(R^2\) reflects a similar concept of informativeness of cleavages for memes as does \(F_{ST}\). In terms of the average levels of partial \(R^2\) and \(F_{ST}\), there is a clear correspondence, with high values of both indicators for age, education, family income, party ID, region and religion (compare the last rows of Tables 1 and Table 6). These similarities in terms of average levels extend to the time path of the indicators cleavage by cleavage. This is most easily seen by comparing Figure 3 and Figure A8: the dynamics of partial \(R^2\) are broadly similar to those of \(F_{ST}\), cleavage by cleavage. Overall, partial \(R^2\) values for Party ID are relatively flat until the early 2000s, after which they increase rapidly, almost doubling in the span of 15 years. We uncover a similar pattern for religion, with an acceleration starting slightly earlier, in the second

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11 Table A9 and Figures A9-A10 in the Appendix replicate these results using 5-year frequency data, expanded to 96 questions. The results are very similar to those described here for the baseline exercise using a 2-wave frequency and 76 questions.
half of the 1990s. We find a hump-shaped partial $R^2$ for gender, and falling partial $R^2$ for urbanicity and region, as we did when capturing fixation with $F_{ST}$.

4 A Model of Cultural Change

In this section, we propose a model of cultural change. The model builds upon ideas from the cultural evolution literature in both anthropology and, more recently, economics. Among the earliest contributions to model culture in an explicitly evolutionary context are Boyd and Richerson (1985) and Richerson and Boyd (2004, 2005). These authors proposed a range of evolutionary mechanisms explaining the dynamic paths of cultural traits where cultural traits evolve through mutation and selection, much like genes but at very different rates, partly because, unlike genes, cultural traits can be transmitted horizontally.\textsuperscript{12} Bisin and Verdier (2000) study the intergenerational transmission of norms in an explicitly economic model where parents rationally choose which traits to pass on to their children, to derive the degree of cultural heterogeneity of a stationary population.\textsuperscript{13} Bernheim (1994) models conformism, assuming that it arises from social influence: social status enters the utility function, so there is a penalty for not conforming. Such conformism can lead to persistent customs as well as temporary fads. Bikhchandani, Hirshleifer and Welch (1992) contains a theory of fads and culture whereby certain values can originate from small shocks to preferences and spread through local conformism, leading to informational cascades and cultural change. Kuran and Sandholm (2008) compare the dynamics of cultural evolution in isolated and integrated societies, by analyzing the role of intergroup versus intragroup socialization and coordination. The goal is to understand the conditions under which cultural integration occurs, and circumstances under which societies can retain their original cultures. We build on all these contributions, but emphasize the role of cultural diversity between and within identity groups, since our purpose is to study how and why the resulting cultural divide changes over time.

The aim of our conceptual framework is two-fold. First, we seek to understand the drivers of different dynamic patterns of $CF$ and $F_{ST}$. The specific sources of cultural change that we model include intergenerational transmission, conformism, and cultural innovations. Some of these sources of cultural change may lead to cultural convergence between groups, whereas others may lead to cultural divergence, or more complex non-monotonic dynamics. Second, our model provides us with a lens through which to interpret our empirical findings. Depending on characteristics of memes, of identity cleavages, and of the extent of cross-group versus within-group cultural diffusion, our model predicts different dynamic patterns for $CF$ and $F_{ST}$. We then discuss these predictions and their origins in light of the specific empirical patterns identified in Section 3.

\textsuperscript{12} Genes and cultural traits can also coevolve. Henrich (2015) contains further explorations in a similar vein.

\textsuperscript{13} Doepke and Zilibotti (2008) also explicitly model parents’ choices of values to impart to their children as a function of economic incentives. Lazear (1999) models an individual’s choice to learn languages, gain familiarity with other cultures, and assimilate culturally, again as a function of economic incentives to trade.
4.1 Setup

Consider a society with one identity cleavage (e.g., gender) and one cultural meme (e.g., belief in God). The identity cleavage has two identity traits $k$ and $-k$ (e.g., male or female) and the cultural meme can take two values $i$ and $-i$. Time is discrete, $t = 1, 2, \ldots$. Identity groups are of equal size, and for now we assume that an individual cannot choose her trait. Each agent has one child, so that each generation is as large as the previous one. Cultural values are imperfectly transmitted from parent to child. As an agent socializes, she may change her cultural value in two situations. First, if she was born with the minority value and is sensitive to conforming to his group’s majority value, she may switch to the majority value. Second, we allow for the emergence of cultural innovations, meaning that one of the values becomes more socially acceptable. If an agent has a taste for adopting cultural innovations, she may switch to the value that has become more acceptable. Before stating an agent’s decision problem, we describe in more detail the different determinants of his culture: vertical transmission, pressure to conform and the adoption of cultural innovations.

Vertical transmission and innate values. There is imperfect vertical transmission between a parent and a child. In particular, a share $\alpha$ of children inherits the value of their parent, and a share $(1 - \alpha)$ is born with the other value. The parameter $\alpha$ therefore measures the intensity of vertical transmission.\footnote{We do not endogenize $\alpha$, in contrast to the approach in the classic paper by Bisin and Verdier (2000), where the intergenerational transmission of culture results from purposeful decisions by parents.} We refer to the value an agent is born with as his innate value. In the absence of conformism and innovation, the utility an agent derives from his innate value is normalized to one.

Pressure to conform. As an agent socializes, he may perceive a benefit from conforming to the majority value of his group. One benefit from conformism may be that agents who frequently interact gain from coordinating on the same value; another reason may be that some agents do not like to stand out by being different from their group’s mainstream view. The benefit from conforming increases in the share of the own group that holds the majority value, but is heterogeneous across individuals. In what follows, we denote by $s^i_k$ the share of group $k$ that holds the majority view (and by $s^{-i}_k$ the share that holds the minority value, where obviously $s^{-i}_k = 1 - s^i_k$). When born, an individual draws a random variable $p$ from a uniform distribution with support $[0, 1/\bar{p}]$. The utility he gets from conforming to the majority value is then $\frac{1}{p} s^i_k$ if he was born with the minority value and as $\frac{1 + \gamma}{p} s^i_k$ if he was born with the majority value, where $\gamma \geq 0$ is a utility premium from having been born with the majority value. A higher $\bar{p}$ indicates a higher expected level of intragroup conformism in society overall.

Our setup does not allow for intergroup conformism per se. However, when discussing comparative statics on $\bar{p}$, we will argue that a weakening of within-group conformism (a lower $\bar{p}$) can be interpreted as a strengthening of between-group conformism.

The diffusion of cultural innovations. We define a cultural innovation as an existing value that becomes socially more acceptable or fashionable. A cultural innovation is simply a label attached to a given value that makes that value more attractive to hold. Some agents may find it attractive to
adopt this value, and switch from the non-innovating to the innovating value. Suppose that \( j \) is the innovating value. For an agent of group \( k \), the benefit of holding the innovating value is increasing in the share of agents of group \( k \) that hold this value, but is heterogeneous across agents. When a cultural innovation occurs, each agent draws a random variable \( r \) from a uniform distribution with support \([0, 1/\bar{r}_k]\). This determines an agent’s utility from imitating the innovating value, \( \frac{1}{\bar{r}_k}s^j_k \). A higher \( \bar{r}_k \) indicates a higher expected level of sensitivity to imitating cultural innovations, i.e. a higher sensitivity to fads, fashions or social trends.

Cultural innovations diffuse within groups, but may evolve differently in the two groups if \( \bar{r}_k \) and \( \bar{r}_{-k} \) are very different from each other. We discuss below situations under which \( \bar{r}_k \) and \( \bar{r}_{-k} \) may be more or less similar to each other.

### 4.2 Decision problem

We now analyze an agent’s value choice at a given time \( t \). Denote by \( i \) the value held by the majority of the agent’s group and by \( j \) the value experiencing an innovation, where \( j \) could be equal or different from \( i \). An agent born with value \( x \) in group \( k \), after drawing variables \( p \) and \( r \), decides which value \( x' \) to adopt by maximizing the following discrete choice problem:

\[
    u(x, k) = \max_{x' \in \{j, i, x\}} \left\{ I(x), I(i) \frac{1 + I(x)\gamma}{p}s^i_k, I(j) \frac{1}{\bar{r}_k}s^j_k \right\}
\]

where

\[
    I(x) = \begin{cases} 
    1 & \text{if } x' = x \\
    0 & \text{otherwise}
    \end{cases}
\]

\[
    I(i) = \begin{cases} 
    1 & \text{if } x' = i \\
    0 & \text{otherwise}
    \end{cases}
\]

\[
    I(j) = \begin{cases} 
    1 & \text{if } x' = j \\
    0 & \text{otherwise}
    \end{cases}
\]

To give an example, consider someone born with the majority value in a society where there is a cultural innovation to the minority value. If she holds on to her majority value, she will get a utility equal to \( \max \left\{ \frac{1+\gamma}{p}s^i_k, 1 \right\} \), whereas if she switches to the innovating value she will get utility \( \frac{1}{\bar{r}_k}s^j_k \).

### Laws of motion

Since individuals do not always keep the value they are born with, we denote by \( z^i_k(t) \) the share of people of group \( k \) born in period \( t \) with innate value \( i \) and by \( s^i_k(t) \) the share of people of group \( k \) with value \( i \) after solving the discrete choice problem. Our assumption on the imperfect vertical transmission of values between a parent and a child implies that

\[
    z^i_k(t+1) = \alpha s^i_k(t) + (1-\alpha)(1-s^i_k(t)) = (2\alpha - 1)s^i_k(t) + (1-\alpha)
\]

Of course if \( \alpha = 1 \), vertical transmission is perfect so that \( z^i_k(t+1) = s^i_k(t) \).

To derive the laws of motion that determine cultural evolution, we solve the discrete choice problem (7), assuming that the random draws of \( p \) and \( r \) are independent. We start by analyzing the case where
the innovation occurs to the minority value \(-i\). Depending on their draws of \(p\) and \(r\), agents of group \(k\) born with value \(-i\) may want to switch to value \(i\). Similarly, agents of group \(k\) born with value \(i\) may prefer value \(-i\). In Appendix B1, we show that the \(ex\ ante\) probability that an individual of group \(k\) born in period \(t + 1\) with value \(-i\) prefers value \(i\) is \(\bar{p}s^i_k(t + 1) - \frac{1}{2}\bar{p}\bar{r} \bar{s}^i_k(t + 1)(1 - s^i_k(t + 1))\). Because of the law of large numbers, this is the same as the share of agents of group \(k\) born with value \(-i\) that switch to value \(i\). As for individuals of group \(k\) born in period \(t + 1\) with value \(i\), the share that prefers to switch to value \(-i\) is \(\bar{r}_k(1 - s^i_k(t + 1)) - \frac{1}{2}\bar{p}\bar{r}_k(1 + \gamma)s^i_k(t + 1)(1 - s^i_k(t + 1))\). These results yield the following law of motion for the share of the population holding value \(i\) when the innovation occurs to value \(-i\):

\[
s^i_k(t + 1) = z^i_k(t + 1) + \bar{p}s^i_k(t + 1)(1 - z^i_k(t + 1)) - \bar{r}_k(1 - s^i_k(t + 1))z^i_k(t + 1)
\]

\[
+ \frac{1}{2}\bar{r}_k\bar{p}s^i_k(t + 1)(1 - s^i_k(t + 1))(1 + \gamma)z^i_k(t + 1) - (1 - z^i_k(t + 1)) \quad \text{if } j = -i
\]  

Next we turn to the case where the innovation occurs to the majority value \(i\). The share of individuals of group \(k\) born in period \(t + 1\) with value \(-i\) who prefer to switch to value \(i\) can be shown to be \(\bar{p}s^i_k(t + 1) + \bar{r}_k s^i_k(t + 1) - \bar{r}_k \bar{p}(s^i_k(t + 1))^2\). The law of motion for the share of people holding value \(i\) when the innovation occurs to value \(i\) then becomes:

\[
s^i_k(t + 1) = z^i_k(t + 1) + \bar{p}s^i_k(t + 1)(1 - z^i_k(t + 1)) + \bar{r}_k s^i_k(t + 1)(1 - z^i_k(t + 1))
\]

\[
- \bar{r}_k \bar{p}(s^i_k(t + 1))^2(1 - z^i_k(t + 1)) \quad \text{if } j = i
\]

The above two laws of motion are difference equations that describe the evolution of the majority value. Of course, the two laws of motion of the minority value are the complements of the laws of motion of the majority value. The laws of motion of the other group \(-k\) can be written down by analogy. Appendix B1 gives further details. Note that if no one is sensitive to cultural innovations (i.e. \(\bar{r}_k = 0\)), or if there is no conformism (\(\bar{p} = 0\)), then these difference equations simplify considerably and become linear.

**Choice of identity trait.** Until now we have assumed that agents cannot choose their identity trait. Of course, for some identity cleavages (e.g., party ID) an individual can freely choose identity trait \(k\) or \(-k\). In that case, at a given time \(t\), the discrete choice problem of an agent born with value \(x\) becomes

\[
u(x) = \max\{u(x, k), u(x, -k)\}
\]

where \(u(x, k)\) and \(u(x, -k)\) are the outcomes of maximization problem (7) for an agent who, respectively, chooses identity trait \(k\) and \(-k\). We postpone the discussion of the laws of motion under this scenario until Proposition 3.

**4.3 Patterns of Cultural Evolution**

In this section, we analyze different patterns of cultural evolution generated by our model. In doing so, we focus on the cases that are most relevant to our empirical analysis.
Conformism. We start by exploring a society with no diffusion of cultural innovation and with no choice of identity traits. We are interested in understanding how the steady-state value shares, and hence $CF$ and $F_{ST}$, depend on the intensity of vertical transmission and the intensity of conformism. As we will now see, the results depend crucially on whether the majority value is the same across groups or not.

Proposition 1: Conformism. Consider a society with no diffusion of cultural innovations (i.e. $\tilde{r}_k = 0$). Then, in steady state:

1. The majority share in each group is weakly increasing in the strength of vertical transmission ($\alpha$) and conformism ($\bar{p}$);
2. If the majority value is the same in both groups, $F_{ST}$ is zero and $CF$ is weakly decreasing in the strength of vertical transmission and conformism;
3. If the majority value is different in both groups, $F_{ST}$ is weakly increasing in the strength of vertical transmission and conformism, and $CF$ is maximized (and equal to 0.5).

Proof. See Appendix B2.

This proposition is intuitive. The steady-state share of the majority value is increasing in the pressure to conform ($\bar{p}$) and in the strength of the intergenerational vertical transmission of values ($\alpha$). With stronger pressure to conform, individuals have a greater incentive to switch to the majority value. As a result, the steady-state majority share becomes larger. With stronger intergenerational transmission of values, the constraint on how high the majority share can become is weakened. Taken together, there is less intragroup heterogeneity when $\bar{p}$ is larger and/or $\alpha$ is larger.

By increasing the steady-state share of the majority value, larger values for $\bar{p}$ and $\alpha$ reduce within-group cultural fractionalization. If both groups conform to the same majority value, this also reduces overall cultural fractionalization. Since, in that case, there are no differences between groups, $F_{ST}$ is zero in steady state. If the two groups conform to different majority values, then a higher $\alpha$ and/or a higher $\bar{p}$ leave the society’s overall cultural fractionalization unchanged, because the two groups are assumed to be of equal size. In this case, the cleavage between groups deepens, thus increasing $F_{ST}$.

How can we extend this discussion to a consideration of between-group conformism? Individuals from one group may be sensitive to the majority value of the other group. Of course, the importance of this force would depend on the importance of interactions between groups. For example, if the intensity of interactions between groups declines, individuals become less sensitive to the majority view of the other group. If the majority values differ across groups, then in our interpretation becoming less sensitive to the other group is akin to becoming more sensitive to one’s own group. This translates into an increase in $\bar{p}$, and hence a higher $F_{ST}$. If, on the other hand, the majority value is the same across groups, then allowing for intergroup conformism does not affect the steady-state cultural divide, since $F_{ST}$ remains zero.

Proposition 1 has a simple corollary which states that if an exogenous shock switches the majority value of one of the groups, the cultural divide between groups will increase.
Corollary 1: Switching of Majority Values. Consider a society with no diffusion of cultural innovations. Starting off in a steady state where both groups conform to the same majority value, assume the value of the majority switches in one of the two groups. In that case, society converges to a new steady state with higher $F_{ST}$ and higher $CF$.

This result is immediate. If initially both groups have the same majority value, their steady-state value shares are identical, so that $F_{ST}$ is zero. Consider a shock that turns the majority value of one of the groups into the minority value. Irrespective of the magnitude of this initial shock, the steady-state value shares of that group will switch. For instance, if the two values had shares of $0.2 - 0.8$ in both groups, these now switch to $0.8 - 0.2$ in one of the two groups. As a result, the steady-state aggregate value shares are $1/2$, so $CF$ is maximized. Given that both groups now conform to different majority values, there is a growing divide between groups, so $F_{ST}$ increases. This result can be applied to a situation where shifting circumstances disrupt the existing consensus enough to make the majority view change in one of the groups.

Cultural innovations. We now turn to analyzing the diffusion of cultural innovations, while still assuming that individuals cannot choose their identity trait. We focus on a situation in which both groups start off holding the same majority value and where the innovation affects the minority value.

Proposition 2: Diffusion of Cultural Innovations. Starting from a situation in which both groups have the same majority value and the same majority share, suppose an innovation occurs to the minority value.

1. If conformism is sufficiently weak and diffusion is sufficiently strong, the majority value switches in both groups. During the transition, $CF$ exhibits a hump-shaped path.

2. If conformism is sufficiently strong and diffusion is sufficiently weak, the majority value stays the same in both groups. During the transition, $CF$ increases.

Proof. See Appendix B2.

Once again, this proposition is intuitive. If diffusion is strong, and hence $r_k$ and $r_{-k}$ are high, individuals have a strong propensity to adopt innovations. Fads diffuse easily, and eventually take over, becoming the new majority norm. As the original consensus breaks down, there is initially growing disagreement between individuals. However, as the old majority norm is replaced by a new majority norm, agreement between individuals once again increases. This translates into a hump-shaped transition path for cultural fractionalization. If cultural diffusion is weak in both groups, the cultural innovation increases $CF$. In both cases, if the strength of diffusion of a particular cultural innovation differs across groups, this will lead to a growing divide across groups since the steady state shares of each value will be different across groups, and $F_{ST}$ will rise.

In practice, for many memes, the majority value is the same across groups, so focusing on the case where both groups have the same majority value is reasonable. Appendix B2 analyzes what happens if initially both groups hold different majority values. As for the cultural innovation, the more interesting case is when it occurs to the minority value. If, instead, it occurs to the majority value, then it simply reinforces the share of people holding the majority view.
How can this proposition inform our understanding of intergroup cultural diffusion? In our model, the innovation affects the same value in both groups. However, the adoption pattern may be different in the two groups, to the extent that $\bar{r}_k$ and $\bar{r}_{-k}$ are different. For instance, if $\bar{r}_k$ is low and $\bar{r}_{-k}$ is high, then group $k$ will be much less sensitive to the innovation than group $-k$. If interactions between groups are frequent and intense, the sensitivity to cultural innovations in the two groups is likely to be more similar.\(^{16}\) Hence we can interpret differences between $\bar{r}_k$ and $\bar{r}_{-k}$ as having effects on cultural diversity akin to those of interactions between groups. If $\bar{r}_k$ and $\bar{r}_{-k}$ are the same, cultural innovations are adopted to the same degree in both groups, leaving $F_{ST}$ unchanged. Correspondingly, if the intensity of intragroup diffusion is different across groups, a cultural innovation will lead to a growing divide between groups. These insights are summarized in the following corollary.

**Corollary 2: Differences in Intragroup Diffusion.** Starting off in a steady state where $\bar{r}_k$ and $\bar{r}_{-k}$ are different, if this difference becomes smaller, then $F_{ST}$ falls.

**Choice of identity trait.** We now let individuals choose their identity trait. Consider an individual born with the minority value in her identity group. In addition to holding on to the minority value of her group, she now has one more option: she can also switch identity groups. This may be an attractive option if she is a conformist and her value is held by the majority in the other identity group. The following proposition summarizes this insight.

**Proposition 3: Choice of Identity Trait.** In a society with no diffusion of cultural innovations where the majority value of one group is the minority value of the other, then as long as the majority shares are smaller than one,

1. $F_{ST}$ is larger if individuals can choose their identity trait than if individuals cannot choose their identity trait;
2. The greater the degree of conformism, the larger the difference in $F_{ST}$ between a situation where individuals can choose their identity trait and one where they cannot.

**Proof.** See Appendix B2.

This proposition says that the cultural divide between groups increases if individuals can freely choose their identity trait. Moreover, the increase in the cultural divide is larger if within-group conformism is stronger. The intuition for these two results is straightforward. Take an individual who holds the minority value in the group she is born into. If it is costless to switch groups, then she would rather change to the group where her innate value is held by the majority, as opposed to changing her value. That is, if changing identity trait is free, then it is better to change identity trait than to change value. This leads to sorting of values along identity traits, and hence to a rising cultural divide between groups. The average payoff from sorting into the identity trait where one’s innate value is held by the majority is especially high if within-group conformism is strong. Hence, the incentive to sort on the majority value is greater in societies where people care a lot about conforming to the group.

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\(^{16}\)By interactions we mean communication, contact and cooperative exchange between groups, not unlike the meaning of "contact" in Intergroup Contact Theory in social psychology (Allport, 1954).
4.4 Interpretation of Empirical Findings

We use the model as a lens through which to interpret the patterns observed in the data. We begin by relating changes in the main model parameters $\bar{p}$, $\bar{r}_k$ and $\bar{r}_{-k}$ to the dynamics of cultural divisions across different cleavages. We then discuss the effect of sorting. Finally, we analyze the role of conformism and cultural innovations in explaining differences across specific memes.

4.4.1 Changes in Interaction Technologies

In the context of our conceptual framework, the main parameters of interest are the level of $\bar{p}$ and the difference between $\bar{r}_k$ and $\bar{r}_{-k}$. For a given cleavage, an increase in $\bar{p}$ can be interpreted as either a strengthening of intragroup conformism or a weakening of intergroup conformism. According to Proposition 1, this would lead to an increase in $F_{ST}$. An increase in the difference between $\bar{r}_k$ and $\bar{r}_{-k}$ can be interpreted as a weakening of the intergroup diffusion of cultural innovations. According to Corollary 2, this would also lead to an increase in $F_{ST}$.

What forces might lead to shifts in the level of $\bar{p}$ and the difference between $\bar{r}_k$ and $\bar{r}_{-k}$? These parameters are affected by technologies that mediate interactions within and between groups. In other words, the manner in which individuals interact with each other affects the level of $\bar{p}$ and the difference between $\bar{r}_k$ and $\bar{r}_{-k}$, i.e. whether social influence occurs mostly within groups or also between groups. In this context, the rise of new forms of digital communication in the late 1990s and early 2000s may have led to differential changes in our model’s main parameters depending upon the specific cleavage under consideration. We consider three examples.

Regional and urban cleavages. In the case where cleavages imply geographic separation between groups, such as those based on region or urbanicity, new interaction technologies are expected to facilitate cross-group interactions by further reducing the effect of geographic barriers. In the absence of any cross-group interaction technology, geographic barriers to interactions were strongly operative. The early introduction of communication technologies like newspapers, the telephone and television already served to reduce geographic barriers to interactions, reducing $\bar{p}$ and the difference between $\bar{r}_k$ and $\bar{r}_{-k}$. More recently, new forms of digital interactions furthered the potential for cross-location interactions. Hence, for region and urbanicity, after the mid to late 1990s we expect that $\bar{p}$ and the difference between $\bar{r}_k$ and $\bar{r}_{-k}$ both went down, reducing geography-based echo chambers. Indeed, for region and urbanicity, $F_{ST}$ has tended to fall throughout our sample period.

Party ID and religion cleavages. For party ID or religion, new interaction technologies create the potential for people to seek out those of the same group, to interact with them disproportionately more, and to reduce the intensity of their interactions with those of a different group. In this case, the initial condition is one where there is inevitably some day-to-day interaction with people from a different group, but digital interaction technologies allow individuals to reduce or minimize such cross-group interactions. For instance, on social media, people of a specific political orientation or religion may seek each other out and interact mostly with each other, creating stronger echo chambers with respect to these cleavages. Thus, for these kinds of cleavages, we expect that $\bar{p}$ increased and the difference between $\bar{r}_k$ and $\bar{r}_{-k}$ also increased since the mid to late 1990s. Consistent with this, for
party ID and religion, we find strong increases in $F_{ST}$, particularly after the expansion of access to the internet in the second half of the 1990s.

**The gender cleavage.** In the case of the gender cleavage, the introduction of new forms of social interactions is likely to have had a more ambiguous effect. There is no reason to expect that internet-based interaction technologies acted to intensify within-gender rather than between-gender interactions. In this case, the initial condition is one of intentional day-to-day interaction between men and women in offline contexts. Given the intentionality of such contact between genders (*heterophily*), we would not expect new interaction technologies to be used for one gender to systematically avoid the other gender. As a result, it is unlikely that new interaction technologies would have created a pronounced increase in the cultural divide across genders. Indeed, our empirical analysis shows no tendency for much of a change in $F_{ST}$ across genders.

4.4.2 Choice of Identity Traits

For identity cleavages with scope for an echo chamber effect (party ID, religion, family income, work status, education, ethnicity and race), Proposition 3 suggests that we should expect the effect to be particularly important for cleavages along which individuals can freely choose their trait. For example, individuals can choose their party ID or their religious affiliation. The payoff from changing party ID or religious affiliation in order to align individual values with those of the majority is greater if within-group conformism is stronger (i.e. when $\hat{p}$ is higher). By introducing a complementarity between within-group echo chambers and sorting, this increases the fixation of party ID or religion on values. In fact, for religion our evidence suggests that much of the increase in $F_{ST}$ may be due to increased sorting, with a declining share of Protestants and a growing share of non-religious individuals: when comparing Figures 3 and A4, we no longer see a growing religious divide when keeping group shares constant. In contrast to party ID and religion, individuals can typically not choose their race. Although internet and social media make it easier for isolated individuals of a certain race to interact with others of the same race, it does not increase the sorting of races on particular values. Hence, fixation on race does not further increase.

An additional observation stems from the ability to directly sort into groups on the basis of cultural values: the increasing alignment between values and traits such as party ID implies that the distinction between identity traits and values could become more blurred. In that sense, some group-specific echo chambers are not unlike value-specific echo chambers. For example, Republican-leaning media increasingly coincide with media promoting conservative values, and vice versa.

**Dynamics of $F_{ST}$ across identity cleavages.** To summarize, the above discussion suggests that two dimensions matter for the dynamics of $F_{ST}$: the scope of the echo chambers effect, and the ease of sorting into identity trait. Figure 5 shows this graphically in a two-dimensional matrix with three regions. Indeed, we can distinguish between three categories of identity cleavages.

A first category consists of identity cleavages for which there is little scope for new interaction technologies to lead to an echo chamber effect: age, gender, region and urbanicity. For the identity
traits in the left half of Figure 5 we would therefore expect no increase in $F_{ST}$ - it could fall or stay flat.

A second category consists of identity cleavages with scope for a more pronounced echo chamber effect, but identity traits cannot be freely chosen: ethnicity, race, and to a lesser extent, family income, work status and education. For the identity cleavages in the bottom-right quadrant of Figure 5 we would therefore expect the introduction of modern media to have a moderately positive effect on $F_{ST}$.

A third category consists of identity cleavages with echo chamber effects for which the complementarity between echo chambers and sorting is at work: party ID and religion. For the identity cleavages in the top-right quadrant of Figure 5 our conceptual framework therefore predicts an increase in $F_{ST}$ following the introduction of modern media.

These theoretical predictions are largely consistent with the empirical patterns seen after the introduction of modern media and communication technologies. Since the late 1990s, fixation is mostly flat for age, gender, region and urbanicity; it is mildly increasing for ethnicity, race, income, work status and education; and it is strongly increasing for religion and party ID.

### 4.4.3 Cultural Innovations and Conformism

There is substantial heterogeneity in cultural evolution, not just across identity cleavages, but also across question categories and within question categories. In what follows, we discuss three examples.

**Crime.** In 69% of questions pertaining to crime, $CF$ exhibits either a U-shaped or an increasing pattern over time. For the subset of crime questions for which $F_{ST}$ is not flat, 67% display a U-shaped or an increasing $F_{ST}$ path. What might account for the U-shaped pattern in $CF$ and $F_{ST}$ for many of the crime questions? One obvious candidate is the evolution of the violent crime rate and the property crime rate, both of which peaked in 1991. There are many explanations for the decline in crime rates since then. They include more and better policing, mass incarceration, the end of the crack epidemic, the introduction of legalized abortion, and the decline in lead exposure, among others.

To see how the rapid decline in crime rates might have changed people’s attitudes towards crime issues, it is useful to focus on a particular example. Take, for instance, the question in the GSS that asks respondents whether courts deal too harshly or not harshly enough with criminals. In 1991, of those surveyed by the GSS, 4% answered courts were dealing too harshly with criminals, compared to 79% who said courts were not harsh enough. By 2016, those numbers had changed to 18% and 55%, respectively. There are two ways of interpreting these numbers in light of the precipitous drop in crime rates. If the driving force in the decline in crime is a harsher judicial system, this change in policy may push more people to believe the courts are too harsh. Under this interpretation, people are not changing their preferences about how harsh the courts should be, but given that the courts have become harsher, fewer people now believe the courts are not harsh enough. As a result, we would see $CF$ increase. If, instead, the driving force in the decline in crime is unrelated to the judicial system, then people may change their preferences about how harsh the courts should be given that crime rates are lower. In our model we would view this as a cultural innovation that increases the minority view that courts are too harsh. In other words, there is an innovation to the minority value. Through
the parameter $\bar{r}_k$, this leads to a changing cultural consensus in the direction of a growing minority believing that courts are too harsh. In that case, cultural heterogeneity increases, since the overall consensus that courts are not harsh enough is waning. Hence, according to Proposition 2, we should expect $CF$ to increase, because of a cultural innovation to the minority value.

At the same time, the view on crime has become more divisive across identity groups. Going back to the question on the harshness of courts, consider the changing racial divide. In 1991, there was a broad consensus across racial groups: only 3% of whites and 12% of blacks answered that courts were treating criminals too harshly. By 2016, these shares had increased to 16% and 38%, respectively. One way of interpreting these facts is that whites have a lower $\bar{r}_k$ for this particular value than blacks. The sensitivity of each group to the cultural innovation differs, because different groups may be affected differently by, say, the increase in mass incarceration. Consistent with Proposition 2, if $\bar{r}_k$ differs from $\bar{r}_{-k}$, the divide between groups increases when an innovation occurs, and $F_{ST}$ increases.

Another interesting question in the crime category relates to the legality of marijuana use. Between 1972 and the early 1990s there was a growing consensus that it should be illegal, reaching a maximum of 83% in favor of keeping it illegal in 1990. Since then, the consensus has completely shifted, and by 2016 only 39% were still in favor of keeping marijuana illegal. As with the question on the harshness of courts, this has led to an increase in $CF$ since the early 1990s. In terms of $F_{ST}$, here as well the susceptibility to the innovation differs across groups. For example, blacks were less in favor of legalization than whites in 1990; this had switched by 2016.

These examples illustrate that when circumstances change, in a way that affects different groups differently, the pre-existing consensus may weaken (showing up as increasing cultural heterogeneity) and there may be growing divides across identity groups (showing up as growing fixation). Looking ahead, whether in the long run the pre-existing consensus is replaced by a new consensus or whether the new steady state is a lack of consensus will depend on the specific question. For example, in the case of marijuana the growing majority in favor of legalization is such that in recent years $CF$ has started to decline, suggesting that a new consensus might be emerging. Indeed, when the old consensus is replaced by a new consensus, Proposition 2 predicts a hump-shaped path for $CF$.

**Free speech.** For 78% of questions related to freedom of speech, $CF$ exhibits a decreasing pattern over time. Moreover, three quarters of these questions display either flat or decreasing $F_{ST}$s. As an example, consider the question whether an atheist should be allowed to make a speech against religion in your community. In 1972, 62% of those surveyed answered positively; by 2016, this percentage had increased to 80%. This points to a long-term growing consensus in favor of free speech, thus leading to a falling $CF$ over time. In general, this increasing agreement happened across all groups. As an illustration, consider how the question on free speech for an atheist changed across the rural-urban divide. In 1972, 80% of those living in locations of more than 1 million favored free speech for atheists, compared to 58% of those living in locations of fewer than 10,000. In 2016, those numbers were 80% and 78%, respectively. Hence, for this particular question on free speech, the rural-urban divide all but disappeared. As a result, in this case $F_{ST}$ converged to a number very close to zero.

In the context of our model, this can be viewed as the diffusion of a cultural value across groups. The end of McCarthyism, the civil rights movement, and the increasing level of education might have
led to a renewed commitment to the First Amendment. Not all groups took this change on board simultaneously, but eventually it diffused to all groups. This led to a decrease in the difference between $\bar{r}_k$ and $\bar{r}_{-k}$. According to Corollary 2, this should lead to a decrease in $F_{ST}$. This is an example of cultural convergence. Why do some changing values diffuse across groups and others do not? One reason is that the issue at stake may affect different groups very differently. For example, the harshness of courts may affect African Americans differently from Whites, whereas the issue of free speech does not have a strong racial element.

**Same-sex relations.** Within question categories, specific questions exhibit strong dynamics that are worth highlighting in the context of our model. For example, the percentage of people answering that homosexual relations were always wrong peaked at the end of the eighties, with 78% in 1987; by 2016, that figure had gone down to 39%. The decline was especially rapid in the early 1990s. Between two consecutive GSS waves, 1991 and 1993, the percentage dropped by nearly 10 percentage points. This increasing tolerance towards same-sex relations translated into an increasing $CF$. This is consistent with Proposition 2: as the original consensus disintegrates, we initially see rising disagreement in society, and hence an increase in $CF$. This has happened across groups, but not at the same rate. Compare locations below 10,000 inhabitants to those above 1 million. In 1990, the share answering homosexual relations were always wrong was 83% and 78%, respectively. These figures stood at 45% and 35% respectively in 2016. Hence, both saw a drop, but the drop was faster in urban areas. In the context of our model, this is a cultural change going from one consensus to a different consensus, but at differing rates across groups (here, urban categories). Thus, $F_{ST}$ decreases in the transition.

### 5 Conclusion

In this paper, we conducted a systematic analysis of the evolution of cultural heterogeneity in the United States. We sought to assess growing concerns about deepening cultural divides between groups defined along a wide range of identity cleavages. We considered eleven such cleavages, such as race, gender, income quintiles, educational attainment, etc. Using answers to questions on values, attitudes and norms - cultural traits that we refer to as *memes*, in reference to Dawkins’ (1989) terminology - we characterized the time paths of cultural divides. The picture that emerges from this analysis is not one of a generalized deepening of cultural divisions. First, the degree of between-group cultural specificity is very small, as between-group variation represents between 0.6% (for gender) and 2.4% (education) of total variation: most variation in memes is within groups. Second, we find, on average, a U-shaped pattern for our $F_{ST}$ measure: cultural divisions tended to fall from the early 1970s to the late 1990s, and to rise in the 2000s. In most cases, $F_{ST}$ remains below its earlier peaks. Third, the data does not justify a sweeping conclusion that there are deepening cultural divides. The increase in the 2000s is driven largely by cleavages such as Party ID. Many commentators have focused on the cultural divide across political lines, ignoring trends across other divides and ignoring heterogeneity across memes. Our paper in contrast took a more systematic approach of looking at a wide range of cleavages and memes. This broader approach does not warrant a pessimistic conclusion that the United States is experiencing cultural disintegration. The data suggests a more qualified conclusion that cultural divisions have grown only since the late 1990s, only for some cleavages and only for some
memes.

We also provided a theoretical interpretation for the heterogeneity in the dynamics of cultural divides across cleavages and memes. In our model, agents are born with cultural traits inherited with variation from their parents. Social influence then triggers potential changes in these inherited traits, because agents conform to the majority of their own group and because they respond to cultural fads and innovations: social influence is a major force explaining cultural change. The degree to which cultural change is group-specific determines the evolution of cultural divides between groups.

The model suggests that the manner in which agents access information and interact with each other has important effects on the evolution of cultural divisions. If the predominant mode of interaction is between groups, cultural change will occur in a similar manner across group identities, keeping $F_{ST}$ low. If instead most interactions are within groups and information is group-specific, it becomes more likely that cultural fixation increases as a result of a cultural innovation. For instance, new information technologies such as tailored cable TV channels and online social media can, under some circumstances, increase the relative importance of within versus between-group social interactions, by creating echo chambers. The dynamics of cultural divides also depend on characteristics of the cultural traits under consideration. For instance, since the mid-1990s, there is an increasing view that the justice system is too harsh on crime, but this change has occurred differentially across races. African-Americans are more likely to find the judicial system too harsh than Whites. In terms of our model, this happens because the susceptibility of each group to this specific cultural innovation is different, creating a growing divide.

Our work can be extended in several directions. First, for each cleavage, we have considered all groups jointly, but this may mask interesting patterns for specific group pairs. For instance, the average divide between all races may follow a certain time path, but the specific divide between Hispanics and Whites may follow a different pattern. Second, we have also treated identity cleavages separately but interactions may be relevant: while men and women may not have drifted apart culturally, it is conceivable that African American women could have drifted apart from White men. Our methodology can easily accommodate such extensions, as $F_{ST}$ can be calculated for specific pairs of identity groups, or for groups defined by the intersection of several traits.

Ultimately, we are interested in the evolution of cultural heterogeneity because of its potential effects on social cohesion, social capital and the ability of different groups to reach agreements on public policy. In this paper, we have described the evolution of cultural divides, but the question of their impact on political economy outcomes such as public goods provision, voting, inequality and economic interactions between groups remains an important topic for future research.
References


Table 1 – CF by Time Period and \( F_{ST} \) by Time Period and Cleavage

(2-wave grouping)

<table>
<thead>
<tr>
<th>Time Period</th>
<th>CF</th>
<th>( F_{ST} ) Age</th>
<th>( F_{ST} ) Educ.</th>
<th>( F_{ST} ) Ethnic</th>
<th>( F_{ST} ) Family income</th>
<th>( F_{ST} ) Gender</th>
<th>( F_{ST} ) Party ID</th>
<th>( F_{ST} ) Race</th>
<th>( F_{ST} ) Region</th>
<th>( F_{ST} ) Religion</th>
<th>( F_{ST} ) Urban</th>
<th>( F_{ST} ) Work Status</th>
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Time period refers to 2-wave groupings. So for instance 1972 refers to pooled data over the 1972 and 1973 waves of the GSS.
Table 2- Dynamics of CF and F<sub>ST</sub>, by Cleavage
(2-wave grouping, 1972-2016, 76 Questions)

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</tr>
<tr>
<td>Family Income</td>
<td>5.26%</td>
<td>1.32%</td>
<td>14.47%</td>
<td>22.37%</td>
<td>56.58%</td>
</tr>
<tr>
<td>Gender</td>
<td>6.58%</td>
<td>17.11%</td>
<td>11.84%</td>
<td>11.84%</td>
<td>52.63%</td>
</tr>
<tr>
<td>Party ID</td>
<td>48.68%</td>
<td>3.95%</td>
<td>6.58%</td>
<td>6.58%</td>
<td>34.21%</td>
</tr>
<tr>
<td>Race</td>
<td>14.47%</td>
<td>3.95%</td>
<td>22.37%</td>
<td>14.47%</td>
<td>44.74%</td>
</tr>
<tr>
<td>Region</td>
<td>11.84%</td>
<td>1.32%</td>
<td>2.63%</td>
<td>34.21%</td>
<td>50.00%</td>
</tr>
<tr>
<td>Religion</td>
<td>34.21%</td>
<td>0.00%</td>
<td>9.21%</td>
<td>14.47%</td>
<td>42.11%</td>
</tr>
<tr>
<td>Urbanicity</td>
<td>15.79%</td>
<td>2.63%</td>
<td>5.26%</td>
<td>27.63%</td>
<td>48.68%</td>
</tr>
<tr>
<td>Work status</td>
<td>7.89%</td>
<td>11.84%</td>
<td>7.89%</td>
<td>18.42%</td>
<td>53.95%</td>
</tr>
<tr>
<td><strong>Panel B Average</strong></td>
<td><strong>16.99%</strong></td>
<td><strong>5.38%</strong></td>
<td><strong>11.12%</strong></td>
<td><strong>19.38%</strong></td>
<td><strong>47.13%</strong></td>
</tr>
</tbody>
</table>

**Note:** This Table displays the fraction of questions, among the 76 in our baseline sample, for which CF or F<sub>ST</sub> follows the types of dynamics listed in the first row, i.e. U-shaped, hump shaped, increasing, decreasing or flat. To assess these dynamics, we regress for each question its CF / F<sub>ST</sub> on a time trend and its square. If both the linear and quadratic terms are statistically significant at the 5% level, and the vertex of the fitted quadratic curve is between 1980 and 2005, we characterize the dynamics as either U-shaped or hump-shaped. In all other cases, we run a linear regression of CF / F<sub>ST</sub> on a time trend, and classify the dynamics as increasing, decreasing or flat depending on whether the coefficient on the time trend is significantly positive, significantly negative, or insignificant, respectively.
Table 3 - Dynamics of CF, by Question Category and Sub-category
(2-wave grouping, 1972-2016, 76 Questions)

<table>
<thead>
<tr>
<th>Question Category</th>
<th>Question Sub-category</th>
<th># of questions</th>
<th>U-shaped</th>
<th>Hump-Shaped</th>
<th>Increasing</th>
<th>Decreasing</th>
<th>Flat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Civil Liberties</td>
<td></td>
<td>23</td>
<td><strong>21.74%</strong></td>
<td><strong>17.39%</strong></td>
<td><strong>17.39%</strong></td>
<td><strong>43.48%</strong></td>
<td><strong>0.00%</strong></td>
</tr>
<tr>
<td></td>
<td>Crime</td>
<td>13</td>
<td>38.46%</td>
<td>7.69%</td>
<td>30.77%</td>
<td>23.08%</td>
<td>0.00%</td>
</tr>
<tr>
<td></td>
<td>Differences &amp; Discrimination</td>
<td>1</td>
<td>0.00%</td>
<td>100.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td></td>
<td>Free Speech</td>
<td>9</td>
<td>0.00%</td>
<td>22.22%</td>
<td>0.00%</td>
<td>77.78%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Current Affairs</td>
<td></td>
<td><strong>23</strong></td>
<td><strong>0.00%</strong></td>
<td><strong>4.35%</strong></td>
<td><strong>43.48%</strong></td>
<td><strong>21.74%</strong></td>
<td><strong>30.43%</strong></td>
</tr>
<tr>
<td></td>
<td>Economic Well-Being</td>
<td>4</td>
<td>0.00%</td>
<td>25.00%</td>
<td>75.00%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td></td>
<td>National Spending</td>
<td>11</td>
<td>0.00%</td>
<td>0.00%</td>
<td>36.36%</td>
<td>18.18%</td>
<td>45.45%</td>
</tr>
<tr>
<td></td>
<td>Social Issues</td>
<td>8</td>
<td>0.00%</td>
<td>0.00%</td>
<td>37.50%</td>
<td>37.50%</td>
<td>25.00%</td>
</tr>
<tr>
<td>Gender &amp; Marriage</td>
<td></td>
<td><strong>14</strong></td>
<td><strong>28.57%</strong></td>
<td><strong>21.43%</strong></td>
<td><strong>21.43%</strong></td>
<td><strong>21.43%</strong></td>
<td><strong>7.14%</strong></td>
</tr>
<tr>
<td></td>
<td>Children &amp; Working</td>
<td>2</td>
<td>50.00%</td>
<td>50.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td></td>
<td>Life Satisfaction</td>
<td>6</td>
<td>33.33%</td>
<td>0.00%</td>
<td>33.33%</td>
<td>16.67%</td>
<td>16.67%</td>
</tr>
<tr>
<td></td>
<td>Marriage</td>
<td>1</td>
<td>0.00%</td>
<td>100.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td></td>
<td>Sex &amp; Sexual Orientation</td>
<td>5</td>
<td>20.00%</td>
<td>20.00%</td>
<td>20.00%</td>
<td>40.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Politics</td>
<td></td>
<td><strong>13</strong></td>
<td><strong>15.38%</strong></td>
<td><strong>0.00%</strong></td>
<td><strong>15.38%</strong></td>
<td><strong>23.08%</strong></td>
<td><strong>46.15%</strong></td>
</tr>
<tr>
<td></td>
<td>Confidence &amp; Power</td>
<td>12</td>
<td>16.67%</td>
<td>0.00%</td>
<td>8.33%</td>
<td>25.00%</td>
<td>50.00%</td>
</tr>
<tr>
<td></td>
<td>Political Beliefs</td>
<td>1</td>
<td>0.00%</td>
<td>0.00%</td>
<td>100.00%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Religion &amp; Spirituality</td>
<td></td>
<td><strong>3</strong></td>
<td><strong>0.00%</strong></td>
<td><strong>66.67%</strong></td>
<td><strong>0.00%</strong></td>
<td><strong>33.33%</strong></td>
<td><strong>0.00%</strong></td>
</tr>
<tr>
<td></td>
<td>Beliefs</td>
<td>1</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>100.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td></td>
<td>Religious Affiliation &amp; Behaviors</td>
<td>2</td>
<td>0.00%</td>
<td>100.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
</tbody>
</table>

**Note:** This Table displays the types of dynamics of CF for different categories and subcategories of questions, as defined by the GSS. The types of dynamics are listed in the first row, i.e. U-shaped, hump shaped, increasing, decreasing or flat. To assess these dynamics, we regress for each question its CF on a time trend and its square. If both the linear and quadratic terms are statistically significant at the 5% level, and the vertex of the fitted quadratic curve is between 1980 and 2005, we characterize the dynamics as either U-shaped or hump-shaped. In all other cases, we run a linear regression of CF on a time trend, and classify the dynamics as increasing, decreasing or flat depending on whether the coefficient on the time trend is significantly positive, significantly negative, or insignificant, respectively. We then summarize these dynamics by averaging within question categories / subcategories.
Table 4 - Dynamics of $F_{ST}$, by Question Category and Sub-category, averaged across 11 cleavages (2-wave grouping, 1972-2016, 76 Questions)

<table>
<thead>
<tr>
<th>Question Category</th>
<th>Question Sub-category</th>
<th># of questions</th>
<th>U-shaped %</th>
<th>Hump-Shaped %</th>
<th>Increasing %</th>
<th>Decreasing %</th>
<th>Flat %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Civil Liberties</td>
<td>Crime</td>
<td>13</td>
<td>23.78%</td>
<td>6.29%</td>
<td>18.88%</td>
<td>14.69%</td>
<td>36.36%</td>
</tr>
<tr>
<td></td>
<td>Differences &amp; Discrimination</td>
<td>1</td>
<td>9.09%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>18.18%</td>
<td>72.73%</td>
</tr>
<tr>
<td></td>
<td>Free Speech</td>
<td>9</td>
<td>15.15%</td>
<td>5.05%</td>
<td>8.08%</td>
<td>52.53%</td>
<td>19.19%</td>
</tr>
<tr>
<td>Current Affairs</td>
<td>Economic Well-Being</td>
<td>4</td>
<td>2.27%</td>
<td>0.00%</td>
<td>22.73%</td>
<td>13.64%</td>
<td>61.36%</td>
</tr>
<tr>
<td></td>
<td>National Spending</td>
<td>11</td>
<td>12.40%</td>
<td>9.92%</td>
<td>11.57%</td>
<td>14.05%</td>
<td>52.07%</td>
</tr>
<tr>
<td></td>
<td>Social Issues</td>
<td>8</td>
<td>22.73%</td>
<td>1.14%</td>
<td>5.68%</td>
<td>11.36%</td>
<td>59.09%</td>
</tr>
<tr>
<td>Gender &amp; Marriage</td>
<td>Children &amp; Working</td>
<td>2</td>
<td>13.64%</td>
<td>9.09%</td>
<td>0.00%</td>
<td>13.64%</td>
<td>63.64%</td>
</tr>
<tr>
<td></td>
<td>Life Satisfaction</td>
<td>6</td>
<td>4.55%</td>
<td>1.52%</td>
<td>13.64%</td>
<td>28.79%</td>
<td>51.52%</td>
</tr>
<tr>
<td></td>
<td>Marriage</td>
<td>1</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>100.00%</td>
</tr>
<tr>
<td></td>
<td>Sex &amp; Sexual Orientation</td>
<td>5</td>
<td>34.55%</td>
<td>9.09%</td>
<td>14.55%</td>
<td>16.36%</td>
<td>25.45%</td>
</tr>
<tr>
<td>Politics</td>
<td>Confidece &amp; Power</td>
<td>12</td>
<td>15.15%</td>
<td>5.30%</td>
<td>6.06%</td>
<td>8.33%</td>
<td>65.15%</td>
</tr>
<tr>
<td></td>
<td>Political Beliefs</td>
<td>1</td>
<td>45.45%</td>
<td>9.09%</td>
<td>0.00%</td>
<td>18.18%</td>
<td>27.27%</td>
</tr>
<tr>
<td>Religion &amp; Spirituality</td>
<td>Beliefs</td>
<td>1</td>
<td>27.27%</td>
<td>0.00%</td>
<td>9.09%</td>
<td>18.18%</td>
<td>45.45%</td>
</tr>
<tr>
<td></td>
<td>Religious Affiliation &amp; Behaviors</td>
<td>2</td>
<td>13.64%</td>
<td>9.09%</td>
<td>13.64%</td>
<td>36.36%</td>
<td>27.27%</td>
</tr>
</tbody>
</table>

Note: This Table displays the types of dynamics of $F_{ST}$ for different categories and subcategories of questions, as defined by the GSS. The types of dynamics are listed in the first row, i.e. U-shaped, hump shaped, increasing, decreasing or flat. To assess these dynamics, we regress for each question its $F_{ST}$ on a time trend and its square. If both the linear and quadratic terms are statistically significant at the 5% level, and the vertex of the fitted quadratic curve is between 1980 and 2005, we characterize the dynamics as either U-shaped or hump-shaped. In all other cases, we run a linear regression of $F_{ST}$ on a time trend, and classify the dynamics as increasing, decreasing or flat depending on whether the coefficient on the time trend is significantly positive, significantly negative, or insignificant, respectively. We then summarize these dynamics by averaging within question categories / subcategories and across all 11 cleavages.
Table 5 – Regression analysis of the Level of FST, by cleavage type, by question category and by subcategory, and by time period.

<table>
<thead>
<tr>
<th>Panel A - Cleavages</th>
<th>Categories</th>
<th>Sub-categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>1.194 (13.56)***</td>
<td>1.194 (13.27)***</td>
</tr>
<tr>
<td>Education</td>
<td>1.770 (20.10)***</td>
<td>1.770 (19.66)***</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>0.851 (9.67)***</td>
<td>0.851 (9.45)***</td>
</tr>
<tr>
<td>Family income</td>
<td>1.127 (12.80)***</td>
<td>1.127 (12.52)***</td>
</tr>
<tr>
<td>Gender</td>
<td>(excluded)</td>
<td>(excluded)</td>
</tr>
<tr>
<td>Party ID</td>
<td>0.775 (8.80)***</td>
<td>0.775 (8.61)***</td>
</tr>
<tr>
<td>Race</td>
<td>0.475 (5.39)***</td>
<td>0.475 (5.28)***</td>
</tr>
<tr>
<td>Region</td>
<td>0.884 (10.04)***</td>
<td>0.884 (9.82)***</td>
</tr>
<tr>
<td>Religion</td>
<td>1.477 (16.77)***</td>
<td>1.477 (16.40)***</td>
</tr>
<tr>
<td>Urbanicity</td>
<td>0.435 (4.94)***</td>
<td>0.435 (4.84)***</td>
</tr>
<tr>
<td>Work status</td>
<td>0.908 (10.31)***</td>
<td>0.908 (10.08)***</td>
</tr>
</tbody>
</table>

| Panel B - Categories and sub-categories           |                      |                  |
|--------------------------------------------------|-----------------------|
| Civil liberties                                  | 0.801 (14.11)***      |
| - Crime                                          | 1.163 (6.85)***       |
| - Differences and discrimination                 | 1.424 (6.15)***       |
| - Free speech                                    | 2.488 (14.42)***      |
| Current affairs                                  | -0.206 (3.63)***      |
| - Economic well being                            | 0.986 (5.39)***       |
| - National spending                              | 0.552 (3.23)***       |
| - Social issues                                  | 0.721 (4.15)***       |
| Gender and marriage                              | (excluded)            |
| - Marriage                                       | (excluded)            |
| - Children and working                           | 0.214 (1.07)          |
| - Life satisfaction                              | 0.815 (4.61)***       |
| - Sex and sexual orientation                     | 1.434 (8.00)***       |
| Politics                                         | -0.756 (11.74)***     |
| - Confidence and power                           | 0.084 (0.49)          |
| - Political beliefs                              | 0.761 (3.29)***       |
| Religion and spirituality                        | 1.288 (12.10)***      |
| - Beliefs                                        | 0.826 (3.57)***       |
| - Religious affiliation and behaviors            | 2.858 (14.26)***      |

(Continued)
### Panel C - Time Dummies

<table>
<thead>
<tr>
<th>Year</th>
<th>Categories</th>
<th>Sub-categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>1972</td>
<td>(excluded)</td>
<td>(excluded)</td>
</tr>
<tr>
<td>1974</td>
<td>-0.139</td>
<td>(1.31)</td>
</tr>
<tr>
<td>1976</td>
<td>-0.283</td>
<td>(2.67)***</td>
</tr>
<tr>
<td>1979</td>
<td>-0.192</td>
<td>(1.81)*</td>
</tr>
<tr>
<td>1982</td>
<td>-0.133</td>
<td>(1.25)</td>
</tr>
<tr>
<td>1984</td>
<td>-0.200</td>
<td>(1.88)*</td>
</tr>
<tr>
<td>1986</td>
<td>-0.155</td>
<td>(1.46)</td>
</tr>
<tr>
<td>1988</td>
<td>-0.323</td>
<td>(3.04)***</td>
</tr>
<tr>
<td>1990</td>
<td>-0.347</td>
<td>(3.26)***</td>
</tr>
<tr>
<td>1993</td>
<td>-0.507</td>
<td>(4.77)***</td>
</tr>
<tr>
<td>1997</td>
<td>-0.544</td>
<td>(5.12)***</td>
</tr>
<tr>
<td>2001</td>
<td>-0.479</td>
<td>(4.51)***</td>
</tr>
<tr>
<td>2005</td>
<td>-0.361</td>
<td>(3.40)***</td>
</tr>
<tr>
<td>2009</td>
<td>-0.289</td>
<td>(2.72)***</td>
</tr>
<tr>
<td>2013</td>
<td>-0.290</td>
<td>(2.73)***</td>
</tr>
<tr>
<td>2016</td>
<td>-0.252</td>
<td>(2.37)**</td>
</tr>
<tr>
<td>Intercept</td>
<td>-0.064</td>
<td>(0.34)</td>
</tr>
<tr>
<td>R²</td>
<td>0.15</td>
<td>0.11</td>
</tr>
<tr>
<td>Number of observations</td>
<td>13,376</td>
<td>13,376</td>
</tr>
</tbody>
</table>

* p<0.1; ** p<0.05; *** p<0.01; t-statistics in parentheses; FST multiplied by 100 to improve readability. Time dummies refers to 2-wave groupings. So for instance 1972 refers to pooled data over the 1972 and 1973 waves of the GSS, and the dummy takes on a value of 1 if the FST measure is computed using these underlying waves, and zero otherwise.
<table>
<thead>
<tr>
<th>Time Period</th>
<th>R² Overall</th>
<th>Age</th>
<th>Educ.</th>
<th>Ethnic</th>
<th>Income</th>
<th>Gender</th>
<th>Party ID</th>
<th>Race</th>
<th>Region</th>
<th>Religion</th>
<th>Urban</th>
<th>Work Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1972</td>
<td>0.155</td>
<td>0.013</td>
<td>0.013</td>
<td>0.006</td>
<td>0.011</td>
<td>0.003</td>
<td>0.010</td>
<td>0.003</td>
<td>0.014</td>
<td>0.014</td>
<td>0.007</td>
<td>0.007</td>
</tr>
<tr>
<td>1974</td>
<td>0.141</td>
<td>0.012</td>
<td>0.010</td>
<td>0.007</td>
<td>0.009</td>
<td>0.003</td>
<td>0.008</td>
<td>0.002</td>
<td>0.012</td>
<td>0.013</td>
<td>0.007</td>
<td>0.006</td>
</tr>
<tr>
<td>1976</td>
<td>0.132</td>
<td>0.012</td>
<td>0.011</td>
<td>0.005</td>
<td>0.009</td>
<td>0.004</td>
<td>0.007</td>
<td>0.003</td>
<td>0.011</td>
<td>0.011</td>
<td>0.007</td>
<td>0.006</td>
</tr>
<tr>
<td>1979</td>
<td>0.136</td>
<td>0.012</td>
<td>0.011</td>
<td>0.004</td>
<td>0.010</td>
<td>0.004</td>
<td>0.008</td>
<td>0.002</td>
<td>0.011</td>
<td>0.013</td>
<td>0.007</td>
<td>0.005</td>
</tr>
<tr>
<td>1982</td>
<td>0.135</td>
<td>0.011</td>
<td>0.011</td>
<td>0.006</td>
<td>0.009</td>
<td>0.004</td>
<td>0.008</td>
<td>0.003</td>
<td>0.011</td>
<td>0.011</td>
<td>0.006</td>
<td>0.006</td>
</tr>
<tr>
<td>1984</td>
<td>0.140</td>
<td>0.014</td>
<td>0.008</td>
<td>0.010</td>
<td>0.005</td>
<td>0.011</td>
<td>0.002</td>
<td>0.013</td>
<td>0.012</td>
<td>0.005</td>
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Time period refers to 2-wave groupings. So for instance 1972 refers to pooled data over the 1972 and 1973 waves of the GSS.
Figure 1 – CF over Time (76 questions, 2-wave grouping)
Figure 2 – Average Cultural FST over Time for 11 Cleavages (76 questions)
Figure 3 – Evolution of FST for Each of 11 Cleavages, over Time
Figure 4 – Total $R^2$ across All 11 Cleavages, Over Time (76 questions, 2-wave grouping)
Figure 5 – Classification of Identity Cleavages

- Urbanicity Region
- Gender
  - Age
- Party ID
  - Religion
  - Education
  - Family income
  - Work status
  - Race
  - Ethnicity

Choice Identity Trait

Echo Chamber