The Effect of Individuals' Discomfort Level on Social Progress from the Social Darwinian Perspective

Abstract

Our way of thinking has gradually altered according to the change of living environment, and in this process, discordance always occurs among people due to their different time point of accepting the new thoughts. This study tried to identify the changing environment (critical issues) in our era and explained why the discordance on the issues occurs based on the social Darwinism theory. As a result, it found that homosexual sex relationships, premarital sex, and capital punishment have been at the center of the changing situation at least over the last fifty years and that individuals' discomfort facing the change is a crucial force in promoting people to adopt new ideas. That is, individuals whose discomfort level is relatively higher tend to become more favorable to the change.

1. Introduction

What we believe right and what we accept as a norm to follow incessantly change. We, humankind, have observed that numerous philosophies, theories, and institutions we had once adopted or enshrined in our society disappeared into history as a new wave of thought spread. Thanks to the recent efforts of many scholars, our belief system has been explored in terms of its specific trends and change pattern, and more reliable datasets have been established, enabling future research to track it more in-depth. As one of these efforts, scholarly research on US public opinion has scrutinized the tendencies over the last decades and produced a great deal of knowledge about their traits. However, because most public opinion studies have mainly focused on the revealed pattern over time and interpretation of the pattern, they don't answer a fundamental question of "why those patterns happened?"

In light of this, the primary purpose of this study is to provide a possible explanation of why those tendencies are observed and to put forward quantitative evidence to underpin the explanation. To this end, this study revisited the theory of social evolution in which all the trends we have observed are considered as a result of the selective adaptation process. Although the theory itself is quite classical, it still furnishes us with, at least, a referential frame that we can coherently apply to the public opinion trends regardless of that they are polarizing, converging, or static.

By taking this advantage of the theoretical framework of social evolution, this study hypothesized that individuals' overall discomfort level towards the current institutions[1] or a specific ongoing issue is a crucial dynamic force of the selective adaptation process. That is, people's discontent leads to the divergence of public opinion in the beginning. Depending on the interaction between our existing institutions and the new environment, it can result in different conclusions where we adopt the new environment or reject it. By proving this hypothesis, it is expected to suggest a possible answer to the "why" question and bring more insightful understandings into the related literature.

To test the hypothesis, this study used the General Social Survey (GSS) data and took two separate analytic approaches. First, it tried to find the changing environment in our era. In other words, it identifies key issues that are most actively interacting with our institutions—or our habits of thought. Secondly, it tested individuals' discomfort level as a factor of deciding to adopt the new environment. As a result, this study found that homosexuality, premarital sex, and capital punishment are the most remarkable issues in our era on which public opinions are

[1] To be clear, institutions in this context refer to "prevalent habits of thought' which cover all kinds of relations, practices, and functions of our daily life in a society (Veblen 1899).

widely diverging. Also, it uncovered that a group of people whose discomfort level is higher tend to have a more liberal stance; thus, they are likely to adopt the new environment earlier than other groups.

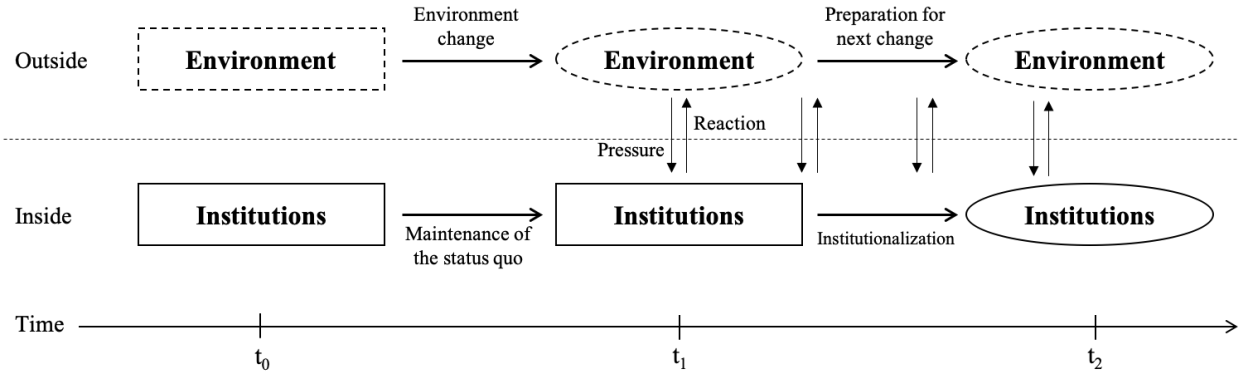
In the following, this study first provided a full detail of the social evolution mechanism and the interaction process between institutions and the environment. After that, it discussed social Darwinian interpretation about the U.S. public opinion trends, and finally conducted quantitative analyses to see if this approach is valid.

2. The Mechanism of Social Evolution

Before speculating the source of public opinion change and why several different patterns are observed, we first need to know the mechanism of social evolution. From the Social Darwinism perspective, our institutions—or our customs, relations, and values—have been built in a continuous process of selective adaptation (Veblen 1899). While the environment surrounding our society keeps changing due to exogenous stimulus (e.g., climate change or pandemic) or endogenous one (e.g., advances in technology or political revolution), institutions, without external pressure, have characteristics to maintain the status quo like the law of inertia in physics. Because of the disparate temperaments of environment and institutions, there must occur a gap between them at a particular time. As illustrated in Figure 1, at t_0 institution has the fittest shape to the environment. However, as time goes to t_1, the environment changes to oval shape and no longer fit institutions to it. At this time, the interaction between environment and institutions becomes active: the changed environment exerts pressure on institutions (and every individual living within the institutions) to readjust their life scheme, and institutions respond to the pressure in various ways. Veblen (1899) asserted that the pressure exerted by the

environment took a form of "pecuniary exigencies," and the members of society who are in both extremes in terms of their property can stand longer against the pressure than other members[2].

Figure 1: Interaction Process between Environment and Institutions



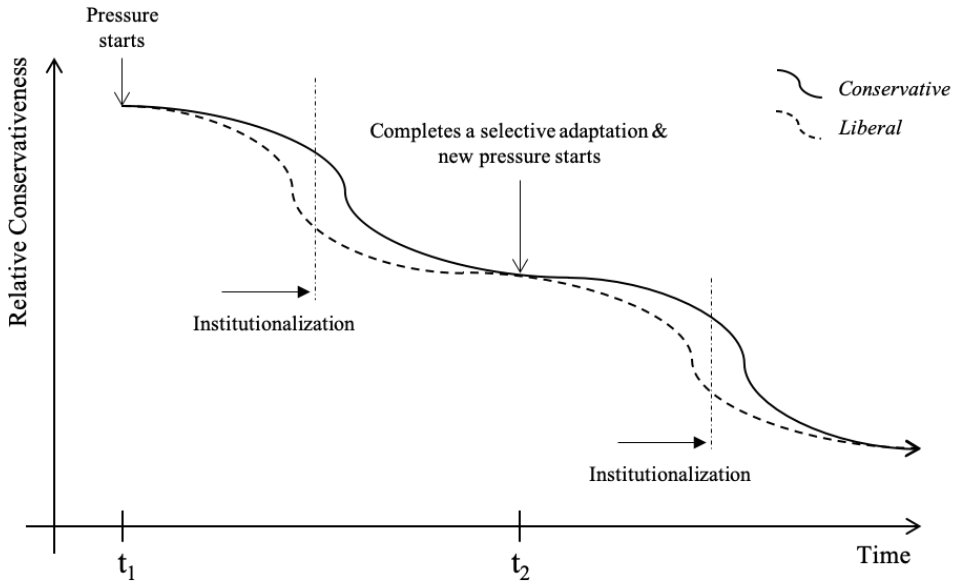
In this study, I extended Veblen's views of the class, especially regarding the interaction process between environment and institutions. In everyday life, it is not only economic pressure that forces us to change our behavior, but also from various sources we feel the same pressure. For example, the changed environment resulting from climate change has threatened our existing institutions and squeezes us to have more eco-friendly lives. On this occasion, the pressure we felt is not much related to pecuniary affairs. Instead, it is closer to social pressure in a broad sense. Since social pressure comes in many different forms, it is challenging to catch all forms and quantify it. Thus, this study focused on social members' reaction to the pressure. Namely, as the pressure increases, some groups of individuals feel discomfort at the widening gap between

[2] According to Veblen (1899), because the readjustment process is always an irksome toil, every individual is unwilling to change. However, due to the economic pressure, the members of society have to change their habits of thought to fit into the new progressive idea, and during this process, the wealthy "leisure class" and abjectly poor class can stand longer against the pressure than other groups. Because the former has enough wealth, the pressure is not much menacing to them. On the other hand, the latter doesn't have enough money to cover even the cost for readjustment; thus, they tend to stay the same.

the newly changed environment and the existing institutions. The more uncomfortable about the gap they feel, the more rapidly they would try to adopt the new habit of thoughts. One crucial point during the interaction is that if institutionalization of the new idea—which means legal and official adoption of the new idea by the existing institutions—is achieved, the change of habits of thoughts accelerates; thus, the new idea quickly permeates our society.

As seen in Figure 1, the institutions are a result of the interaction process between environment and institution in the past. Thus, today's institutions are artifacts of the past and a conservative factor themselves (Hodgson 1992). Figure 2 describes this interaction process at the individual level.

Figure 2: Selective Adaptation Process



Source: Restructured from Jung and Cho (2019)

At t_1, as the changing environment exerts pressure on institutions, some of the society members begin to feel discomfort. Because the institutions themselves have conservative

characteristics, this study hypothesized that individuals who are more sensitive to the discomfort tend to have more liberal political orientation and adapt themselves to the new environment more rapidly than less sensitive members. Most importantly, it needs to note here that this situation described in Figure 2 is just one scenario where institutionalization is successfully achieved. As mentioned above, institutionalization expedites the selective adaptation process by accelerating the readjustment of all social members' habits of thought. However, not all issues can reach the institutionalization phase. As Fischer and Hout (2006) pointed out, public opinions about abortion and the death penalty showed a reverse pattern. This study addressed the issue in the next section.

3. Public Opinion Literature and Social Evolutionary Interpretation

The trends and pattern of the U.S. public opinion on major social and political issues have been consistently researched and recorded by various social surveys for several decades. Using the survey data, scholars have been able to grow the public opinion literature, and by exploring the literature, we can see how their focus has changed over time. Although there are numerous ways of classification of the literature, the directly related literature to this study can be classified into three groups: 1) one investigating the overall trends and pattern, 2) one researching on the issue itself and measuring its importance (issue salience), and 3) the other studying how issues diffuse and permeate into society. Scholars in the first group have explored the characteristics of public opinion by categorizing it into ideological dichotomy and tried to grasp liberalization and polarization trends (Abramowitz and Saunders 2008; Baldassarri and Park 2020; Converse 1964; Davis 1992, 2013; Fiorina 2006; Fischer and Hout 2006; Smith 1985). The second group, mainly political scientists, recognized each issue's heterogeneity in

terms of its importance to individual and the effect on voter's behavior and has devised measuring methods (Dennison 2019; Epstein and Segal 2000; RePass 1971; Wlezian 2005). The last group focused on the issue (or innovation) diffusion and designed models for tracking the diffusion process (Munshi 2004; Rogers 2003; Young 2009).

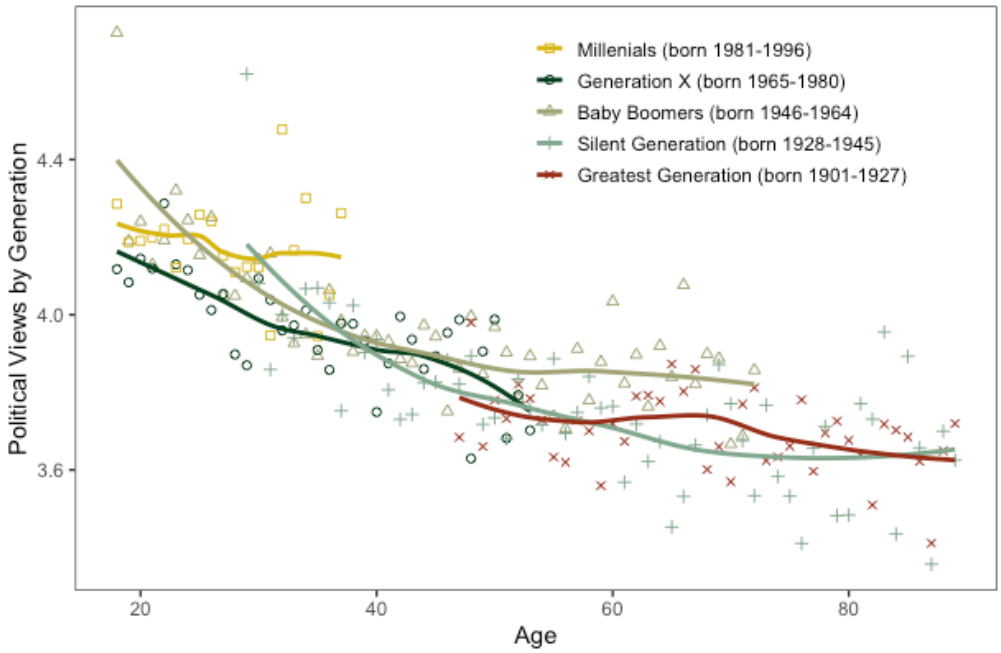
This study is not solely belonging to one of these groups. Instead, it tried to provide a plausible answer to a question that is so fundamental for the whole literature, but none of the studies above seriously addressed: why we are observing all kinds of these trends and patterns? In the followings, we shall see how the social Darwinian perspective can be applied to the observed trends in the U.S., and the logical development of the hypothesis in this study.

In his study, Smith (1985) found a liberalizing pattern that looked like a plateau. That is, the liberalization trends in the U.S. continued since World War II, and it had reached its top and slowed its advance in the 1980s. Davis (1992) tracked the trends of Americans' political view from 1972 to 1989 with two different mechanisms of change: intracohort shift and cohort replacement. He found that the replacement effect had shown the broadly liberal trend during the period, but the intracohort shift showed some divergence depending on topics. In his subsequent study, comparing two generations who were interviewed in 1972-1976 and 2006-2008, respectively, he found that the latter generation was more liberal than the former generation, but the mechanism of change itself was evolving (Davis 2013). He confirmed that the correlation between cohort and political views was getting decreased, and, in turn, the replacement effects had abated.

Figure 3 illustrates the effect of cohort replacement on the liberalization trend described in Davis (1992). All in all, the younger generation tends to have a more liberal political orientation at a specific time. However, two notable points are that all generations become more

conservative as getting older and that the younger generation is not more liberal than the older people when they enter the same ages. Indeed, baby boomers and the Silent generation were more liberal than Generation X in their 20s to 30s. It means that the effect of cohort replacement is contingent on the absolute size of the newly entering generation. Namely, when a new generation overwhelmed the older generation by number, the replacement effect would be significant. It makes sense that the liberalization trends culminated in the 1980s (Smith 1985) when the boomers were the youngest generation in the surveys. Because the boomers are getting older and becoming more conservative, the replacement effects in a whole society have decreased with the smaller number of younger generations. Regarding the intracohort effect on the liberalization trend, as seen in the figure, age seems not a decisive factor since it moves in the opposite direction against the trend.

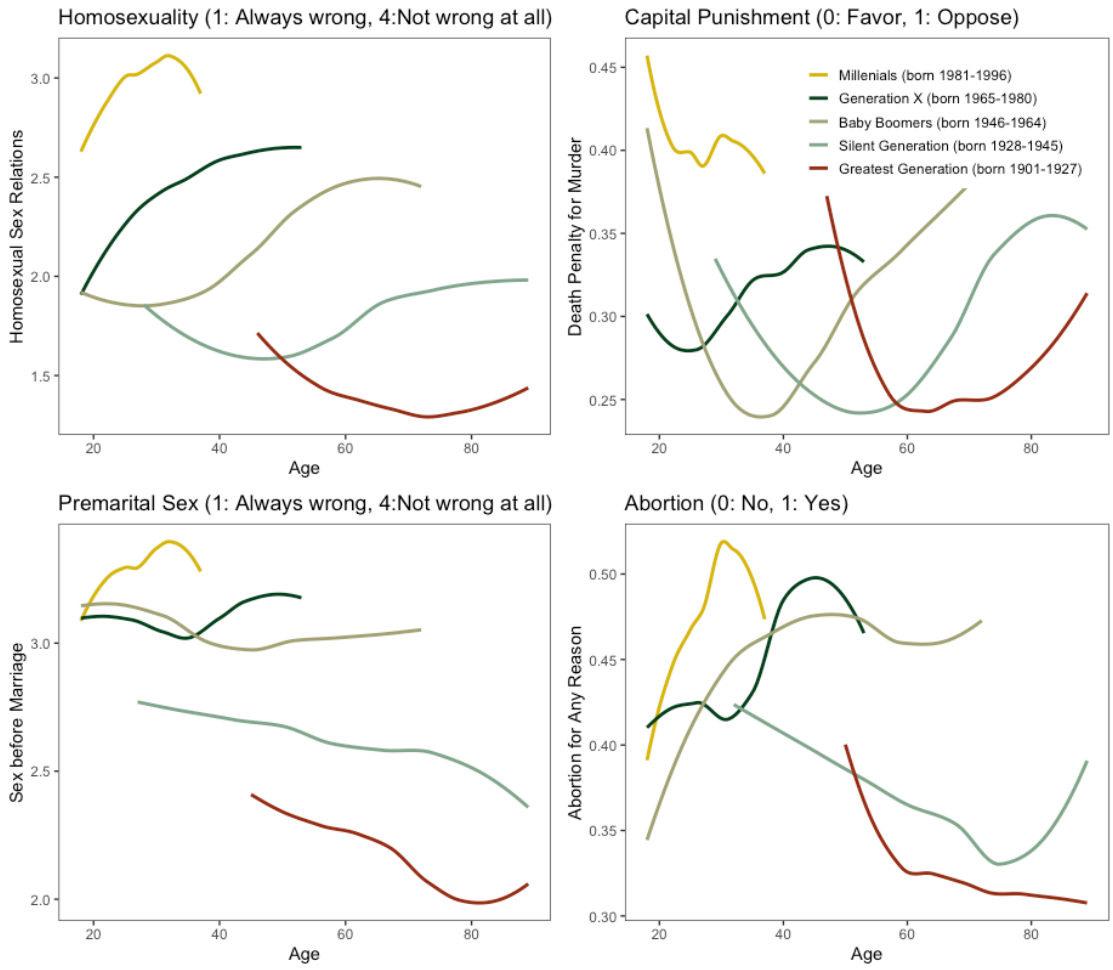
Figure 3: Political Views by Generation over Age



Note: Political views are measured on a seven-point scale where 1 is extremely conservative, and 7 is extremely liberal. The regression curves are drawn using locally estimated (loess) method.

By specific issue, Figure 4 describes how the average attitudes of each generation towards homosexuality, capital punishment, premarital sex, and abortion have changed over their age. Except for capital punishment, the younger generations generally show more liberal attitudes in the same survey year and at the same age. For the capital punishment issue, considering the age gap among generations, baby boomers, the Silent and Greatest generations have shown a very similar proportion of pros and cons in the same survey and similar U-shape. As Fischer and Hout (2006) indicated, the public opinion on the issue seems to follow the national homicide rate rather than the liberalization trends.

Figure 4: Average Attitudes towards Key Issues by Generation



Note: Data are smoothed using locally estimated (loess) regression.

Baldassarri and Park (2020) detected the increasing partisan divide on economic and civil rights issues, but not on moral issues; instead, on the latter, more noticeable was the liberalization trends for both Democrats and Republicans. They concluded that the observed culture war on moral issues could be a mere transient phenomenon in the process of liberalization due to the time gap of adoption between the two parties. Fischer and Hout (2006) also identified that the gap can be narrowing or widening depending on the timing to see the issue. These results are in keeping with the social Darwinian mechanism described in Figure 2 in that individuals who have a more liberal propensity adopt the newly changed environment earlier than the conservatives. However, every issue has to go through its own selective adaptation process (Veblen 1899). That is, the different trends by issue might not be attributed to the characteristics of the issue itself but to the interaction between institutions (habits of thought) and environment (issue) in the adaptation process. Thus, combining issues by its characteristics—such as moral, economic and civil rights—might overlook each interaction process's idiosyncrasy.

Another point this study briefly highlights here is the importance of institutionalization, although measuring the effect of institutionalization on the spread of public opinion is beyond the scope of this study. The concept, institutionalization, is somehow similar to the "social influence" model in Young (2009). According to Young (2009), during the diffusion process of an issue (or innovation) driven by social influence, people tend to adopt if "enough other people in the group have adopted." Although they are different in the sense that the principal agent of the social influence model is individual while that of social Darwinism is society, both recognized that the permeation of an issue can be hugely accelerated when a majority of society members accept it. Therefore, in the light of social Darwinism, the reverse patterns appeared on

the abortion and capital punishment issues (Fischer and Hout 2006) can be interpreted as a failure of achieving institutionalization. Indeed, neither completely legalized nor officially accepted in all states in the U.S. are both issues. Even on the homosexuality issue on which people have shown a constant liberalization trend—but it is still struggling to be legitimized—we cannot be sure where it goes. As shown in the upper left plot in Figure 4, the loess curve on the homosexuality issue has a concave silhouette in most generations, and among the Millennials and Boomers, the level of favor has been decreasing.

So far, we have looked around the mechanism of social Darwinism and how the findings of contemporary public opinion studies can be explained with it. In a nutshell, the selective adaptation process is a non-teleological interaction between our institutions and the incessantly changing environment. Because the direction of the process is not predetermined, it is not much meaningful to predict future trends; instead, it would be more valuable to investigate its inner mechanism. In light of this, this study mainly focused on the interaction process and its operation principle. All the trends shown in Figure 3 and 4 represent the "reaction" of institutions between t_1 and t_2 in Figure 1 from the social Darwinian perspective. This study measured the reaction of institutions with a discomfort level of society members. As the gap between environment and institutions is getting widened, the discomfort that the members feel also increases. Therefore, this study regarded discomfort as a key dynamic force of the interaction process and hypothesized that a group of people whose discomfort level is relatively higher will adopt the new environment faster; thus, they show more liberal orientation than other groups.

4. Data and Methods

This study used the General Social Survey (GSS) data, which is the most extensive social survey data in the United States conducted since 1972 and provides American's social characteristics and attitudes toward social issues. As one of the most widely used databases, GSS has helped many social scientists keep track of over-time trends in U.S. society and enabled them to compare the U.S. with other societies (Marsden, Smith and Hout 2020). Considering the availability of key variables and its stable observability, this study used the GSS dataset from 1974 to 2018 and omitted the Lost Generation (born before 1901), Generation Z (born after 1996), and any missing cases in political views (*POLVIEWS*) from the sample. Thus, the final dataset has 54,535 respondents over 29 survey years.[3]

With this data, this study designed two separate stages of modeling methods to test the hypothesis. Through Stage 1, it tried to identify the most outstanding issues representing the changing environment in our time in the sense that individuals' attitudes are clearly dividing towards the issues. In Stage 2, it conducted the hypothesis test by investigating whether there is a causal relationship between the discomfort level of groups of social members and their political orientation. More details about each stage are as follows.

4.1 *Stage 1*: Ridge Regression Model (Linear Regression with L2 Regularization)

The purpose of this stage was twofold: to identify the changing environment since 1970s and test how congruous people's attitudes to each issue are with their political views. Regarding the first purpose, in other words, it was to find the most influential predictors which have the

[3] Until 1993, GSS had been irregularly conducted in a year or two. Since 1994, it has been conducted biennially on a regular basis.

most explanation power on people's self-positioning of political orientation. If one social issue is more strongly related to deciding one's political orientation than other issues, it implies that the issue is now more debatable in our society and forcing people to adjust to the new habits of thought. In addition to the first purpose, through the second purpose, this study tried to test if the argument of Converse (1964) was still valid. After analyzing open-ended interview questions, he concluded that a majority of people did not have a clear grasp of ideology. Relatively recently, Fiorina (2006) also developed a similar argument doubting the existence of a confirmed belief system among most Americans. By regressing individual's political orientation on various issues, this study was able to check the sign and statistical significance of the coefficients, and finally, judge if the mass belief system is reliable.

To collect candidates of the most active social issues, this study borrowed Davis (1992)'s 42 items that he used to track the overall trends of the "liberal" shift in the U.S. from 1972 to 1989. Some of the previous studies—including Davis (1992)—often clustered the items into several categories such as crime, free speech, politics, race, religion, and gender (Davis 1992) or moral, economic, and civil rights (Baldassarri and Park 2020). However, in this study, all items were individually put into the model considering that the selective adaptation process of each issue proceeds at their own pace. In order to address any possible multicollinearity problem and reduce variances of the least-squares estimates, the L2 regularization (Ridge regression) was applied. Ridge regression is often used for variable selection in case there a large number of explanatory variables. Because it adds the squared magnitude of coefficient as a penalty, the coefficients of less influential variables end up being close to zero. By doing so, this study could avoid unnecessary bias resulting from constructing new variables and deal with every specific issue separately.

Out of the 42 items, this study removed four items which does not represent social issues—party affiliation (*PARTYID*), political views (*POLVIEWS*), frequency of attendance at religious services (*ATTEND*), and whether or not watched X-rated movie(*XMOVIE*)—and replaced the condition for legal abortion (*ABHLTH*, *ABSINGLE*) with a more general predictor (*ABANY*). Lastly, this study added one new issue, gun permits (*GUNLAW*). Thus, in the model total of 38 items were separately used, and their description is as in Table 1.

Table 1: Candidates of Most Active Social Issues in Our Time

Variable	Description	Variable	Description
cappun	Favor or oppose death penalty for murder	busing	Attitude toward racial busing
courts	Courts dealing with criminals	natrace	Improving the conditions of blacks
grass	Should marijuana be made legal	racmar	Favor law against racial intermarriage
natcrime	Halting rising crime rate	racopen	Vote on open housing law
natdrug	Dealing with drug addiction	racseg	Whites have right to seg. Neighborhood
libath	Allow anti-religious book in library	fund	How fundamentalist is r currently
libcom	Allow communists book in library	letdie1	Allow incurable patients to die
libhomo	Allow homosexuals book in library	postlife	Belief in life after death
pornlaw	Feelings about pornography laws	reliten	Strength of affiliation
spkath	Allow anti-religionist to speak	suicide1	Suicide if incurable disease
spkcom	Allow communists to speak	natheal	Improving & protecting nations health
spkhomo	Allow homosexual to speak	chldidel	Ideal number of children
spkrac	Allow racist to speak	fehome	Women take care of home not country
commun	Feelings about communism	fepres	Vote for woman president
natarms	Military, armaments, and defense	fework	Should women work
natcity	Solving problems of big cities	homosex	Homosexual sex relations
nateduc	Improving nations education system	premarsx	Sex before marriage

natenvir	Improving & protecting environment	abany*	Abortion if woman wants for any reason
natfare	Welfare	gunlaw*	Favor or oppose gun permits

Note: The variables with an asterisk were newly added, and the others are from Davis (1992).

To compare the strength of coefficients, this study normalized every continuous variable to a 0-to-1 range and added the survey year as a control variable. Thus, the linear regression model and its least square estimates are as below:

$$Political\ Orientation_i = \beta_0 + \sum_{k=1}^{K} \beta_k Issue_{ik} + \sum_{n=1}^{N} \gamma_n Year_n + \epsilon_i$$

$$\hat{\beta}^{ridge} = arg\min_{\beta} RSS + \lambda \sum_{k=1}^{K} \sum_{n=1}^{N} |\beta_k|_2^2 + |\gamma_n|_2^2$$

where *i* is each individual, *k* social issue, and *n* is the survey year. In the second equation, RSS is the residual sum of squares from the first equation and λ is a hyperparameter adjusting the extent of penalty level, which was decided by the 10-fold cross-validation in this study. For missing values, this study used the multivariate imputation method and compared the results of five imputed datasets to secure the robustness of the imputation.

4.2 *Stage 2*: Mixed-effect Cohort Analysis Models

In Stage 2, this study tests the hypothesis in earnest. At the end of Section 3, we established a hypothesis that a group of people whose discomfort level is higher will have a more liberal orientation than other groups. It means that this test is to find what is the crucial dynamic force for people to change their existing ways of thinking during the interaction process between our institutions and the changing environment.

To find a causal relationship between key variables over time, it might be the most suitable method to use a panel analysis. However, because the GSS is a repeated cross-sectional dataset, it was impossible to apply panel analysis directly. As an alternative, this study transformed the dataset into a pseudo-panel by grouping each individual into several cohorts by their birth-year interval and calculating the average values of each cohort. By doing this transformation, we can observe each cohort repeatedly in different survey years. This approach was first devised by Deaton (1985) to make up for the lack of panel data. The most significant benefit of the pseudo-panel analysis is that it can cover a long-time period using the existing repeated cross-sectional data and that it is free from any attrition issue of panel data (Guillerm 2017).

After converting the dataset to a pseudo-panel data format, this study conducted multilevel mixed-effect regression on the cohort observations. Multilevel regression has an advantage in that it does not require a balanced panel design nor equally spaced measurement. Because in the converted dataset, each cohort has an unbalanced number of survey years, it was considered a suitable methodology for this study. Considering that each cohort was repeatedly observed across tens of survey years, this study designed a two-level hierarchical structure: the effect within the cohort at level 1 and between cohorts at level 2. Thus, the model used in this stage is:

$$\overline{Political\ Orientation}_{tc} = \beta_{0c} + b_1\overline{Discomfort}^2_{tc} + b_2\overline{Discomfort}_{tc} + \bar{\boldsymbol{X}}\gamma_{controls} + \bar{\varepsilon}_{tc}$$

$$\beta_{0c} = b_0 + \bar{\zeta}_c$$

where *t* is the survey year, *c* is each cohort, $\bar{\zeta}_c \sim N(0, \sigma^2_\zeta)$, $\bar{\varepsilon}_{tc} \sim N(0, \sigma^2_\varepsilon)$, and the latter two terms are independent each other. $\bar{\boldsymbol{X}}$ is a feature matrix for all control variables including ratio-scaled

personal income, subjective opinion of family income, age, and education level. Notably, all variables, including the controls, are the average values of observed individuals belonging to the same cohort at each survey year. Thus, for each variable z, z_{tc} is transformed to $\bar{z}_{tc}$ where $\bar{z}_{tc} = \frac{1}{N}\sum_{i\in t,c} z_{itc}$.

In order to measure the level of discomfort, which is the key explanatory variable of this study, this study used the level of general happiness (*HAPPY*) from the GSS dataset and rearranged it so that 1 indicates "Very happy" and 3 "Not too happy." Even though the happiness item does not completely match up with the discomfort level this study described, it is expected that the average cohort value of the item represents the overall society satisfaction level of each cohort. Also, its squared term was added to catch a quadratic relationship.

One of the most careful parts of using a pseudo-panel format is to decide the size of cohorts. The larger the number of each cohort, the lower the measurement errors; however, using large cohorts means fewer observations which means the variability of observations at any given time decreases (Guillerm 2017). Due to the trade-off between the size of cohorts and the number of cohorts, this study used four different age brackets (3-year, 5-year, 10-year brackets, PEW Research Center's generational cohort[4]) to secure the robustness of the results. Their descriptive statistics were listed in Table A1 to A4 in the Appendix.

[4] PEW Research Center (2017) defined generational cohorts in the U.S. such as Greatest Generation (born 1901-1927), Silent Generation (born 1928-1945), Baby Boom Generation (born 1946-1964), Generation X (born 1965-1980), Millennial Generation (born 1981 to 1996), and Generation Z (born 1997 and later).

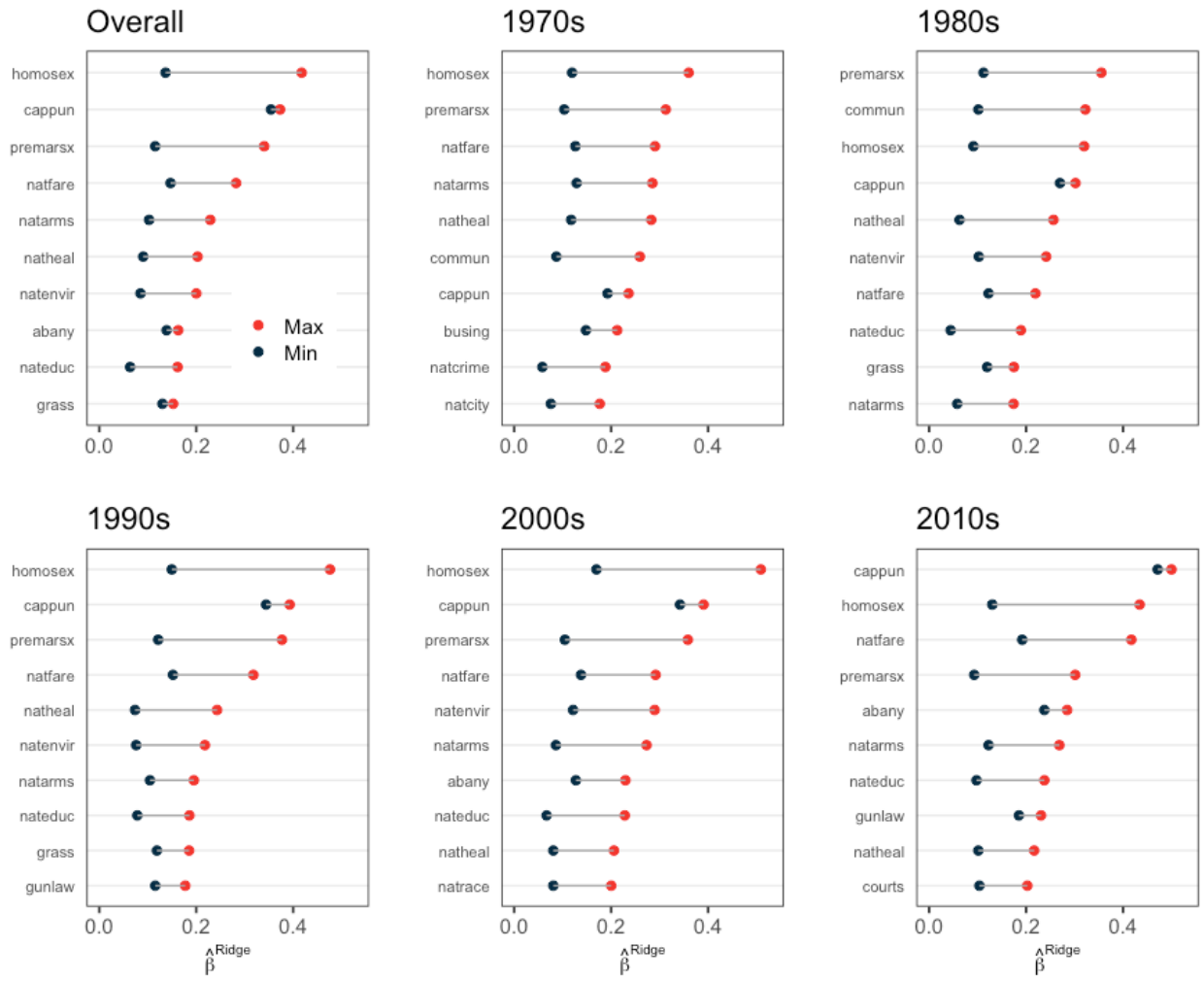
5. Results

5.1. Results of Stage 1

The results of the linear regression with L2 regularization by period are as in Figure 5 (only the top 10 predictors are listed). The red point indicates the maximum coefficient value among the five imputed sets, and the blue point the minimum value. Notably, homosexuality (*HOMOSEX*), premarital sex (*PREMARSX*), and capital punishment (*CAPPUN*) have been consistently at the heart of the changing environment in our era since the 1970s. On the other hand, attitudes towards Communism (*COMMUN*) and racial busing (*BUSING*) had been essential predictors in the 1970s or 1980s but no longer appeared on the top 10 list since the 1990s. Also, the issues related to government role (variables starting with *NAT*) have always been important predictors: the liberals tend to expect the government for larger roles and more active interventions. The complete result of this model is available in Table A5 in the Appendix.

The signs of all key predictors were reasonable, as expected. A person has a more liberal orientation if she or he is favorable to homosexual and premarital sexual relations, abortion, euthanasia, smoking marijuana legally, government's spending for welfare, and gun permits. On the other hand, they tended to oppose the death penalty for murder, have a less strong affiliation with religion and prefer fewer children. This means that Converse (1964) and Fiorina (2006)'s inferences for the unstable mass belief system might be an inflated concern. We can see that people generally positioned themselves on the political orientation spectrum in accordance with their attitudes towards various issues.

Figure 5: Result of Stage 1



From this result, this study identified which issues nowadays have been exerting pressure on us to change our old ideas, and the key issues such as homosexuality, death penalty, and premarital sex have long been struggling with the existing institutions over the last fifty years, at least. To put it another way, those social issues are now going through the test of selective adaptation over which the conservative and liberal sides are most seriously counterposing each other.

5.2 Results of Stage 2

Table 2 summarizes the results of the mixed-effect models with different birth-year intervals. Model (1) to (4) shows the results with 3-year, 5-year, 10-year, and PEW Research Center's generational cohorts, respectively. As seen in Model (2) and (3), the cohort's average level of discomfort has a significantly positive relationship with their average political orientation regardless of cohort interval. Namely, when a cohort feels more uncomfortable with their lives in general, they tend to become more liberal. This result supports the alternative hypothesis of this study. Moreover, the squared term of discomfort level also showed a positive sign in both Model (2) and (3). It means that as the discomfort level of the cohort increases, the extent to be liberal also increases.

Table 2: Results of Mixed-effect Cohort Analysis

	Dependent variable: Political Views (1: Extremely Conservative, 7: Extremely Liberal)			
	(1) 3-year Cohort	(2) 5-year Cohort	(3) 10-year Cohort	(4) PEW Cohort
Fixed part				
(Discomfort level)^2	0.042***	**0.063*** **	**0.049***	-0.030
	(0.010)	(0.020)	(0.027)	(0.054)
Discomfort level	-0.006	**0.071****	**0.083***	0.023
	(0.029)	(0.033)	(0.046)	(0.078)
Personal income	-0.096***	-0.124***	-0.126***	-0.075
	(0.028)	(0.035)	(0.043)	(0.075)
Subjective family income level	-0.089***	-0.048	0.011	-0.158**
	(0.027)	(0.034)	(0.044)	(0.062)
Age	-0.551***	-0.650***	-0.654***	-0.712***
	(0.034)	(0.045)	(0.067)	(0.086)
Education level	0.025	-0.015	-0.103	0.074
	(0.036)	(0.050)	(0.072)	(0.088)
Constant	-0.050	-0.052	-0.037	0.039
	(0.048)	(0.076)	(0.124)	(0.113)

Random part				
σ_ϵ^2	0.379	0.335	0.285	0.389
σ_ζ^2	0.044	0.079	0.128	0.043
Number of Cohorts	31	19	10	7
Number of Observations	639	401	221	134
Log Likelihood	-629.907	-378.788	-197.033	-138.937
Akaike Inf. Crit.	1,277.814	775.576	412.066	295.874
Bayesian Inf. Crit.	1,317.953	811.522	442.650	321.954
Note:				*p**p***p<0.01

On the other hand, in Model (1) and (4), due to the trade-off between the size of cohorts and the number of cohorts—some cohorts in Model (1) have only one observation, and the total number of cohorts in Model (4) is seven—both models could not catch the relationship correctly.

Regarding other control variables, income and age show consistent adverse effects in most models. As the average age of a cohort increases, they tend to be more conservative. This trend is also shown in Figure 3. Also, as the average income of a cohort is high, they showed less liberal orientation. Lastly, the variances of the random intercept (σ_ζ^2) in all models were smaller than the variances of the within-cohort error terms (σ_ϵ^2). It means that the differences within cohort in terms of their intercepts are a more critical factor to explain the entire data than the between-cohort difference across time.

6. Conclusion

Our way of thinking has gradually altered according to the change of living environment, and in this process, discordance always occurs among people due to their different time point of accepting the new thoughts. This study tried to explain the discordance based on the social

Darwinian theory in which our habits of thought are deemed a result of the past interaction procedure between environment and institutions. Through a hypothesis test, this study concluded that individuals' discomfort arisen from discordance is a vital force promoting people to adopt new ideas. If people feel more uncomfortable with the existing institutions facing a newly introduced environment, they become more favorable to the change; thus, they tend to have a more liberal propensity in general.

As measuring the discomfort level using the individual's general happiness level, however, this study is exposed to potential measurement error. In the strictest sense, the happiness level cannot accurately represent the uncomfortable feeling towards a specific topic. For future studies, it needs to be considered an alternative variable. Constructing a new variable using different measurements might be a good attempt. Another limitation comes from converting the individual-level data to a cohort-based panel form. Because some individual information such as gender cannot be aggregated, it lost several controls that might affect the output variable. Lastly, although, in Section 2 and 3, this study emphasized the importance of institutionalization several times, it did not deal with its isolated impact on the selective adaptation process. If future studies address this issue, it will be a valuable addition to the issue diffusion and other relevant literature.

Despite all of these limitations, this study is meaningful because it revisited the social Darwinian mechanism on social progress and sought an answer from it to why public opinions on some issues show the liberalization trend while others are being polarized. Unlike the previous literature that mainly focused on the revealed tendencies and their traits, this study attempted to find a logic behind them. From the social evolutionary perspective, our institutions are not progressing in a prearranged direction, but just evolving according to the result of the interaction process between our habits of thought and the new situation we face (Veblen 1899). Therefore, it

would be more important to thoroughly understand its operational principle than to identify ostensible shapes of the patterns.

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Appendix

Table A1: Descriptive Statistics of Pseudo-Panel Data with 3-year Cohort (Standardized)

#	Cohorts	N_year	Polviews	Satisfaction	Income	Sub_income	Age	Education
1	1888-1911	21	-0.821	-0.446	0.160	-0.692	1.535	-2.207
2	1912-1914	22	-0.343	-0.509	0.036	-0.920	1.213	-1.689
3	1915-1917	24	-0.777	-0.374	0.291	-0.403	1.139	-1.321
4	1918-1920	25	-0.374	-0.493	-0.211	-0.208	1.029	-1.054
5	1921-1923	27	-0.678	0.103	-0.188	-0.025	0.960	-0.914
6	1924-1926	28	-0.672	-0.220	0.020	-0.048	0.850	-0.696
7	1927-1929	30	-0.533	-0.174	0.054	0.303	0.785	-0.510
8	1930-1932	30	-0.659	-0.056	0.180	0.436	0.635	-0.224
9	1933-1935	30	-0.699	-0.180	0.213	0.288	0.480	-0.122
10	1936-1938	30	-0.346	-0.252	0.167	0.099	0.330	0.031
11	1939-1941	30	-0.436	-0.283	0.359	0.487	0.176	0.281
12	1942-1944	30	-0.205	0.002	0.374	0.702	0.025	0.509
13	1945-1947	30	0.319	0.129	0.504	0.657	-0.131	0.784
14	1948-1950	30	0.654	0.052	0.363	0.392	-0.277	0.899
15	1951-1953	30	0.577	0.263	0.305	0.064	-0.428	0.781
16	1954-1956	30	0.436	0.338	0.161	-0.012	-0.581	0.553
17	1957-1959	29	0.409	0.174	0.024	0.036	-0.694	0.463
18	1960-1962	26	0.360	0.207	-0.055	-0.239	-0.741	0.572
19	1963-1965	24	0.064	0.321	-0.243	-0.026	-0.823	0.526
20	1966-1968	22	0.404	-0.136	-0.329	-0.136	-0.905	0.429
21	1969-1971	19	0.562	0.061	-0.388	-0.042	-0.945	0.603
22	1972-1974	16	0.578	0.221	-0.255	-0.668	-0.977	0.514
23	1975-1977	14	0.527	0.182	-0.405	-0.363	-1.036	0.499
24	1978-1980	12	0.810	0.842	-0.367	-0.637	-1.091	0.428
25	1981-1983	10	0.892	0.621	-0.480	-0.673	-1.140	0.630
26	1984-1986	9	2.109	-0.553	-0.636	-0.305	-1.237	0.591
27	1987-1989	7	1.339	0.848	-1.256	-0.665	-1.295	0.403
28	1990-1992	6	0.850	0.414	-1.916	-0.632	-1.386	0.186
29	1993-1995	4	0.911	1.021	-2.104	-0.105	-1.439	0.028
30	1996-1998	3	0.519	0.878	-2.244	0.063	-1.525	-0.192
31	1999-2000	1	0.440	1.205	-2.751	0.343	-1.575	-0.960

Table A2: Descriptive Statistics of Pseudo-Panel Data with 5-year Cohort (Standardized)

#	Cohorts	N_year	Polviews	Satisfaction	Income	Sub_income	Age	Education
1	1888-1911	21	-0.959	-0.606	0.187	-0.738	1.480	-2.124
2	1912-1916	23	-0.781	-0.377	0.196	-0.687	1.147	-1.424
3	1917-1921	26	-0.489	-0.358	-0.241	-0.138	1.021	-0.971
4	1922-1926	28	-0.768	-0.286	-0.012	-0.050	0.858	-0.712
5	1927-1931	30	-0.634	-0.190	0.087	0.428	0.701	-0.328
6	1932-1936	30	-0.693	-0.215	0.226	0.324	0.449	-0.080
7	1937-1941	30	-0.520	-0.447	0.353	0.465	0.202	0.262
8	1942-1946	30	-0.026	0.036	0.458	0.774	-0.042	0.628
9	1947-1951	30	0.695	0.092	0.430	0.522	-0.286	0.936
10	1952-1956	30	0.599	0.314	0.244	0.044	-0.532	0.682
11	1957-1961	29	0.507	0.200	-0.020	-0.034	-0.734	0.484
12	1962-1966	25	0.214	0.320	-0.240	-0.133	-0.844	0.532
13	1967-1971	21	0.585	0.290	-0.370	-0.230	-0.950	0.498
14	1972-1976	16	0.727	0.153	-0.314	-0.738	-1.006	0.529
15	1977-1981	12	0.853	0.641	-0.368	-0.709	-1.072	0.538
16	1982-1986	10	1.652	0.571	-0.665	-0.385	-1.211	0.550
17	1987:1991	7	1.563	0.750	-1.411	-0.648	-1.311	0.376
18	1992-1996	5	1.079	1.139	-2.080	-1.073	-1.442	-0.130
19	1997-2000	2	1.311	2.191	-2.488	1.372	-1.518	-0.326

Table A3: Descriptive Statistics of Pseudo-Panel Data with 10-year Cohort (Standardized)

#	Cohorts	N_year	Polviews	Satisfaction	Income	Sub_income	Age	Education
1	1888-1911	21	-0.985	-0.700	0.238	-0.721	1.374	-1.966
2	1912-1921	26	-0.591	-0.385	-0.215	-0.314	1.023	-1.011
3	1922-1931	30	-0.717	-0.219	0.087	0.267	0.736	-0.377
4	1932-1941	30	-0.616	-0.402	0.347	0.511	0.265	0.195
5	1942-1951	30	0.380	0.076	0.494	0.771	-0.207	0.875
6	1952-1961	30	0.575	0.395	0.189	0.082	-0.647	0.688
7	1962-1971	25	0.391	0.376	-0.311	-0.125	-0.921	0.560
8	1972-1981	16	0.891	0.337	-0.412	-0.857	-1.073	0.492
9	1982-1991	10	1.784	0.747	-0.830	-0.410	-1.253	0.493
10	1992-2000	5	1.099	1.400	-2.084	-0.929	-1.429	-0.125

Table A4: Descriptive Statistics of Pseudo-Panel Data with PEW's Cohort (Standardized)

#	Cohorts	N_year	Polviews	Satisfaction	Income	Sub_income	Age	Education
1	Baby Boomers	30	0.590	0.212	0.264	0.306	-0.556	0.802
2	Generation X	23	0.517	0.341	-0.532	-0.351	-1.015	0.482
3	Generation Z	2	1.287	2.400	-2.133	1.815	-1.419	-0.084
4	Greatest Generation	29	-0.583	-0.316	-0.046	-0.405	0.976	-0.675
5	Lost Generation	14	-1.163	-0.733	0.733	-0.617	1.474	-2.152
6	Millennials	10	1.280	0.872	-0.801	-0.684	-1.206	0.507
7	Silent Generation	30	-0.393	-0.276	0.352	0.750	0.199	0.322

Table A5: Complete Result of Stage 1 (Overall: 1970s – 2010s)

	Imputed Set 1		Imputed Set 2		Imputed Set 3		Imputed Set 4		Imputed Set 5	
#	Predictor	$\hat{\beta}$	Predictor	$\hat{\beta}$	Predictor	$\hat{\beta}$	Predictor	$\hat{\beta}$	Predictor	$\hat{\beta}$
1	cappun	0.354	homosex	0.403	homosex	0.418	homosex	0.395	homosex	0.413
2	abany	0.161	cappun	0.370	cappun	0.361	cappun	0.367	cappun	0.373
3	natfare	0.147	premarsx	0.340	premarsx	0.325	premarsx	0.294	premarsx	0.322
4	homosex	0.137	natfare	0.277	natfare	0.276	natfare	0.280	natfare	0.282
5	gunlaw	0.135	natarms	0.207	natarms	0.205	natarms	0.229	natheal	0.199
6	grass	0.134	natenvir	0.200	natheal	0.203	natenvir	0.188	natarms	0.198
7	premarsx	0.115	natheal	0.197	nateduc	0.162	natheal	0.169	natenvir	0.183
8	natarms	0.103	abany	0.155	grass	0.152	abany	0.163	grass	0.148
9	busing	0.100	nateduc	0.145	natenvir	0.150	grass	0.150	nateduc	0.146
10	natheal	0.091	gunlaw	0.140	abany	0.145	natrace	0.143	abany	0.139
11	natenvir	0.085	grass	0.130	gunlaw	0.137	nateduc	0.134	natrace	0.127
12	reliten	-0.084	natrace	0.130	natrace	0.127	gunlaw	0.131	gunlaw	0.120
13	postlife	-0.078	commun	0.088	natcity	0.091	natcity	0.099	natcity	0.091
14	natrace	0.072	busing	0.085	reliten	-0.082	commun	0.096	racopen	0.082
15	racopen	0.066	courts	0.084	letdie1	0.079	reliten	-0.087	letdie1	0.079
16	nateduc	0.064	natcity	0.084	racopen	0.077	letdie1	0.079	reliten	-0.076
17	spkath	-0.049	postlife	-0.081	postlife	-0.076	courts	0.078	busing	0.075
18	fepres	0.042	reliten	-0.079	courts	0.073	postlife	-0.073	courts	0.068
19	letdie1	0.041	racopen	0.068	fepres	0.070	pornlaw	0.060	commun	0.067
20	pornlaw	0.039	fepres	0.061	busing	0.062	chldidel	-0.057	pornlaw	0.060
21	courts	0.039	letdie1	0.055	commun	0.057	racopen	0.057	postlife	-0.059
22	fehome	0.038	natdrug	0.055	chldidel	-0.052	natdrug	0.054	natdrug	0.055
23	fund	0.038	spkath	-0.044	pornlaw	0.043	spkhomo	-0.052	fepres	0.053

24	suicide1	0.037	fund	0.042	racmar	-0.042	busing	0.052	suicide1	0.042
25	natcity	0.037	pornlaw	0.040	natdrug	0.042	fepres	0.047	natcrime	0.041
26	racmar	-0.030	spkhomo	-0.039	fund	0.040	fund	0.045	fund	0.039
27	natdrug	0.028	chldidel	-0.038	spkhomo	-0.032	suicide1	0.041	libhomo	-0.035
28	commun	0.025	suicide1	0.034	spkath	-0.029	racmar	-0.037	racmar	-0.031
29	spkhomo	-0.024	racmar	-0.030	suicide1	0.024	spkath	-0.028	spkhomo	-0.030
30	libcom	-0.022	libath	0.030	natcrime	0.023	natcrime	0.028	chldidel	-0.028
31	year	-0.015	natcrime	0.022	spkrac	-0.017	fehome	0.021	spkath	-0.024
32	libhomo	-0.014	libhomo	-0.019	libcom	-0.016	libath	-0.019	fehome	0.023
33	libath	0.014	year	-0.014	year	-0.015	year	-0.015	spkcom	-0.019
34	natcrime	0.012	libcom	-0.014	libath	-0.008	libhomo	-0.014	fework	0.016
35	chldidel	-0.007	spkcom	0.009	libhomo	-0.006	fework	0.012	year	-0.015
36	spkrac	0.007	spkrac	-0.006	fehome	0.005	spkcom	0.002	libath	0.006
37	spkcom	-0.007	fehome	0.005	spkcom	0.005	spkrac	0.001	libcom	-0.002
38	fework	0.003	fework	0.001	fework	0.002	libcom	0.001	spkrac	-0.001
	(Intercept)	0.913	(Intercept)	1.778	(Intercept)	1.870	(Intercept)	1.834	(Intercept)	1.692
	MSE	1.617		1.588		1.600		1.586		1.601