UNIVERSITY OF CALIFORNIA

Santa Barbara

Explaining Regional Differences in Attitudes toward Gay Men and Lesbians: The Contextual Influence of Education

A Thesis submitted in partial satisfaction of the

requirements for the degree Master of Arts

in Sociology

by

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June 2020

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ACKNOWLEDGEMENTS

I want to thank my committee chair Maria Charles for reading countless drafts of this thesis and providing wonderful advice, and thanks to John Sutton, Sarah Thébaud, and Catherine Taylor for their feedback throughout the writing process. I want to acknowledge the Broom Center for Demography for providing the funds for me to attend an Inter-University Consortium for Political and Social Research workshop, which helped further my research.

ABSTRACT

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LGBT policies governing hate crimes, discrimination, adoption, conversion therapy, health care, restroom access, and gender identity documentation all differ by state. In order to better understand this geographic disparity, this thesis explores variability in attitudes toward gay men and lesbians within the United States. Employing 1984-2016 American National Election Studies (ANES) data, I assess the power of state-level economic, social, cultural, and political factors to explain attitudinal differences across US states. Results show that the educational attainment of a state's population is the most robust macro-level predictor of individual attitudes toward homosexuality. An increasing percentage of college graduates leads to generally more positive attitudes across the state, even among those who are not themselves college educated. Other contextual level variables, such as economic development, religious fundamentalism, or political and legal conditions, do not explain the association between population level educational attainment and attitudes toward gay men and lesbians. Understanding what explains regional differences in attitudes can help social scientists and policy makers mitigate disparities in outcomes for and treatment of sexual minorities.

I. Introduction

In 2017, New York Times columnist Frank Bruni wrote an opinion piece called "The Worst (and Best) Places to Be Gay in America." He asserts, "There's no such thing as LGBT life in America…" Rather, there is LGBT life in progressive states like New York and California, and there is LGBT life in conservative states like Texas and Mississippi. Policies governing hate crimes, discrimination, adoption, conversion therapy, health care, restroom access, and gender identity documentation all differ by state. Through personal anecdotes, Bruni demonstrates that living in different states is not only a matter of policy but also of lived experience. For example, gay parents are applauded and respected in LGBT friendly states, while they are vilified and threatened in LGBT hostile states. Research studies that have examined regional differences in outcomes for gay men and lesbians corroborate Bruni's argument. For example, employment callback rates for gay men in states located in the South and Midwest were significantly lower than in the Northeast or West (Tilcsik 2011), wage gaps for gay men and lesbians are largest in "non-metropolitan Canada" (Denier and Waite 2018), and gay men and lesbians experience worse mental health outcomes in states that have fewer protections or deny services for sexual minorities (Hatzenbuehler, Keyes, and Hasin 2009; Raifman et al. 2018).

What explains this geographic disparity in LGBT life? While many LGBT people tacitly understand this geographic contrast, comparative sociological research on attitudes toward homosexuality has largely overlooked regional variation.[1] Scholars have primarily focused on variation across country or country-year and either explored over-time changes in

[1] To be clear, most research to date has mainly explored attitudes toward gay men and lesbians/homosexuality, and not bisexuality, gender identity, or other identities in the LGBTQ+ community; gay men and lesbians are the focus of this paper due to limitations in historical data.

attitudes within one country (e.g. Baunach 2011; Baunach 2012; Fetner 2016; Loftus 2001; Rosenfeld 2017), or variation across multiple countries (e.g. Adamczyk 2017; Andersen and Fetner 2008b; Inglehart and Baker 2000; Inglehart 2018; Hadler and Symons 2018; Hildebrant, Trudinger, and Wyss 2018). While understanding how countries compare with each other or how the United States has changed over time is important, not enough research focuses on the "missing-middle" subnational scale (Lobao, Hooks, and Tickamyer 2008). With such large subnational disparities, most countries, especially ones as large and heterogeneous as the United States, cannot be construed as monolithic in their treatment of sexual minorities. This misappraisal means that not much is known about how subnational contextual factors affect individual attitudes within a country such as the United States, and crucially, how these contextual factors differ from those identified through cross-national comparisons. Without understanding why or how state-level differences express themselves, social scientists and policy makers cannot adequately address disparities in the treatment of and outcomes for sexual minorities, such as the ones Bruni highlights in his article.

This thesis offers a closer look at contextual explanations of variability in attitudes toward homosexuality within the United States. Employing 1984-2016 American National Election Studies (ANES) data, I assess how well contextual variables measured at the state level explain variation in individual responses on a feeling thermometer toward gay men and lesbians. ANES asks respondents to rate how warmly or coldly they feel toward gay men and lesbians on a feeling thermometer scale of 0-100. Results show that the educational attainment of a state's population influences individual attitudes toward homosexuality, where an increasing percentage of college graduates leads to generally more positive attitudes across the state, even among those who are not themselves college educated. This effect exists not only for between-state differences but also for within-state changes. The

results are net of individual level covariates such as education, religiosity, and belief in Biblical literalism, among other demographic variables. Contrary to some previous cross-national studies, other contextual level variables, such as economic development, religious fundamentalism, or political and legal conditions, do not explain the association between population level educational attainment and attitudes toward gay men and lesbians.

II. Attitudes toward Homosexuality: US and Cross-National Research

In the United States research examining attitudes toward homosexuality has primarily focused on change over time using national data and emphasized individual characteristics over contextual factors. American attitudes toward homosexuality and same-sex marriage have significantly liberalized since the 1970s and 80s (Baunach 2011; Baunach 2012; Fetner 2016; Loftus 2001; Rosenfeld 2017). Despite broad-based improvements in public opinion, researchers have identified three major fault lines in American attitudes: politics, religion, and education. Public opinion toward homosexuality is typically more negative for Republicans and political and religious conservatives (Adamczyk, Boyd, and Hayes 2016; Baunach 2011; Baunach 2012; Loftus 2001; Sherkat et al. 2010). Backlash to same-sex marriage legalization was nonexistent except among conservative partisans (Bishin et al. 2015; Kazyak, Burke, and Stange 2018; Kazyak and Stange 2018; Redman 2018), and backlash was particularly strong in regions that had not legalized same-sex marriage prior to the 2015 Supreme Court decision (Ofosu et al. 2019). At the same time, college education at the individual level generally improves favorability toward gay men and lesbians (Engberg, Hurtado, and Smith 2004; Kozloski 2010; Lambert et al. 2008; Ohlander, Batalova, and Treas 2005; Treas 2002), and changes in educational attainment in the United States are likely related to the drastic shifts in public opinion toward gay men and lesbians (Loftus 2001). However, researchers have yet to extensively examine how these individual

predictors might scale up to aggregate contextual level effects. For example, does it matter if an individual who is not college educated lives in a state with a lot of college graduates? Does living in an area with a lot of religious conservatives affect even those who are not themselves religious?

The contextual factors that might explain regional differences in the United States have largely been developed at the cross-national level. Cross-national comparisons seek to understand why some countries seem to be more "tolerant" of homosexuality than others. One theory is that economic development (how wealthy and industrialized a country is) partially accounts for international variation in attitudes toward homosexuality (Adamczyk 2017; Andersen and Fetner 2008b; Inglehart and Baker 2000). Economic development leads to material abundance where individuals do not have to worry about daily survival; in turn, this leads to individualist "postmaterialist values", which include, among other things, tolerance of sexual minorities (Inglehart 2018). Cultural-religious context also explains some of the variation in attitudes (Adamczyk 2017; Inglehart and Baker 2000), where differences exist both in the dominant religion and how salient it is in society. The strength of religious norms is frequently more important than the type of dominant religion in explaining attitudinal variation (Adamczyk 2017).

Political variables (such as a free press and individual rights) also play a role, with the link between economic development, public opinion toward homosexuality, and favorable laws toward sexual minorities sometimes moderated by political processes: democracies are more likely to translate favorable public opinion into liberal LGBT policies (Adamczyk 2017; Hildebrandt, Trudinger, and Wyss 2018). Countries with more links to liberal global institutions are more likely to adopt liberal LGBT policies (Frank and Moss 2017; Velasco 2018), while countries outside the sphere of liberal influence are increasingly introducing

repressive policies (Hadler and Symons 2018). Introducing favorable policies can improve attitudes toward gay men and lesbians (Abou-Chadi and Finnigan 2018). What these cross-national comparisons suggest is that each country inhabits a specific overarching economic, religious, or political context that influences individual attitudes.

A few studies do adopt this framework for studying variation within the US by asking what macro-sociological forces shape regional differences in attitudes and policies. Counties with strong gender norms and simultaneously "weak community cohesion" were most likely to support same sex marriage bans (McVeigh and Diaz 2009), and strong religious climates at the county level negatively affect individual attitudes toward gay men and lesbians (Adamczyk, Boyd, and Hayes 2016). Unfortunately, research explaining regional differences for gay men and lesbians specifically is surprisingly sparse (Adamczyk and Liao 2019). Research in other areas, however, can offer clues. The density of fundamentalist Protestants has been connected to regional differences in conservative gender attitudes and the willingness to extend civil liberties to unpopular groups such as communists, racists, and homosexuals (Ellison and Musick 1993; Moore and Vanneman 2003; Moore and Ovadia 2006), while an increasing proportion of college educated individuals in an area appears to increase tolerance of unpopular groups (Moore and Ovadia 2006).

While the effects of affluence, religion, politics, and policies figure prominently in research on macro-sociological forces, research on the effect of demographic differences in college education is quite rare (cf. Moore and Ovadia 2006). Even though numerous studies have pointed to strong individual level effects of college education (Engberg, Hurtado, and Smith 2004; Kozloski 2010; Lambert et al. 2008; Ohlander, Batalova, and Treas 2005; Treas 2002), researchers have not substantially examined how an increasing population density of college educated persons may affect attitudes toward gay men and lesbians. Both Loftus

(2001) and Treas (2002) suggest college education has something to do with increasing acceptance of gay men and lesbians, but neither examines this relationship at the macro level. The only study that seriously considers the contextual effect of college education is Moore and Ovadia (2006), who argue increasingly college educated populations are more willing to extend civil liberties to a range of unpopular groups, such as racists, communists, and homosexuals. The role of population level educational attainment in influencing attitudes toward gay men and lesbians merits more attention. The US population has become more college educated, both in absolute terms and as a share of the population, since 1960, when it was 7.7% college educated, to 2018, when it was 35% college educated (Census Bureau 2019). Furthermore, substantial disparities exist between state level educational attainment: in 2000, the most college educated state (Massachusetts) had more than double the percent of college graduates than the least college educated state (West Virginia) (Census Bureau 2019). College educated individuals may spread more tolerant attitudes toward gay men and lesbians via face to face interactions or through more institutionalized means such as news media and school curricula (Moore and Ovadia 2006). An increasing density of college graduates means that non-college educated individuals are more likely to encounter the perspectives of college graduates and possibly be influenced by their attitudes toward gay men and lesbians.

III. What Explains Regional Differences within the US?

In this thesis I focus on five contextual variables that researchers have used to explain spatial differences in attitudes toward gay men and lesbians: societal affluence, religious context, political conditions, policy landscape, and educational attainment. The over-time data available through the ANES surveys allow me to model how changes in these

contextual features of states since 1984 map onto differences in attitudes toward gay men and lesbians.

I begin by addressing Inglehart's (2018) postmaterialist thesis. Increasing societal affluence enables individuals to no longer worry about their day-to-day survival, a condition which predisposes humans to be suspicious of outsiders and toward a mindset of intolerance (Inglehart 2018). This increase in prosperity lends material security to many people in that society, a phenomenon which has primarily manifested in post-World War II North America, Europe, and Japan (Inglehart 2018). This material security generates a new set of values dubbed "postmaterialist" values, meaning that the people who hold them have shifted their concerns toward values that emphasize self-expression, tolerance, and freedom, including tolerance of sexual minorities (Inglehart 2018). While this theory is most often used to explain differences between countries, significant disparities in affluence within countries exist (Andersen and Fetner 2008b). The United States is an excellent country to study subnational variations in affluence. Based on GDP per capita in 2018 dollars, the wealthiest state, New York, had double the wealth of the poorest state, Mississippi. This large disparity in wealth between states suggests possible subnational differences that may affect attitudes toward gay men and lesbians. Based on this postmaterialist theory:

Hypothesis 1: Increasing state affluence will be associated with more favorable attitudes toward gay men and lesbians.

Researchers have often turned to differences in religion and in religious intensity in order to understand why some places are more tolerant of gay men and lesbians (e.g. Adamczyk 2017; Inglehart and Baker 2000). In comparative research, the US is treated as a

largely Anglo-Protestant cultural entity, yet significant regional variations exist. For example, evangelical Christians comprise 25.4% of the US population, yet they are not evenly distributed throughout the country (Pew Research Center 2014). Geographically they are concentrated in Southern states: Tennessee has the highest percentage at 52% evangelical, while Northeastern states tend to have the lowest percentage, typically between 10-15% (Pew Research Center 2014). Furthermore, the way in which religion shapes attitudes is not clear. Differences between religions are not as powerful as differences in religious intensity (Adamczyk 2017), but religious intensity could be measured numerous ways, such as fundamentalism, piety, and denomination. I use belief that the Bible is the literal Word of God as a proxy for religious fundamentalism. Church attendance, strong personal religious beliefs, and evangelicalism, although forms of religious intensity, need not necessarily be opposed to homosexuality. A literal interpretation of the Bible, on the other hand, is much more likely to engender negative attitudes. For example, from Leviticus chapter 20, verse 13:

> "If a man has sexual relations with a man as one does with a woman, both of them have done what is detestable. They are to be put to death; their blood will be on their own heads."

Individuals who live in states with higher concentrations of people who believe the Bible is the literal Word of God are more likely to encounter individuals who espouse religious ideology that opposes homosexuality (see Adamczyk, Boyd, and Hayes 2016, who study religion at the county level). They are more likely to be embedded in social networks which

include family, friends, coworkers, and classmates that include people who believe in a literal interpretation of the Bible.

Hypothesis 2: An increasing share of religious fundamentalists in a state will be associated with less favorable attitudes toward gay men and lesbians.

I also explore the effects of political context. Some studies have pointed to the importance of the political climate on attitudes (e.g. Adamczyk 2017; Hildebrandt, Trudinger, and Wyss 2018). Elite cues and political discourse may influence attitudes toward gay men and lesbians, for example Bill Clinton's 1992 presidential campaign which promoted more inclusive rhetoric and policies (Rosenfeld 2017). I examine how Democratic Party control of the legislature affects attitudes, with the expectation that Democratic political control will be associated with more favorable attitudes toward gay men and lesbians.

Hypothesis 3: Democratic control of the state legislature will be associated with more favorable attitudes toward gay men and lesbians.

Policy changes that improve the legal standing of gay men and lesbians would ostensibly increase favorable attitudes (see Flores and Barclay 2015; Ofosu et al. 2019). However, in Europe, only legalizing same sex marriage had a positive effect on attitudes, while domestic partnership laws had a negative effect on attitudes (Abou-Chadi and Finnigan 2018). While same sex marriage extends an already existing benefit to gay men and lesbians, domestic partnership laws create a new benefit for the exclusive use of gay men and lesbians, thus

increasing “perceived group difference” (Abou-Chadi and Finnigan 2018). In this study, I examine the effects of state level employment non-discrimination laws on attitudes. Since employment non-discrimination laws extend special protections to gay men and lesbians, I expect the effect to mirror that of domestic partnership laws. Thus, I expect non-discrimination laws will be associated with less favorable attitudes.

Hypothesis 4: Employment non-discrimination laws will be associated with less favorable views toward gay men and lesbians.

Finally, I consider the role of educational attainment at the state level. State affluence, religious fundamentalism, political climate, and favorable policies may all be associated with the educational context in a state. The population of the United States has become more college educated in absolute and relative terms every year since 1960 (Census Bureau 2019), which may be associated with increasing support for gay men and lesbians (Loftus 2001). College educated individuals may transmit their liberal beliefs about sexuality to other individuals, possibly through cultural cues in schools and media (Moore and Ovadia 2006; Treas 2002). Individuals who live in states with larger shares of college graduates are more likely to be embedded in networks that contain more college educated individuals. Thus, they are more likely to encounter ideas that reinforce more liberal values, including favorable attitudes toward gay men and lesbians, even if the individuals are not themselves college educated.

Hypothesis 5a: An increasing share of college educated persons in a state will be associated with more favorable attitudes toward gay men and lesbians.

However, I think that strong religious fundamentalism at the individual level will attenuate the contextual effect of college graduates. Previous research suggests that the individual and contextual effects of college education serve to increase the willingness of individuals to extend civil liberties to gay men and lesbians (Loftus 2001; Moore and Ovadia 2006). Yet Americans often distinguish between civil liberties for gay men and lesbians and the morality of homosexuality, and they are generally more conservative when it comes to morality (Loftus 2001). Religious fundamentalists are more likely to couch their opposition to homosexuality in terms of principle and morality. Since the liberalizing contextual effect of education appears to be framed in terms of civil liberties, it may be less likely to liberalize religious fundamentalists.

Hypothesis 5b: The effect of educational context will be weaker among religious fundamentalists.

III. Data and Methods

I use individual-level data from the 1984-2016 American National Election Studies (ANES). ANES is a nationally representative sample of American citizens over the age of 18, and survey interviews take place before and after national elections, including some midterm elections. I compare the ANES to the General Social Survey (GSS) in Appendix A and conclude that the surveys are comparable in sample size and that the ANES offers a more general measure of attitudes toward homosexuality. My dependent variable is the gay men and lesbian "feeling thermometer", which approximates an individual's acceptance of gay men and lesbians. The feeling thermometer asks respondents to rate how warm or cold they feel toward gay men and lesbians on a scale of 0-100, where 0 means they feel cold and

100 means they feel warm toward gay men and lesbians. In the time series cumulative data file, the scale is reduced to 0-97, and respondents who answer 98, 99, and 100 are recoded as 97. The question is asked as part of a series of feeling thermometers probing about various groups in society (e.g. conservatives, environmentalists, whites). The gay and lesbian feeling thermometer question is available in 1984, 1988, 1992, 1994, 1996, 1998, 2000, 2002, 2004, 2008, 2012, and 2016. I use all years except 2002 since it does not ask about religious fundamentalism. The question is part of the ANES post interview module, and not every participant who participated in the first interview is asked this question. Depending on the year, anywhere from less than 1% to 15% of the sample was not asked this question. Of the respondents asked this question, anywhere from less than 1% to 5% responded "Don't know", which were excluded from the analysis. Per ANES guidance, I use sampling weights in my analyses to adjust the representativeness of the sample to more accurately infer population estimates (DeBell 2010).

A. Individual Level Predictors

Individual level covariates include important demographic predictors of attitudes, including age, gender, race/ethnicity, and education. Age is a continuous variable from 18-96. Gender is a dummy variable where "1" is female and "0" is male. Race/ethnicity is a categorical variable, with White non-Latinx, Black non-Latinx, Latinx, and Other or Multiple Race/Ethnicity categories. I code education where "1" means the respondent has a college education or higher, and "0" means the respondent has less than a college education (combining some college, high school degree, and less). I code marital status as either "Married", "Formerly Married" (which includes divorced, widowed, and separated), and "Never Married".

I control for political party identification and religiosity. I collapsed political party identification into three categories: "Democrat/Lean Democrat" which includes "Strong Democrat", "Weak Democrat", and "Independent - Democrat"; "Independent" which includes "Independent - Independent"; and "Republican/Lean Republican" which includes "Strong Republican", "Weak Republican", and "Independent - Republican".

I measure religiosity in two ways: piety and fundamentalism. I measure piety by how often the respondent attends religious services. I code this as a dummy variable where "1" means the respondent attends religious services every week, and "0" means they do not attend every week (but may attend every other week, once a month, or never). This is a more powerful indicator of piety than whether the respondent considers religion important in their life because it demonstrates a physical commitment to religion rather than a vague sentiment. I measure fundamentalism by whether the respondent believes the Bible is the Word of God and should be interpreted literally, where "1" means they do believe this and "0" means they do not. See Appendix B for information on this variable construction.

B. State Level Data

I utilize a variety of sources to measure time-varying state level predictors. In order to measure affluence at the state level, I opted to use a federal measure known as personal income per capita from the Bureau of Economic Analysis (BEA). While gross domestic product (GDP) per capita is frequently used to measure wealth, state level GDP per capita data from the BEA is truncated at 1997 into two incomparable data sets: one that uses Standard Industrial Classification (SIC) from 1977-1997, and another that uses North American Industrial Classification System (NAICS) from 1997-2018.[2] Thus, I chose state

[2] Per BEA cautionary note: "Users of GDP by state are strongly cautioned against appending the two data series in an attempt to construct a single time series for 1963 to

level personal income per capita (in $1,000s) in place of GDP per capita because it has a continuous data record from 1929 to 2018 in unadjusted 2018 dollars; I apply a personal consumption expenditure price index to adjust the income per capita data for inflation, chained to 2012 dollars. While the two measures are not exactly the same, they are similar and approximately measure overall economic development and affluence: where GDP measures the total value of goods and services produced, personal income measures the total amount of economic value received.

I use data from the National Conference of State Legislatures to measure the partisan composition of state legislatures. I code "1" for a Democratic legislature (meaning both upper and lower chambers are Democratically controlled) and "0" for anything else. (Nebraska, which has a unicameral nonpartisan legislature, will be coded "0"). I measure employment non-discrimination laws using data from the Movement Advancement Project (MAP). I chose employment non-discrimination because it reflects both early support for gay men and lesbians and present day variability in subnational policy. For example, Massachusetts was the first state to pass employment non-discrimination in 1989; today, there are 26 states which have still not explicitly prohibited employment discrimination. If a state passed an employment non-discrimination law in 2002, all years prior would be coded "0" and all years after would be coded "1". In some cases, laws were not explicitly passed but were amendments of previous laws or they explicitly interpret existing law to include sexual orientation. Since this study is focused on homosexuality, I use the year in which non-discrimination laws were extended to gay men and lesbians (gender identity non-discrimination has typically been passed or amended much later).

2018." SIC and NAICS are classification schemes that code industries for the purpose of measuring economic output by sector, which use four- and six-digit codes, respectively. NAICS allows for standardization across the US, Canada, and Mexico.

I estimate the percentage of college graduates in a state with ANES data. After recoding the education variable into the dummy described above ("1" if college educated, "0" if not), I then calculated the percentage of college graduates in each state from 1984 through 2016. I also use ANES data to estimate the percentage of people by state who believe the Bible is the literal Word of God. I aggregate the individual level Bible literalism dummy variable using the method described above for measuring population level educational attainment. Not all states have respondents in all years, leaving the total number of state-years at 375.

C. Analytic Strategy

I employ two-way fixed-effects linear regression models to predict attitudes on the gay men and lesbian feeling thermometer. The two-way fixed-effects model uses dummy variables for state and for year, thus controlling both for time invariant unobserved characteristics of states, such as region and historical legacies, and for over time trends that affect every state. I use clustered standard errors by state-year in order to account for correlation of errors within state-years, a violation of the standard OLS assumption of the independence of errors. I compute a series of models, starting with a set of standard individual predictors of attitudinal variation. I then add to this model a series of contextual variables, one at a time and then all at once. The final model includes a cross-level interaction of individual level religious fundamentalism and contextual level educational attainment (the contextual variable is mean centered). Regression equations are listed below.

Two-way fixed-effects model, individual covariates only:

Eq. 1 $\mathbf{Y_{ijt} = \beta_0 + \beta X_{ijt} + \beta Year_t + \beta State_j + r_{ijt}}$

β_0 is the intercept, βX_{ijt} represents individual level covariates, $\beta Year_t$ represents survey year fixed effects, $\beta State_j$ represents state fixed effects, and r_{ijt} represents the individual residuals.

Two-way fixed-effects model, with contextual level covariates:

Eq. 2 $\mathbf{Y_{ijt} = \beta_0 + \beta X_{ijt} + \beta W_{jt} + \beta Year_t + \beta State_j + r_{ijt}}$

β_0 is the intercept, βX_{ijt} represents individual level covariates, βW_{jt} represents state level covariates, $\beta Year_t$ represents survey year fixed effects, $\beta State_j$ represents state fixed effects, and r_{ijt} represents the individual residuals.

Two-way fixed-effects model, with cross-level interaction:

Eq. 3 $\mathbf{Y_{ijt} = \beta_0 + \beta Bible_{ijt}College_{jt} + \beta X_{ijt} + \beta W_{jt} + \beta Year_t + \beta State_j + r_{ijt}}$

β_0 is the intercept, $\beta Bible_{ijt}College_{jt}$ is the cross-level interaction between individual level fundamentalism and educational context, βX_{ijt} represents individual level covariates, βW_{jt} represents state level covariates, $\beta Year_t$ represents survey year fixed effects, $\beta State_j$ represents state fixed effects, and r_{ijt} represents the individual residuals.

IV. Results

Table 1 shows descriptive statistics of individual and state level covariates. The mean level of the outcome variable is around 45 points on the feeling thermometer across the three decades, with a wide distribution reflecting variability between individuals and numerous responses at the extreme ends of the scale. Zero-order correlations among state-level covariates are shown in Appendix Table 2.

Table 1: Descriptive statistics of individual and state level variables

N = 21,999				
Dependent Variable	**Mean**	**SD**	**Min**	**Max**
Gay men and lesbian feeling thermometer	45.26	28.93	0	97
Individual Level Covariates				
No college degree	0.74	0.44	0	1
College degree	0.26	0.44	0	1
Does not attend religious service every week	0.76	0.42	0	1
Attends religious service every week	0.24	0.42	0	1
Bible should not be interpreted literally	0.63	0.48	0	1
Bible should be interpreted literally	0.37	0.48	0	1
Democrat/leans Democrat	0.48	0.50	0	1
Independent	0.12	0.33	0	1
Republican/leans Republican	0.40	0.49	0	1
Married	0.56	0.50	0	1
Never married	0.24	0.43	0	1
Formerly married	0.20	0.40	0	1
Age	45.97	17.43	18	96
Male	0.47	0.50	0	1
Female	0.53	0.50	0	1
White non-Latinx	0.75	0.43	0	1
Black non-Latinx	0.11	0.32	0	1
Latinx	0.10	0.29	0	1
Other or multiple race/ethnicity	0.04	0.20	0	1
State Level Covariates				
Income per capita	38831.59	8641.88	20146.86	66889.24
Percent fundamentalist	37.39	15.65	4	86.05
Democratic legislature	0.40	0.49	0	1
Employment non-discrimination law	0.29	0.45	0	1
Percent college educated	28.06	10.74	3.51	64.71

Source: American National Election Studies, 1984-2016; Bureau of Economic Analysis, 2019; Movement Advancement Project, 2019; National Conference of State Legislatures 2019.

Figure 1 gives a sense of how far public opinion toward homosexuality has come since the 1980s. From a mean of around 30 degrees on the feeling thermometer in 1984, attitudes toward gay men and lesbians have increased to about 60 degrees in 2016. Figures 2A and 2B show bar graphs of the mean level of attitudes by state in 1984 and 2016 respectively. Again showing how far the country has come, the lowest mean level in 2016 (North Dakota, around 41 degrees) is higher than all but two states in 1984.

Table 2 shows results from the individual level two-way fixed-effects model. This model has no contextual level variables, and state and year fixed-effects are controlled but not shown. For the most part, individual level covariates are associated with attitudes in the expected directions.

Consistent with other research (Engberg, Hurtado, and Smith 2004; Kozloski 2010; Lambert et al. 2008; Loftus 2001; Ohlander, Batalova, and Treas 2005; Treas 2002), having a college degree is associated with higher scores on the feeling thermometer compared to not having a college degree (6.76 degrees). Two dimensions of religious faith are measured: religious piety and religious fundamentalism. Both are associated with negative attitudes toward gay men and lesbians, but the magnitude is greater for those who believe the Bible is the literal Word of God (-5.15 versus -12.52 degrees).

As expected, Republicans and Independents have less favorable views than Democrats, while those who never married have more positive views than those who ever married. Older people report more negative attitudes. Women have substantially more favorable views than men (9.14 degrees). This effect is larger than the effect of having a college degree. Black non-Latinx and Latinx Americans both have more favorable views than White Americans, consistent with other recent research dispelling the myth that Black Americans are more homophobic (Adamczyk, Boyd, and Hayes 2016).

Figure 1: Yearly trends in national attitudes toward gay men and lesbians

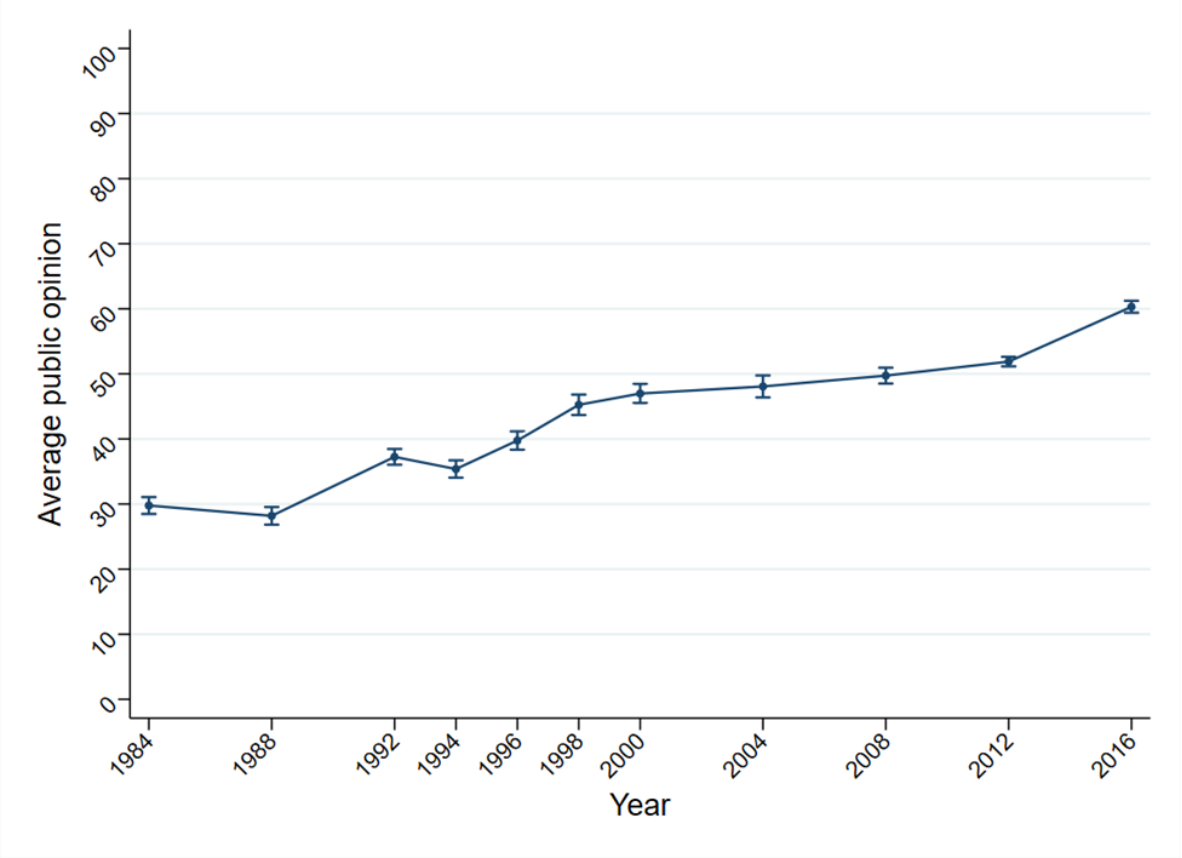

Figure 2: Average public opinion by state, 1984 and 2016

A. 1984

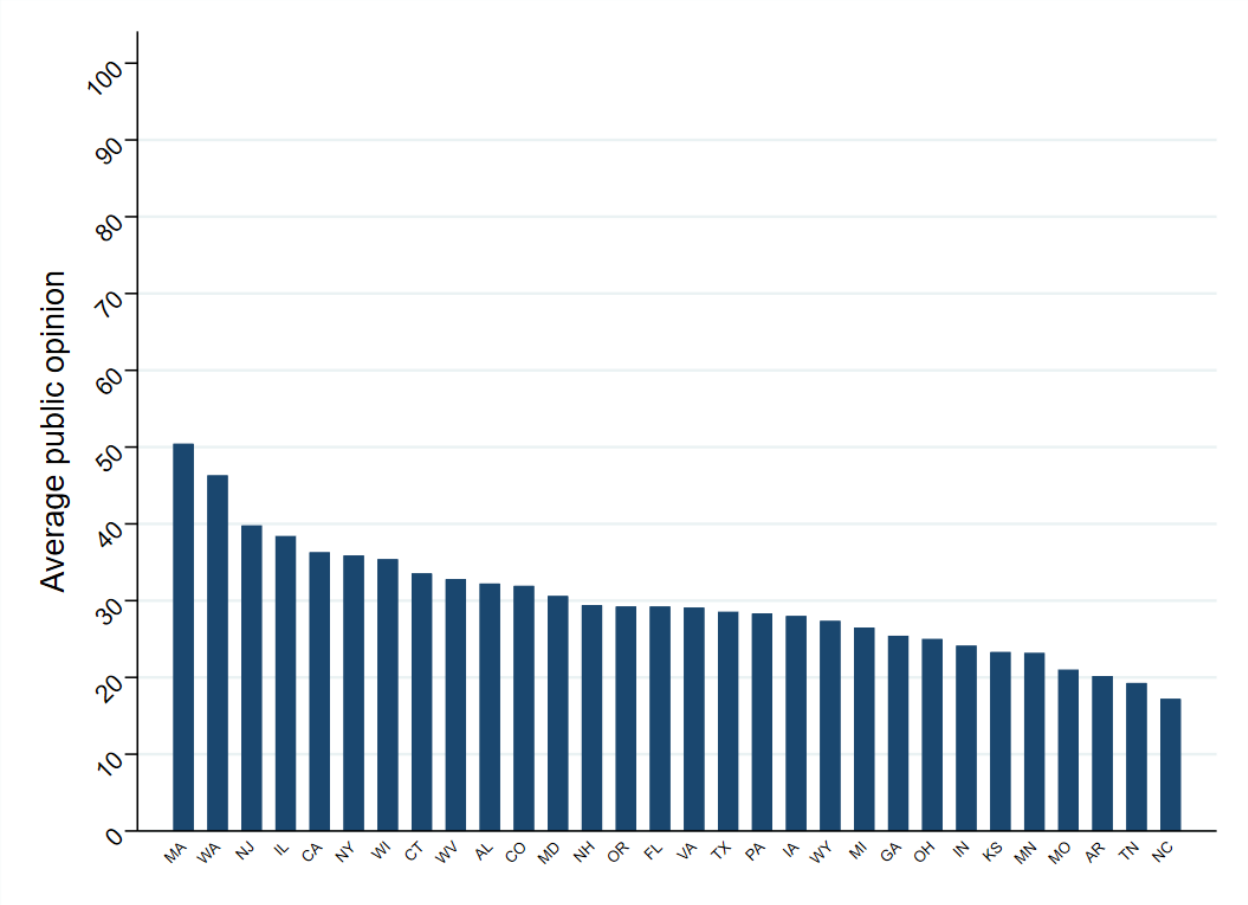

Figure 2: Average public opinion by state, 1984 and 2016

B. 2016

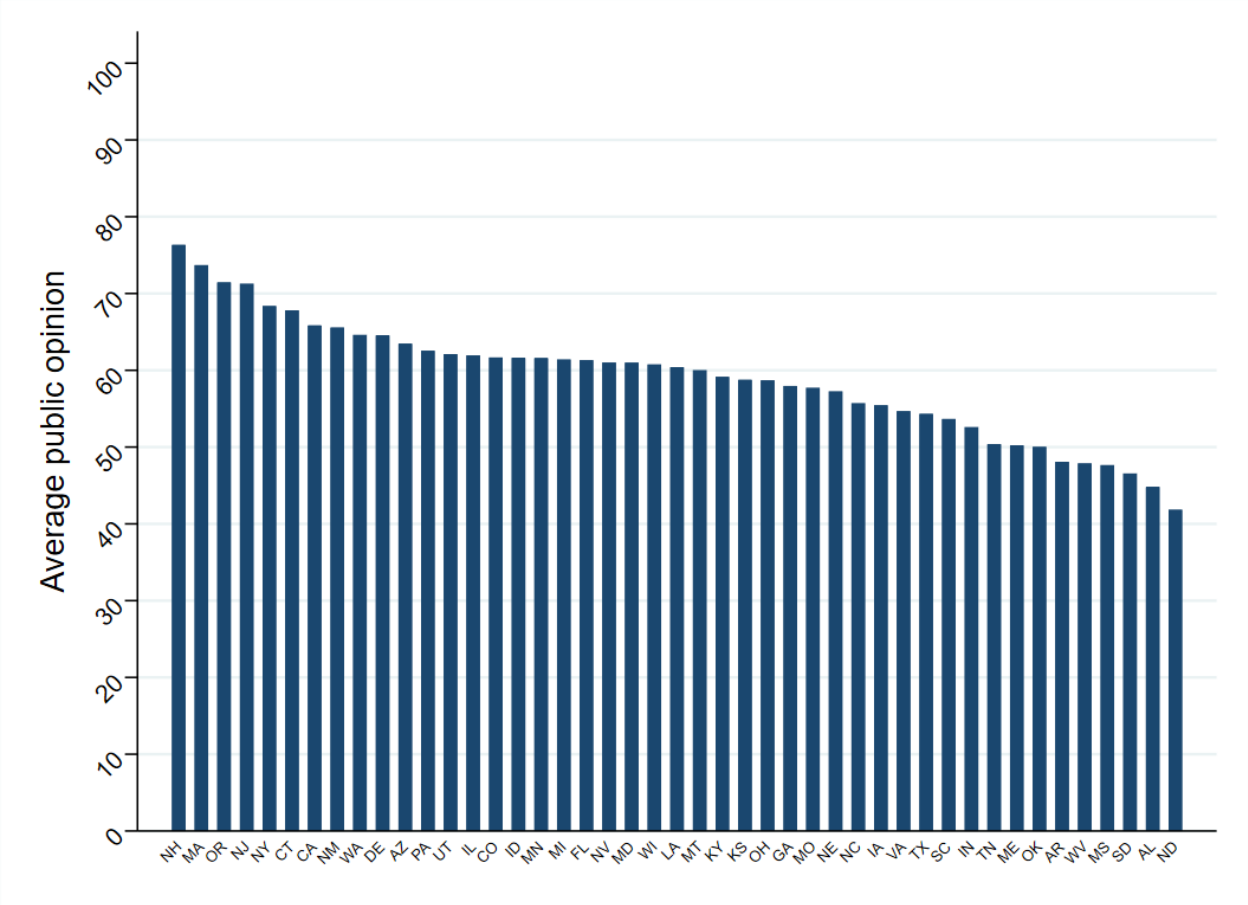

Table 2: Two Way Fixed Effects Model Predicting Attitudes toward Gay Men and Lesbians: Individual Covariates Only

	Model 1
College degree	6.76***
	(0.46)
Weekly religious service	-5.15***
	(0.54)
Religious fundamentalist	-12.52***
	(0.51)
Independent	-6.98***
	(0.69)
Republican/Lean Republican	-10.03***
	(0.47)
Never Married	3.58***
	(0.61)
Formerly Married	0.51
	(0.53)
Age	-0.15***
	(0.01)
Female	9.14***
	(0.40)
Black non-Latinx	1.59*
	(0.81)
Latinx	2.32**
	(0.87)
Other or multiple race/ethnicity	-3.52**
	(1.32)
State and Year Fixed Effects	Y
Constant	30.36***
	(1.68)
Individual Observations	21999
State-Year Observations	375
R^2	0.297
Adjusted R^2	0.294

Source: American National Election Studies, 1984-2016
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
Note: Standard errors are clustered by state-year.

I next turn to the study's main questions focusing on the five contextual variables: state affluence, religious context, political climate, policy conditions, and educational attainment. Table 3 shows coefficients for contextual level variables and interactions. Individual level covariates and state and year fixed-effects are controlled but not shown. Models 1-5 show results for each of the contextual variables on their own. Model 6 shows the results when all contextual covariates are combined into a single model. Model 7 shows the effect of state level religious fundamentalism and educational context in the same model. Model 8 shows the results for the cross-level interaction between individual level religious fundamentalism and state level educational context.

Model 1 takes up the postmaterialist thesis by assessing the effect of increasing state affluence on attitudes. Results demonstrate that the effect of state affluence is not significantly different than zero, and in fact the direction of the effect is not expected. The postmaterialist thesis would have expected that increasing affluence would increase broad based favorable attitudes as people become more oriented toward values of self-expression and tolerance. Hypothesis 1 is not supported by these results.

Model 2 addresses the question of how living in a state with a high density of religious fundamentalists affects attitudes for individuals living in that state. Results suggest that there is a significant negative effect, such that an increasing share of the population that is religiously fundamentalist depresses attitudes toward gay men and lesbians, consistent with Hypothesis 2. This result is in line with others who have found religious context affects attitudes (Adamczyk, Boyd, and Hayes 2016; Ellison and Musick 1993; Moore and Vanneman 2003; Moore and Ovadia 2006).

Table 3: Two Way Fixed Effects Model of Gay Men and Lesbian Feeling Thermometer: Contextual Level Covariates

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
State affluence	-0.20					-0.10		
	(0.11)					(0.11)		
Percent fundamentalist		-0.08**				-0.03	-0.04	-0.05
		(0.03)				(0.04)	(0.04)	(0.04)
Democratically controlled legislature			-1.13			-0.40		
			(0.66)			(0.65)		
Employment non-discrimination law				-2.41**		-1.67		
				(0.86)		(0.88)		
Percent college educated					0.14***	0.12**	0.12**	0.16***
					(0.03)	(0.04)	(0.04)	(0.04)
Individual level religiously fundamentalist								-12.51***
								(0.51)
Individual level fundamentalist x percent college educated								-0.12**
								(0.04)
Individual Level Predictors	Y	Y	Y	Y	Y	Y	Y	Y
State and Year Fixed Effects	Y	Y	Y	Y	Y	Y	Y	Y
Constant	26.59***	33.74***	31.47***	29.79***	32.78***	31.61***	34.05***	33.96***
	(2.64)	(2.12)	(1.86)	(1.72)	(1.82)	(3.28)	(2.08)	(2.06)
Individual Observations	21999	21999	21999	21999	21999	21999	21999	21999
State-Year Observations	375	375	375	375	375	375	375	375
R^2	0.297	0.297	0.297	0.297	0.297	0.298	0.298	0.298
Adjusted R^2	0.295	0.295	0.295	0.295	0.295	0.296	0.295	0.296

Source: American National Election Studies, 1984-2016; Bureau of Economic Analysis, 2019; Movement Advancement Project, 2019; National Conference of State Legislatures 2019.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: See Table 2 for individual level covariates. Standard errors are clustered by state-year.

Model 3 examines how political climate affects attitudes but finds no significant effect. Hypothesis 3 expected Democratic control of the legislature to be associated with more favorable attitudes. It is possible that Democratic legislatures are a poor measure of liberal political climate given that Southern state legislatures were often Democratically controlled.

Model 4 examines how employment non-discrimination laws impact public opinion. Results show that extending benefits to gay men and lesbians is actually associated with decreasingly favorable attitudes, suggesting a possible backlash effect. This is consistent with what other research has found (Abou-Chadi and Finnigan 2018) and supports Hypothesis 4.

The results for population level educational attainment in Model 5 show that an increasing share of the population that is college educated is associated with more favorable views toward gay men and lesbians, even among those who are not themselves college educated. This finding supports Hypothesis 5a.[3]

All five contextual variables are included in Model 6. Relationships are similar to those found for the items individually, with one important exception: the significant effect of religious fundamentalism disappears. To identify the variable or variables responsible for this change, I computed a series of models (not shown) that included different combinations of the five state-level variables. Results suggest that the negative effect of fundamentalism shown in Model 2 is largely attributable to the strong negative correlation between college education and fundamentalism (see Appendix Table 2). This result is confirmed in Model 7.

Figure 3 shows a bivariate scatter plot for the percent of college graduates and mean level of attitudes toward gay men and lesbians in 2016. This demonstrates a positive

[3] In a separate analysis, I do not find an interaction effect between population level and individual level educational attainment, suggesting that the contextual effect of an increasing

correlation between population level educational attainment and favorable public opinion, where more college graduates at the state level is associated with more favorable views on homosexuality.

Finally, Model 8 adds to Model 7 a cross-level interaction between individual level religious fundamentalism and state level educational context. Results show that the effect of an increasingly college educated state population is much stronger among those who do not ascribe to fundamentalist beliefs; conversely, those who do believe the Bible is the literal Word of God are not substantially affected by educational context (see Figure 4). These findings support Hypothesis 5b, suggesting that religious fundamentalists may couch their opposition to homosexuality in a way that is incompatible with the liberalizing influence of college graduates.

I also find in separate sensitivity tests that alternative economic, religious, and political variables show no significant relationship to feeling thermometer scores (see Table 4). As an addendum to the postmaterialist thesis, Andersen and Fetner (2008b) found income inequality depressed attitudes. I did not find a significant association between income inequality and attitudes. I also examined an alternative measure of religiosity: the percent who attend church weekly. This was not significant. Finally, instead of Democratic control of the legislature I checked the effect of the percent of women in the state legislature. This also had no effect.

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share of college graduates influences all education levels, consistent with what Moore and Ovadia (2006) find in their analysis.

Figure 3: Correlation between percent college graduates and average public opinion by state in 2016

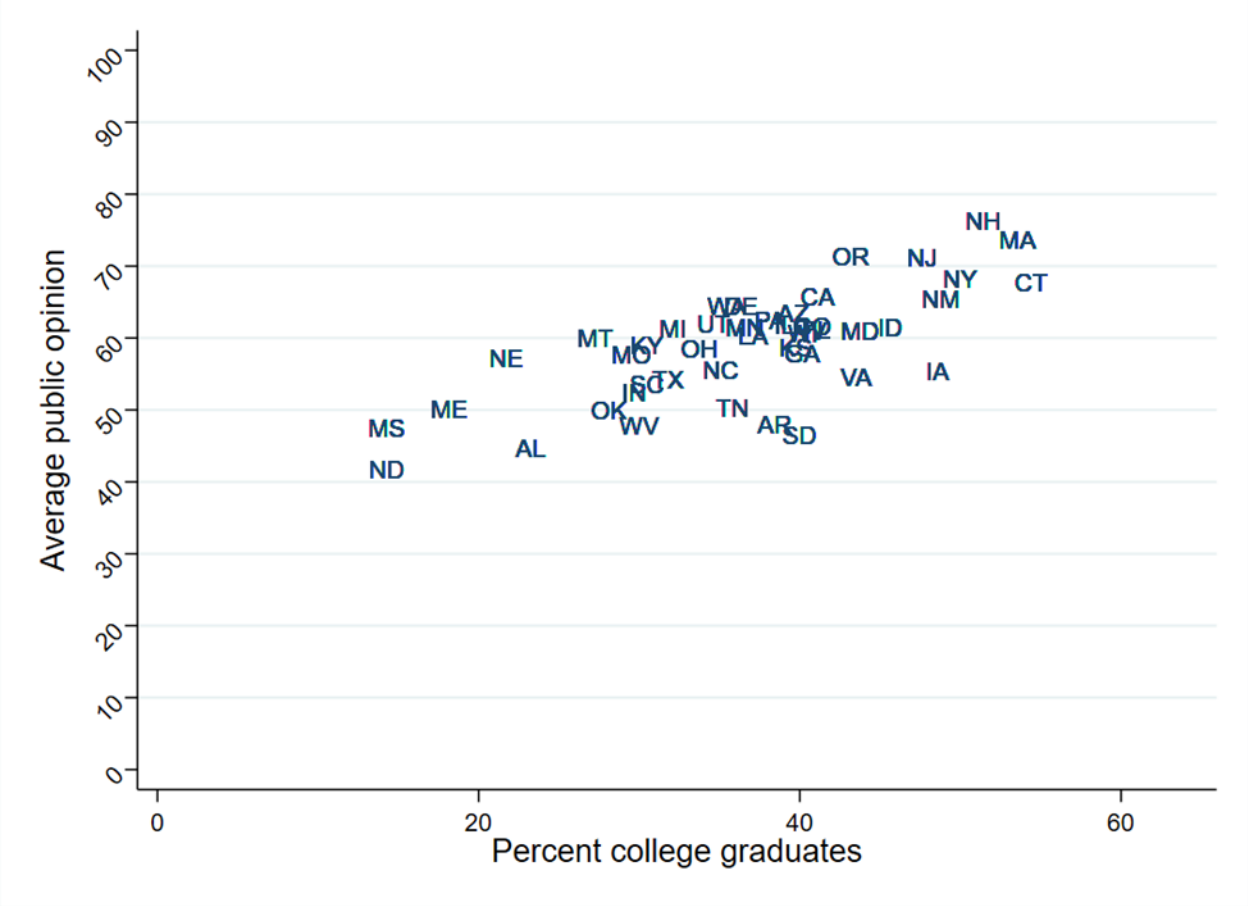

Figure 4: Interaction effect

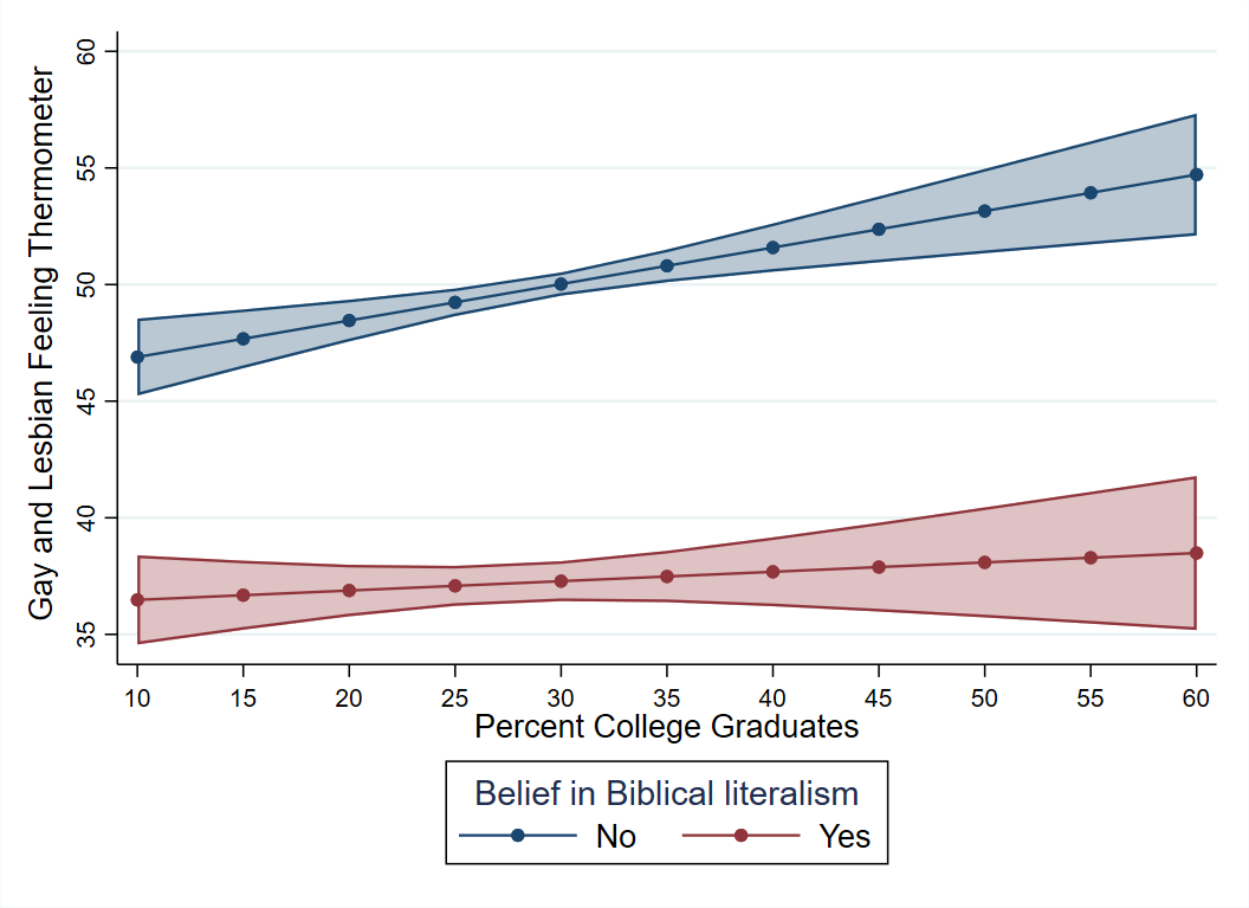

Table 4: Sensitivity Tests[4]

	Model 1	Model 2	Model 3
Income inequality	-0.18		
	(0.11)		
Percent attend religious services weekly		-0.04	
		(0.04)	
Percent women state legislature			-0.06
			(0.10)
Individual Level Predictors	Y	Y	Y
State and Year Fixed Effects	Y	Y	Y
Constant	31.94***	31.68***	30.53***
	(1.96)	(2.19)	(1.69)
Individual Observations	21999	21999	21999
State-Year Observations	375	375	375
R^2	0.297	0.297	0.297
Adjusted R^2	0.294	0.294	0.294

Source: American National Election Studies, 1984-2016; Frank et al. 2015; Center for American Women and Politics, 1977-2018.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
Note: See Table 2 for individual level covariates. Standard errors are clustered by state-year.

[4] State level income inequality is measured by the share of income going to the top 1% in a state. The data was compiled by economists Mark Frank, Estelle Sommeiller, Mark Price, and Emmanuel Saez. This is a time varying variable with values for every year except 2016; I impute 2016 values using data from 2015. Income inequality as measured by this variable has increased over time. I aggregate religious attendance data from ANES, recoding it as a dummy variable where "1" means the respondent attends church weekly and "0" means the respondent does not. I use data from the Center for American Women and Politics (CAWP) at Rutgers University to measure the percentage of women in the state legislature. With this source, I have time varying data from 1990. Data from the years 1984 and 1988 will be imputed from 1990 data.

V. Discussion

In this paper I identify individual and contextual factors that help explain major disparities between US states in attitudes toward gay men and lesbians. Population level educational attainment is the most powerful state-level predictor of between-state differences and within-state changes in attitudes, while other contextual variables such as affluence, religious context, and political and legal conditions that are discussed in the context of cross-national comparative analyses were less compelling at the subnational level. This education effect is much weaker among those who hold fundamentalist beliefs, suggesting that strong religious convictions may be hard to overcome.

Why does educational context explain geographic disparities in attitudes toward gay men and lesbians? Thus far, researchers have yet to adequately address this question. While research on individual educational attainment is quite common (Engberg, Hurtado, and Smith 2004; Kozloski 2010; Lambert et al. 2008; Ohlander, Batalova, and Treas 2005; Treas 2002), research on the social effects of an increasingly college educated population is rare (cf. Moore and Ovadia 2006). Treas (2002) examines trends in attitudes toward sexuality, including homosexuality. She finds that the gap in attitudes toward homosexuality between Americans with and without a college degree decreased from 1988 to 1998, suggesting a "diffusion" of more permissive sexual values from highly educated Americans to those without a college degree. Yet precisely how this cultural diffusion occurs is not clear. Furthermore, while the gap in attitudes between Americans with and without a college degree is decreasing, the US population as a whole is also becoming more college educated. In just the ten year time frame that Treas examines (1988-1998), the percent of college educated Americans increased by 16.8% (20.3% in 1988, 24.4% in 1998). In fact, the US population has become more college educated, both in absolute terms and as a share of the

population, since 1960, when it was 7.7% college educated, to 2018, when it was 35% college educated (Census Bureau 2019).

Understanding exactly how college education may influence the attitudes of other individuals should be prioritized in future research. Social networks may play a role in education's contextual effect on attitudes. Individuals living in regions with a larger share of college graduates may experience spillover effects from the liberalizing influence of college education. On the one hand, those who do not have a college degree may be in more contact with Americans that do have college degrees, thus exposing them to more tolerant world views. On the other, college graduates may reinforce each other's liberal views. Future research should study how exposure to college graduates influences attitudes. It is also possible that an increasingly educated population may diffuse more favorable attitudes via "policy decisions, judicial decisions/precedents, school curricula, and news coverage" (Moore and Ovadia 2006). Experimental or quasi-experimental research would help to bolster these findings.

Moreover, other factors do not seem to explain the association between educational context and attitudes. While religious fundamentalism seems like it would have a strong negative effect on attitudes toward gay men and lesbians, the results show that its macro-level effect is nonsignificant when controlling for educational context. The two variables are negatively correlated, suggesting that more educated populations are also less fundamentalist. Indeed, the core liberalizing effect of an increasingly college educated population may be that the population is less religiously fundamentalist, and thus less opposed to homosexuality on principle. However, one limitation of this study is that it takes the state as the unit of analysis. It is possible that strong religious norms operate through more local conduits, and so studying the contextual effect of religious fundamentalism at a

smaller unit of analysis may yield stronger results (see Adamczyk, Boyd, and Hayes 2016 and Moore and Ovadia 2006. Both studies use sub-state level units to analyze the effect of religiosity and find significant results).

State affluence also does not explain the association. Despite predictions from postmaterialist theorist Ronald Inglehart, affluence is not significantly associated with attitudes toward gay men and lesbians. In a country as wealthy as the United States it is possible that the overall national economic context attenuates any subnational differences in wealth, such that despite large disparities in regional wealth, every state in the country is reasonably wealthy enough to be considered postmaterialist. Given that economic development and educational attainment are both indicators of societal development (e.g. United Nations Human Development Index uses both), it seems educational attainment is a better indicator to use when studying subnational variation in a wealthy country such as the United States.

The political conditions in a state also do not seem to have a significant effect on attitudes, possibly because Democratic party control is not a strong indicator of liberal political climate. Democratic party control is historically strong in highly educated states in the Northeast and less educated states in the South, potentially muddling the effect of Democratic control. The effect of employment non-discrimination laws also seems ambiguous and requires more research to determine the exact relationship with attitudes. Because attitudes and policies reciprocally influence each other, stronger causal inference designs may be necessary to determine their effect on attitudes.

Future studies could corroborate these findings in other subnational contexts. For example, is educational context an important factor in countries that have a nationalized higher education system? Religious fundamentalism may also play a much different role in

other national contexts. Future research could explore how regional variations in religiosity matter in contexts that may be more secular than the US or may be a different religion altogether. Scholars must focus more attention on subnational variations in attitudes toward LGBT people. Further research within the United States should continue to examine attitudes at the state and county level in order to understand how contextual factors influence attitudes. Perhaps most importantly, new research must begin to focus on regional variation in attitudes toward gender identity. This kind of research can help explain the balkanized state of LGBT life in America today, where LGBT health, employment, and families vary by where they live.

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Appendix A

ANES is comparable to the General Social Survey (GSS) in terms of sample size (see Appendix Table 1). The ANES feeling thermometer is a more general attitudinal measure than other questions asked in either the ANES or the GSS. The GSS does not offer a comparably general question; instead, it relies on questions that ask about civil rights for homosexuals (whether they should be allowed to speak, teach, marry, or have books about homosexuality in public libraries), or on a strictly moral question of whether homosexual sex is wrong. The question on marriage is sometimes used to gauge support broadly for gay men and lesbians, however the GSS asks the question once in 1988 and not again until 2004. In this case, the ANES feeling thermometer offers a broader historical scope. The question of whether homosexual sex is wrong does offer more historical data (GSS 1973-2018), however its moral framing and narrow options limit its usefulness. It asks respondents to rate "sexual relations between two adults of the same sex" on a 4 point scale ranging from "always wrong" to "not wrong at all". Because of the starkly moral language, responses on this GSS question tend to cluster at the extremes, with few respondents selecting the middle options "almost always wrong" or "sometimes wrong". The ANES feeling thermometer, on the other hand, allows individuals to select a more nuanced response both because of the general question wording and because the options range from 0-100. Responses in the ANES data cluster around the extremes (0 and 100) and at ten point intervals (e.g. 10, 50, 70). With a dependent variable like this, transforming the data into 10 categories and using ordinal logistic regression would resolve the heteroskedasticity that violates OLS assumptions. In my analysis, I will use OLS for the sake of simplicity.

Appendix Table 1: Sample size of ANES and GSS by year

ANES: Year of Survey	N	GSS: Year of Survey	N
1984	2,257	1984	1,473
1988	2,040	1988	1,481
1992	2,485	1993	1,606
1994	1,795	1994	2,992
1996	1,714	1996	2,904
1998	1,281	1998	2,832
2000	1,807	2000	2,817
2002	1,511	2002	2,765
2004	1,212	2004	2,812
2008	2,322	2008	2,023
2012	5,914	2012	1,974
2016	4,270	2016	2,867
Total	**28,608**	**Total**	**28,546**

Source: American National Election Studies, 1984-2016; General Social Surveys, 1984-2016

Appendix B

I combine two variables in ANES to measure a respondent's faith in the authority of the Bible. The two variables span separate time periods: the first in 1964-1990 and the second in 1990-2016. The wording of the question and answers differ somewhat, raising questions about the comparability of these two measures and whether they can be reliably combined into one time series measure across 1984-2016. The old question (1964-1990) asks the following:

Here are four statements about the Bible and I'd like you to tell me which is closest to your own view. (STATEMENTS SHOWN TO R)

1. The Bible is God's word and all it says is true
2. The Bible was written by men inspired by God but it contains some human errors.
3. The Bible is a good book because it was written by wise men, but God had nothing to do with it.
4. The Bible was written by men who lived so long ago that it is worth very little today.

9. DK; other

0. NA; no Post IW; abbrev. telephone IW (1984, see VCF0015); form A (1990)

INAP. question not used

The new question (1990-2016) asks the following:

Which of these statements comes closest to describing your feelings about the Bible? You can just give me the number of your choice. (STATEMENTS SHOWN TO R)

1. The Bible is the actual Word of God and is to be taken literally, word for word

2. The Bible is the Word of God but not everything in it should be taken literally, word for word

3. The Bible is a book written by men and is not the Word of God

9. Other; DK

0. NA; form B (1990); short form or Spanish language questionnaire (1992)

INAP. question not used

I combine these two measures into a single dichotomous variable that measures whether the respondent believes the Bible is the actual Word of God and all it says is true/is to be taken literally (=1) or whether the respondent believes that the Bible may have human errors/should not be interpreted literally, word for word (=0). From this, I calculate the percentage who do believe the Bible should be read literally, word for word, by state-year. This gives me data on many but not all state-years.

Appendix C

Appendix Table 2: Zero-order correlations among state-level variables

	State aff-luence	Percent fundamen-talist	Democratic legislature	Nondis-crimination law	Percent college educated	Income inequality	Percent weekly religious attendance	Percent women legislature
State affluence	1							
Percent fundamentalist	-0.612	1						
Democratic legislature	-0.026	0.0819	1					
Nondis-crimination law	0.5803	-0.5144	0.3752	1				
Percent college educated	0.6275	-0.6541	-0.0266	0.3565	1			
Income inequality	0.7266	-0.3753	-0.042	0.3907	0.3741	1		
Percent weekly religious attendance	-0.4611	0.519	-0.0203	-0.3785	-0.3505	-0.3292	1	
Percent women legislature	0.5163	-0.5786	-0.004	0.4996	0.4496	0.3505	-0.3918	1