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Differential Fertility as a Determinant of Trends in Public Opinion about Abortion in the United States

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Abstract

Differential fertility is frequently overlooked as a meaningful force in longitudinal public opinion change. The researchers examine the effect of fertility on abortion attitudes, a useful case study due to their strong correlation with family size and high parent-child correlation. They test the hypothesis that the comparatively high fertility of pro-life individuals has led to a more pro-life population using 34 years of General Social Survey data (1977-2010). They find evidence that the abortion attitudes have lagged behind a liberalizing trend of other correlated attitudes, and consistent evidence that differential fertility between pro-life and pro-choice individuals has had a significant effect on this pattern. Future studies should account for differential fertility as a meaningful force of cohort replacement in studies of public opinion where parents and children are likely to share the same attitude.

Over the last half century, few public issues have been more prominent in as protracted a fashion as questions surrounding abortion rights. Support for abortion rights has turned flat after a period of increase following *Roe v. Wade*, and in recent years there are even indications of a reversal toward more restrictive attitudes. This U-turn is evinced particularly among younger cohorts, and is happening despite liberalizing trends in several ostensibly related issue domains. We investigate whether and how this curious pattern in population attitudes about abortion is connected to population differences in fertility.

Population changes and longitudinal trends in public opinion are fundamentally intertwined. As publics change in their composition, the opinions they collectively hold are likely to vary as well. Over 34 years of GSS data (1977-2010), pro-life individuals have had, on average, 27% more children than pro-choice individuals. This pattern does not simply reflect a broader trend toward higher fertility among those who are more politically conservative, as we show below that the pattern for abortion is stronger than the pattern one observes for conservatism and for other correlated attitudes.

In this paper, we examine the evidence for differential fertility as an explanatory factor in population level trends in abortion attitudes. We begin with a theoretical discussion of the mechanism through which differential fertility may shape cultural trends, as well as a brief overview of previous studies on abortion attitudes. We then explore several lines of evidence using GSS data to test the hypothesis that the fertility gap has played a role in the longitudinal trend of abortion rights beliefs. We conclude with a discussion of the results, limitations of the study, and steps for future research.

BACKGROUND

Population change in attitudes is conventionally decomposed into age effects, intraindividual change—in which individuals change their minds about an issue—and cohort replacement—in which the people who enter a sample over time differ from those who exit it (Firebaugh 1992). Cohort replacement changes are usually characterized either in terms of changes in demographic composition (e.g., educational attainment) or intergenerational cultural shifts. Differential fertility provides a third mechanism of cohort replacement, shaping the composition of cohorts likely to share a particular attitude.

Fertility, as a meaningful force in population change, is more commonly examined in the context of biological evolution. One of the central differences between cultural and biological evolution is that the survival and spread of cultural variants is decoupled from the survival and fertility of individuals. Our interest here is in cultural processes that blur this distinction and reconnect fertility and cultural transmission. Many cultural beliefs and political attitudes are characterized by a high correlation between parents and their children (Eaves and Hatemi 2008; Hatemi et al. 2010). In circumstances where children have a high likelihood of sharing the beliefs of their parents, large fertility difference among people who hold different opinions on as issue can potentially have long term consequences for the population composition of attitudes. The comparatively high fertility of those who hold one position may cause individuals with that opinion to be increasingly represented in subsequent generations through a simple process of cohort replacement. As we will show, the strong correlation between abortion attitudes and fertility allows for the possibility that differential fertility may be one force shaping trends in abortion attitudes.

In the gene-culture coevolutionary literature, the impact of fertility on cultural change is frequently referred to as 'natural selection of cultural variants'. Boyd and Richerson (1985) postulate the role fertility may have played in shaping changes in religious preference over time:

> Demographers have shown that measures of religious affiliation are strongly correlated with fecundity and mortality … [and] parent-offspring similarities for religion are quite strong … Thus, there is a chance that a major component of the generation-to-generation increase or decrease in one religious doctrine relative to another is due to natural selection of vertically transmitted cultural variation, episodes of mass conversion or mass apostasy aside. (176)

The process by which large fertility differences can shape attitude trends shares similarities with other demographic processes. Studies on migration and attitudes examine influxes of individuals with a high likelihood of holding a particular belief (see Firebaugh and Davis 1988). A key difference is that in the case of migration the population level consequences are immediate, whereas in the case of fertility, the effects are lagged roughly 18 years in order for new children to grow into adulthood and enter a typical sampling population. Nonetheless, the general ideas are similar—when individuals with a particular disposition for holding one attitude over another enter the population at higher rates, the proportion of individuals in the population who hold that attitude will tend to increase even if no individual changes their attitude.

Abortion Attitudes

Various studies of trends in abortion attitudes have been done, but none have yet examined the role of fertility. Other studies examining national trends in abortion rights attitudes have shown that supportive attitudes are correlated with educational attainment, with higher educated individuals holding more pro-choice beliefs, though this gap is shrinking slightly, especially among Republicans (Jelen and Wilcox 2002). African Americans are generally less pro-choice, though this can be explained in part by more conservative religious beliefs in the black population (Coombs and Welch, 1982; Hall and Ferree, 1986; Wilcox, 1990; Cook, et al.

1992). The gap between Blacks and Whites nearly disappeared in the mid 1990's, only to reemerge in the latter part of the decade (Jelen and Wilcox 2002). There is also evidence that the abortion issue is becoming more polarized, as more people shift away from moderate attitudes to unequivocally pro-choice or pro-life (DiMaggio et al. 1996; Evans et al. 2001). There is little evidence that abortion rights beliefs change much over the life course (Wilcox and Norrander 2002).

Researchers have found that for a period following *Roe v. Wade* (1973) cohorts became increasingly pro-choice, especially compared to their parents who came of age in the 1950s or prior (Cook et al. 1992; 1993; Wilcox and Norrander 2002). Scott (1998) examines abortion attitudes through the lens of cohort replacement, arguing that generational differences do exist in abortion attitudes, with more recent cohorts being more in favor of abortion rights, particularly those that came of age around the time of the *Roe v. Wade* ruling. In recent cohorts, this liberalizing trend has flattened and has even shown signs of reversal.

[Figure 1 about here]

Whereas some studies have examined change as a result of social causes, we seek to identify the role of a demographic cause, differential fertility, as a complement to these important social causes. We progress through a series of four analyses, each intended to examine the question of whether the comparatively high fertility of those who hold pro-life attitudes has led to a higher proportion of pro-life attitudes in the population than would have otherwise been predicted given equal fertility.

DATA AND ANALYTIC STRATEGY

We test the hypothesis that the comparatively high fertility of individuals opposed to abortion rights has resulted in higher levels of contemporary opposition to abortion rights than

would otherwise be observed if fertility and abortion attitudes were unrelated. The primary data source for this project is the General Social Survey (GSS) cumulative file. The General Social Survey is based on a probability sample of all non-institutionalized US adults and has been conducted every one or two years since 1972, with the first questions about abortion being asked in 1977. Both individual level and aggregate data from 1977 to 2010 are used. Data from the American National Election Study (ANES) is also used as a robustness check for the year and cohort trend in abortion attitudes. The ANES is not used in all analysis because total number of children was only asked in four waves, which is too few to allow us to examine longitudinal trends in differential fertility.

[Table 1 about here]

The GSS asks a series of questions about abortion—if the respondent thinks abortion should be legally permitted for any reason, and a series of other questions examining more specific reasons: if the woman was raped, if she is too poor, if the mother's health is in jeopardy, or if there is a serious defect in the child. Previous studies have used these items to create an index of abortion attitudes (Gillespie et al. 1988; Scott 1998; Strickler and Danigelis 2002). A closer examination of the items highlights quite disparate patterns and varying trends in particular items over time. The items are not clearly unidimensional nor is it plain the dimensional structure has remained constant over time. For the purposes of the paper, the "any reason" item provides a good representation of the population division about abortion rights and aligns with abortion questions from the ANES. While we are mindful that abortion attitudes are far more complex than a dichotomy, we use the shorthand "pro-choice" to refer to individuals who agree that a woman should be allowed an abortion "for any reason", and hereafter use "pro-

life" to refer to those who disagree with this item. This dichotomous variable serves as our primary outcome.

Our data are limited in that they do not allow for direct analysis of parents' abortion attitudes. We rely on evidence of a parent-child correlation found in other studies (Eaves and Hatemi 2008, Hatemi et al. 2010). Abortion attitudes also show a sizable correlation with an individual's fertility—particularly when compared to many other attitudinal measures. Table 2 illustrates the strong fertility gradient in abortion attitudes in comparison to other measures of public opinion.

[Table 2 about here]

Pro-choice beliefs are inversely correlated with large family size, exceeding most other public opinion measures in this respect. On average, pro-life individuals have over 2.5 children for every 2 children by pro-choice individuals which, when coupled with the high parent-child correlation, makes abortion attitudes a good candidate for studying the role fertility plays in shaping the longitudinal trajectory of an attitude in a population. The exception is gay rights attitudes, which have shown a drastically different longitudinal pattern despite a similar correlation with fertility. The trend in gay rights attitudes serves as an important caution elucidating the power of cultural processes to counteract the cohort replacement effects of fertility. This divergence is further explored in the discussion section below.

We follow four lines of evidence: an analysis of correlated attitudes to establish if abortion attitudes are lagging behind; a counterfactual demonstration using number of siblings; a cross-tabulation method that examines two cohorts over time; and a time series regression technique that utilizes the GSS data averaged by cohort years. We use the term 'fertility ratio' to describe the ratio of children from pro life individuals to children from pro choice individuals.

This is calculated on both males and females over age 45+ under the assumption of completed fertility. Listwise deletion is used for missing data.

RESULTS

Association of Abortion Attitudes with Attitudes on Other Issues

Our first step is to identify if abortion attitudes are indeed lagging behind the liberalization of other associated attitudes. We examine if pro-choice attitudes are less prevalent than would otherwise be expected based on trends in four other attitudes— gay rights, prayer in schools, end of life decisions, and sex education. These are chosen because they have a similar longitudinal breadth in the GSS as abortion attitudes and because most have a meaningful correlation with abortion attitudes.

[Table 3 about here]

We run a logistic regression model predicting the proportion pro-choice based on values of this series of public opinion measures for a 5 year period from 1978-1983. We are able to calculate the predicted values of pro-choice attitudes using the coefficients from this 1978-1983 regression analysis using values from the two most recent survey years (2008-2010). This yields a predicted proportion pro-choice of .456 (95% confidence interval: .433, .479) for 2008-2010. This means that based on the trajectory of correlated attitudes, the proportion pro choice in the population would be expected to be .456. The actual proportion pro-choice is .430, lower and falling outside the 95% confidence interval. These results suggest that change in abortion attitudes has indeed lagged behind that of correlated measures of public opinion, and justifies further analysis of the role fertility in shaping abortion attitudes trends. Other explanations are possible—perhaps the

pro-life movement is more organized and has more resources at its disposal—so we must focus further analysis on the specific role of fertility.

Reweighting by inverse of family size

Indirect evidence of a parent-child correlation can be inferred by comparing the magnitude of the correlation between abortion attitudes and fertility and the correlation between abortion attitudes and number of siblings. If the parent-child correlation in an attitude was zero, we would not expect any correlation between attitudes and number of siblings because any correlation between high fertility and pro-life beliefs would have no consequence for the distribution of beliefs among siblings in the next generation. Likewise, if the parent child correlation is 1, we would expect the correlation between abortion attitudes and number of siblings to be as large as the correlation between abortion attitudes and number of children, because larger numbers of children in a generation age into being larger adult sibships in the next generation. We find a correlation of -.133, slightly smaller in magnitude than the correlation between pro-choice attitudes and number of children (-.156). This suggests that there is a fairly sizable parent-child correlation, as the correlation between large family size and pro-life beliefs is carried through multiple generations. It is possible that number of siblings has an independent causal effect of abortion attitudes, such that children from larger families would have more restrictive abortion attitudes regardless of the attitudes of parents. We know of no evidence to this end, and testing it would require data on the abortion attitudes of both parents and children.

We create a counterfactual prediction about the population given no fertility difference between pro-life and pro-choice individuals, examining the predicted population trend in abortion attitudes based on our estimate of a uniform family size across the population. The weight is the inverse of the number of siblings. The first consequence of differential fertility is

that individuals who have more children have more descendants in the subsequent generation; if we down-weight respondents proportional to their number of siblings, then a representative sample of individuals becomes a representative sample of individuals' parents.

We plot the time trend in pro-choice beliefs along the same trend weighted by individuals' number of sibships. As an example, individuals with 5 brothers and sisters (6 sibships) are weighted as 1/6, whereas an 'only child' is weighted as 1. This allows us to hold fertility constant and estimate the counterfactual distribution of abortion attitudes if all individuals came from a one child family. Figure 1 displays the elevated pro-choice attitudes of the weighted population, and Figure 2 shows the same transformation of the cohort trend for comparison. Both the year and cohort trends display a more strongly pro-choice pattern than when weighted to account for differences in family size. This analysis suggests that if there were no fertility difference between pro-choice and pro-life individuals, the population would be about 5 percentage points more pro-choice. Whereas other similar attitudes show no difference when controlling family size, the difference here is noticable and consistent over time. The evidence supports the hypothesis that the comparatively high fertility of pro-life individuals has played a role in making the population less pro-choice.

[Figure 2 about here]

This calculation may be a conservative estimate of the effect of fertility. The number of individuals holding an attitude is often frequency dependent, meaning the proportion of those already sharing the attitude in the population can 'pull' more individuals toward that attitude. As a result, the primary effect of differential fertility on an attitude could also be amplified by a secondary effect of whatever cultural influence the 'extra' people with that attitude have on others. This demonstration also does not capture the nonliear effects that could result from

having a more pro-choice population overall. Nonetheless, it illustrates that if not for the larger family size of pro-life individuals, we would expect the population to be more pro-choice than it presently is.

Cohort Crosstabulations

We are able to observe potential nonlinearities and fluctuations in the parent child correlations by examining two carefully chosen cohorts over time. We can calculate the expected proportion pro-choice in the child generation based on the combination of the proportion pro-choice and the fertility ratio in the parental generation. We can also make predictions about the possibility of asymmetric transmission, meaning that the parent child correlations are unequal and higher for one side of our imposed dichotomy. Whereas parent child correlations for attitudes are often treated as monotonic, we can show that it is likely that the parent child correlation varies based on whether parents are pro-choice or pro-life.

The GSS encompasses cohorts from roughly 1900 to 1985, allowing the observation of two separate generations. Following these cohorts through two periods we are able to create a prediction for the proportion pro-choice in their "offspring" generation based on the fertility ratio in the parental generation, and what we know about the correlation in abortion attitudes between parents and children. Assuming a perfect parent-child correlation and a closed population, the proportion pro-choice in any given cohort would simply be function of the proportion of pro-choice individuals in the previous generation and their average fertility. Any observed variation from this pattern beyond sampling variability suggests fluctuation in the parent-child correlation, assuming a closed population. If the proportion pro-life is higher than would be anticipated given perfect correlation between parents and children, this is evidence for an asymmetry in which the parent-child concordance for pro-choice parents is far lower than that of the pro-life parents. If,

alternatively, the proportion pro-life is lower than predicted, this suggests a decline in the relative concordance of pro-life attitudes in parents and their children.

We consider individuals born between 1950-1955 who were surveyed between 1978 and 1984 when they were ages 23-34. Of the 1162 people in this cohort, 44.7% are pro-choice. We then examine the cohort of individuals born between 1975 and 1980, one generation removed from the 1950-55 cohort. Of these individuals surveyed in years 2004-2010, only 38.8% are pro-choice. We examine whether or not that 6 percentage point decrease in pro-choice attitudes was potentially a result of the comparatively high fertility of pro-life individuals by examining predicted values. These results are shown in Table 3 below. There are three columns of predicted values. Column A presents predictions under the assumption of a perfect parent child correlation, such that the proportion pro-choice in the child generation matches the proportion in the parent generation. Column B presents predictions based on a symmetrical 25% switching rate, where 25% of children have the opposite attitude of their parent. Finally, column C is based on an adjusted switching rate where the rate is different for pro-life and pro-choice parents in order to produce the population frequencies observed.

[Table 4]

The fertility ratio of pro-life to pro-choice births for the earlier cohort was 1.41, meaning that pro-life individuals had roughly 3 children (2.82) for every 2 children from pro-choice individuals. Observing only this early cohort, we might hypothesize that the proportion pro-choice in the population would decrease, given our knowledge of both the fertility difference and parent child correlation in abortion attitudes. The question is how far in the pro-life direction the population would be likely to move. We can compute a simple "fertility rate" of the expected number of descendants in a sample of comparable size of the next population. Note that given

that a child has two biological parents, this would be about half the size of actual fertility rates and would be further constrained to approximate the replacement level given that sample sizes remain roughly the same. With a pro-choice fertility rate of .89, 519 individuals would be predicted to have 462 children, and assuming perfect attitude transmission, all would enter the population as pro-choice individuals. When we do the same with 643 pro-life individuals at a fertility rate of 1.11, this produces 714 pro-life individuals in the next generation. The result is a predicted percent pro-choice of 39.3%, compared to the actual observed 38.8%.

Despite the accuracy of this prediction, we know there is not perfect fidelity of transmission between parents and children. Alternatively, modeling this same pattern with a 25% switching rate for both groups, meaning that 25% of children from pro-choice parents become pro-life and vice versa, results in a population that is more pro-choice than observed. We can predict from this analysis that there is some degree of asymmetric transmission occurring, with pro-life individuals having a higher likelihood of maintaining the attitude of their parents. Any values of symmetric switching would move the population further in the pro-choice direction than observed.

We can calculate a range of possible values for transmission asymmetries. Assuming a perfect parent child correlation for pro-life individuals, 8.5% of pro-choice children would have to acquire the opposing attitude to produce the observed values. At 10% pro-life attrition, pro-choice attrition would be predicted to be 22.1%. Below is a figure that shows the predicted asymmetric attrition between the two groups. The figure is not intended to suggest that both rates trend together—rather it is intended to show that the relationship between the attrition rates for the individuals in our sample are likely to fall along this line, taking into account that some

amount of sampling error is likely and assuming that migration and mortality have had symmetric effects.

[Figure 3 about here]

We can conclude that differential fertility has likely played a role in the pro-life leaning of the younger generation. However, we have also illustrated some asymmetries in the parent-child correlation, suggesting one of two things: either there is a simple case of asymmetric transmission in which pro-life beliefs are always more faithfully transmitted than pro-choice ones; or, there has been a cultural shift towards more pro-life beliefs that is being reflected in the parent child correlations. Our data do not allow us to answer these questions. Nonetheless, understanding the nuances of transmission is important for projecting the magnitude of the fertility effect. Studies rarely separate out two sides of a dichotomous public opinion variable and examine the parent child concordance therein, instead choosing to group together both sides into one construct (Eaves and Hatemi 2008; Hatemi et al. 2010). Studies focus on the heritability of abortion attitudes, rather than the heritability of pro-choice and pro-life attitudes. Our evidence suggests that future studies should be cautious in treating attitude transmission as a symmetric process, and focus more carefully on processes through which attitudes can be transmitted asymmetrically.

Time Series Analysis

Next, we construct a time series model to identify if a fertility difference in the parental cohort has a statistically significant impact on the longitudinal trajectory of abortion attitudes. We examine if the fertility ratio in the parental cohort significantly predicts the proportion pro-choice in the respondent cohort, even when controlling for other covariates shown to affect aggregate abortion attitudes. We calculate the average value of each variable on cohort years to

create a longitudinal sample of cohorts in the GSS. We then use a fractional logit model for proportional outcomes, as the outcome is the proportion of individuals in a cohort who are pro-choice, with lags of the dependent variables to compensate for serial correlation. Our focal explanatory variable is calculated based on the average age difference between mothers and children (National Vital Statistics Report, 2002). The lag range used is from 21 to 30, with heavier weight on the middle values and then diminishing asymmetrically outward with a skewed tail towards the high values (see Appendix B). Thus, for any given cohort the variable is a measure of the fertility ratio in the highest probability parental cohorts, which are lagged roughly 24 years. We recognize the distribution used here does not encompass all parental cohorts, but rather captures the cohort range with the highest density of parents based on Vital Statistics data for the relevant parental cohorts. Our regression models are intended to uncover whether this fertility ratio can significantly predict the proportion pro-choice in the population, even when controlling for other demographic and social characteristics.

The outcome variable is the aggregate proportion pro-choice for a single-year birth cohort of GSS respondents, leaving out cohorts with fewer than 200 respondents. Our hypothesis is that if the fertility ratio is high in the parental cohorts, meaning that pro-life individuals have comparatively more children than pro-choice, this would translate into a decrease in pro-choice individuals in the observed child cohort. The results are shown in table 5 below.

[Table 5 here]

As we can see from Model 1 above, the weighted lagged fertility ratio is negatively correlated with proportion pro-choice, but its effect only shows statistical significance after the education variable, which had been suppressing the effect, is entered in Model 2. In this model, we see a significant negative effect of more children born to pro-life parents than pro-choice parents on the proportion pro-choice in the child's cohort. Adding racial and religious variables into the

model decreases the *p*-value slightly, though given their general lack of significance and the small *N*, Model 2 is plausibly the best fitting model.

Though we control for serial correlation in our dependent variable using lags, it is still possible that a secular time trend in our independent and dependent variables could cause a spurious correlation. To control for this possibility, we detrend all variables by regressing them onto cohort and predicting the residuals. This flattens any linear time trend and only takes into account deviations from the general upward or downward trend. The detrended analysis asks the question: in a case where our independent variable is unusually low (or high), is our dependent variable also unusually low (or high)? The results from this detrended analysis are shown in Table 6.

[Table 6 about here]

Very similar results emerge from the detrended model. The lagged fertility ratio of the parental cohorts is once again significant and in the hypothesized direction. A cohort of individuals is significantly less pro-choice when pro-life individuals in their parent's generation had far more children, creating a high fertility ratio of pro-life to pro-choice individuals in the parental cohorts. Adding additional controls does decrease the significance, but given the lack of change in the magnitude of the coefficient, this appears to be more of an issue with degrees of freedom rather than a greater issue of explanatory power. Taken together, the regression analyses provide moderate support for the hypothesis that higher fertility of pro-life individuals in the parental generation has lead to a less pro-choice population.

We examine the marginal effects in order to determine the magnitude of the effect for fertility. Holding all other variables at their means, increasing the parental cohort fertility ratio

from 1 to 1.6 (the maximum) is predicted to decrease the proportion pro-choice in the population from .466 to .411, a change of roughly 5 percentage points, and similar to what is reflected in the initial counterfactual analysis. Important to note is that even if controlling for covariates like church attendance did account for a substantial portion of the relationship between fertility and abortion attitudes, this would not change any of the predictions about the consequences of differential fertility on population attitude trends; instead, this would simply elaborate the mechanisms by which a relationship between fertility and abortion attitudes is sustained.

DISCUSSION

The evidence presented above supports the hypothesis that the comparatively high fertility of pro-life individuals has played a role in flattening the trajectory of pro-choice attitudes. We find that if family size were uncorrelated with abortion attitudes, the resulting population would be about five percentage points more pro-choice than is presently observed. This counterfactual demonstration illustrates how large families have the potential to increase the prevalence of pro-life attitudes in the population. This does not take into effect any nonlinear or path dependent effects that could result from having a more pro-life population, or the expected compounding of any stable effect over time. Thus, we take this analysis as circumstantial support for our hypothesis as it illustrates the counterfactual and shows that our hypothesis is a plausible one.

When we separate our sample into generational cohorts, one made up of the predicted child cohort of the former, we see similar support. The proportion pro-choice in the population decreased at the expected rate given the difference in fertility, though we do observe some likely asymmetries in the parent-child correlations of each attitude. A limitation is the lack of parent-

child data which would be ideal for examining the actual asymmetries in parent child correlations based on the attitude of the parents. We do some simple calculations based both on what is indicated about the parent child correlation in abortion attitudes from other studies, and the results observed in our study which suggests some asymmetries. Future research should investigate these asymmetries more with parent child data to investigate if two sides of a dichotomous attitude do indeed transmit differently between generations.

The regression analysis examines the statistical significance of the fertility gap and to estimate the effect of fertility alongside other variables known to shape abortion attitudes over time. It is clear that the GSS respondents only provide an estimate of the fertility differences in the observed generation, so it should be noted that this component is primarily exploratory. The results show that the proportion pro-choice in a cohort is significantly lower when the ratio of pro-life to pro-choice births in the parental generation is high. Controlling for educational attainment, the best predictor of abortion attitudes, does not have a big effect on the coefficient of fertility, though other non-significant variables like race and church attendance do decrease the significance.

Taken together, these findings suggest that fertility has had at least some part in leading the population in a more pro-life direction over time. Further investigation into this pattern indicates that not only are abortion attitudes associated with fertility, but in proportional terms—which is what matters for cultural change—the gap is widening (see Appendix A). Fertility has declined for both pro-choice and pro-life groups over the past 30 years, but fertility has declined far less markedly for pro-life individuals. Whereas pro-choice individuals born before 1940 were only having about 1.2 children per one child born to a pro-choice parent, this ratio has grown to over 1.5 for those born in the mid to late 1970s. This pattern suggests that future

cohorts may place an even stronger demographic drag on the liberalization of abortion attitudes. Perhaps the coming decades will be the biggest test of the shaping power of fertility, as liberalizing trends clash with multiple demographic ones.

Our analysis is intended to serve as a useful first step in addressing the effect of differential fertility on attitude trends. The most pressing limitation is the lack of data that includes attitudes about abortion rights of both parents and adult children. Without this, we are unable to make direct calculations of parent child correlations, nor calculate precise age difference between parents in children. Likewise, our analysis does not take into account the timing of reproduction. The data show that pro-life individuals do not simply have more children, but they have their children sooner. This subsequently may amplify the consequences of fertility differences.

Some asymmetry to the parent child correlation is also likely. Future analyses should examine these asymmetries by separating out families with two pro-choice versus two pro-life parents, as well as heterogeneous couples where attitudes are mixed in order to discern the parent child correlations for each parental composition. This is meaningful because our model can be adjusted as a result of one 'side' of an attitude having a more faithful parent child correlation than the other.

Furthermore, there are other attitudes that display a fertility difference but show an opposing effect. Table 2, discussed above, shows a nearly identical fertility difference for attitudes towards gay rights as for abortion rights—yet the trajectory for gay rights looks starkly different, with a sharp increase in more liberal attitudes towards gay rights over the last 20 years. While changes in attitudes about gay rights have been much studied elsewhere (Eaves and Hatemi 2008; Lewis 2003; Loftus 2001; Yang 1997), it is worth considering the contrast

between gay rights and abortion rights, especially as Table 2 demonstrated that gay rights are like abortion rights in that both are substantially related to fertility. The rapid increase in supportive attitudes toward gay rights has been reflected both in adults changing their mind on issues and a large generational divide in which younger Americans are substantially more supportive on gay rights issues than older Americans. As a result, the upward movement in support for gay rights is occurring much more quickly than what countervailing effect differential fertility may have. While there was a period of cohort effects on abortion attitudes, these were neither as dramatic nor as sustained, and attitude change on abortion rights in midlife may be bidirectional. In other words, differential fertility becomes part of the story as a cleavage on a social issue becomes protracted, and is relatively inert in the face of more rapid social change. A possible implication that might be considered in future work is that large population attitude changes that run counter to fertility differentials need to happen more quickly if they are to happen.

Fertility differences cannot drive change alone, and may be overwhelmed by a strong cultural shift in a particular direction. Fluctuations in the predicted parent child correlation are not necessarily evidence of dramatic changes within the family, but may rather be evidence of broader societal or cultural trends towards one area of belief. Fertility differentials must operate in concert with a substantial parent-child correlation in order to be a meaningful force in attitude change.

CONCLUSION

Our analysis provides consistent support for the hypothesis that the strong fertility gradient of abortion attitudes has played some role in the population trend over time. Abortion

attitudes serve as a useful candidate for studying the possible effects of fertility on an attitudinal outcome due to their strong correlation with fertility and their fairly high parent child correlation. Based on the evidence we present, we argue that the fertility difference between pro-choice and pro-life individuals has caused a more conservative trend in abortion attitudes over the last 34 years of GSS data, as well as the span of cohorts included within. Our cautious estimate of the total effect size of differential fertility on abortion attitudes is 5 percentage points, which does not take into account the possibility for nonlinearities, asymmetric transmission, and frequency dependent bias.

Overall, more work needs to examine cultural traits characterized by the two required components—a high parent child correlation and a meaningful fertility difference—to probe the effects of fertility on longitudinal trends in outcomes. This analysis is a first step towards a better understanding of the role fertility can play in cultural change, and as a stepping stone towards a more comprehensive demography of attitudes. Fertility is only one component—we hope to create a framework that ties together the effect of fertility, mortality, and migration on long-term attitude and cultural trends. Nonetheless, we contend that scholar interested in public opinion trends must account for fertility, as ignoring it can lead to an incomplete understanding of public opinion change.

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TABLES

Table 1: Summary statistics of key dependent and independent variables for cohort years 1935-1970

Variable	Obs	Mean	SD	Min	Max
Believes abortion should be legally permitted					
For any reason	19282	.435		0	1
In the case of rape	18761	.817		0	1
If mother is too poor	18907	.483		0	1
In case of birth defect	18862	.806		0	1
If mother's health threatened	18884	.905		0	1
Year	19282	1992	9.36	1977	2010
Age	19282	39.1	11.7	18	75
Number of Children	19228	1.74	1.60	0	8
Black	19282	.148		0	1
Latino	15216	.061		0	1
Protestant	19236	.586		0	1
Catholic	19236	.249		0	1
Attend Church Weekly	19124	.253		0	1
College Degree (age >30)	14790	.271		0	1

Table 2: Mean number of Children, by Attitude (age 45+)

	Pro Abortion Rights	Pro Gay Rights	Pro Capital Punishment	Pro No School Prayer	Pro No Sex Education	Pro End of Life Decision	Conservative
Yes	2.19	2.14	2.50	2.37	2.54	2.41	2.57
No	2.80	2.75	2.72	2.67	2.76	2.82	2.50
Ratio*	1.27	1.28	1.08	1.13	1.08	1.17	1.02

*Ratio is No/Yes, except in the case of Conservative

Table 3: Bivariate Correlations of Associated Attitudes with Abortion Attitudes Measure

	Gay Rights	Prayer in Schools	End of life decisions	Sex education
Correlation with Abortion Attitudes Measure	.3441	.207	.301	.183

Table 4: Abortion Attitudes Compared Across Cohorts

Cohort	*Attitude*	Year: 1978-1984	2004-2010			
		Actual	***Actual***	***Column A****	***Column B*** **	***Column C**** **
1950-1955	**Pro-choice**	519	268			
	Pro-life	643	307			
	Ratio	.447	.466			
1975-1980	**Pro-choice**		227	248	270	227
	Pro-life		358	337	315	358
	Ratio		0.388	0.424	0.46	.388

*Column A is based on fertility of parental cohorts and perfect transmission
** Column B is based on fertility of parental cohorts and 25% attitude switching.
***Column C is based on gradient of asymmetric transmission in Figure 2

Table 5: Fractional Logit Models of effects of Weighted Lagged Fertility Ratio and other Control Variables on Proportion Pro-choice (Lagged Dependent Variable)

	Model 1 Prop. Pro-choice	Model 2 Prop. Pro-choice	Model 3 Prop. Pro-choice	Model 4 Prop. Pro-choice
Wtd. Lgd. Fertility Ratio	-0.224	-0.379***	-0.314+	-0.228
	(-1.55)	(-3.68)	(-1.67)	(-1.19)
Bachelors Degree +		2.789***	2.728***	2.435***
		(4.76)	(5.24)	(3.57)
Latino			-0.247	-0.793
			(-0.48)	(-1.44)
Black			0.437	0.394
			(0.52)	(0.48)
Attend Church Weekly				-0.627
				(-1.05)
Constant	-0.716*	-0.636**	-0.788	-0.594
	(-2.36)	(-2.62)	(-1.64)	(-1.02)
N	36	36	36	36

t statistics in parentheses
+ p<.10, * p<.05, ** p<.01, *** p<.001
1, 2, and 3 year lags of the dependent variable are not shown.

Table 6: Fractional Logit Models of effects of Weighted Lagged Fertility Ratio and other Control Variables on Proportion Pro-choice (Detrended data)

	(1) Prop. Pro-choice	(2) Prop. Pro-choice	(3) Prop. Pro-choice	(4) Prop. Pro-choice
Wtd. Lgd. Fertility Ratio	-0.158***	-0.0757*	-0.0757	-0.0757
	(-3.80)	(-2.05)	(-1.45)	(-1.53)
Bachelors Degree +		0.525***	0.545***	0.546***
		(4.73)	(4.43)	(4.69)
Latino			0.0227	-0.0593
			(0.09)	(-0.25)
Black			0.145	0.183
			(0.59)	(0.79)
Attend Church Monthly				-0.367*
				(-2.14)
Constant	0.0160*	0.0197***	0.0212**	0.0162*
	(2.47)	(3.85)	(3.45)	(2.60)
N	36	36	36	36

t statistics in parentheses
+ p<.10, * p<.05, ** p<.01, *** p<.001

FIGURES

Figure 1: Abortion Attitudes by Year and Cohort

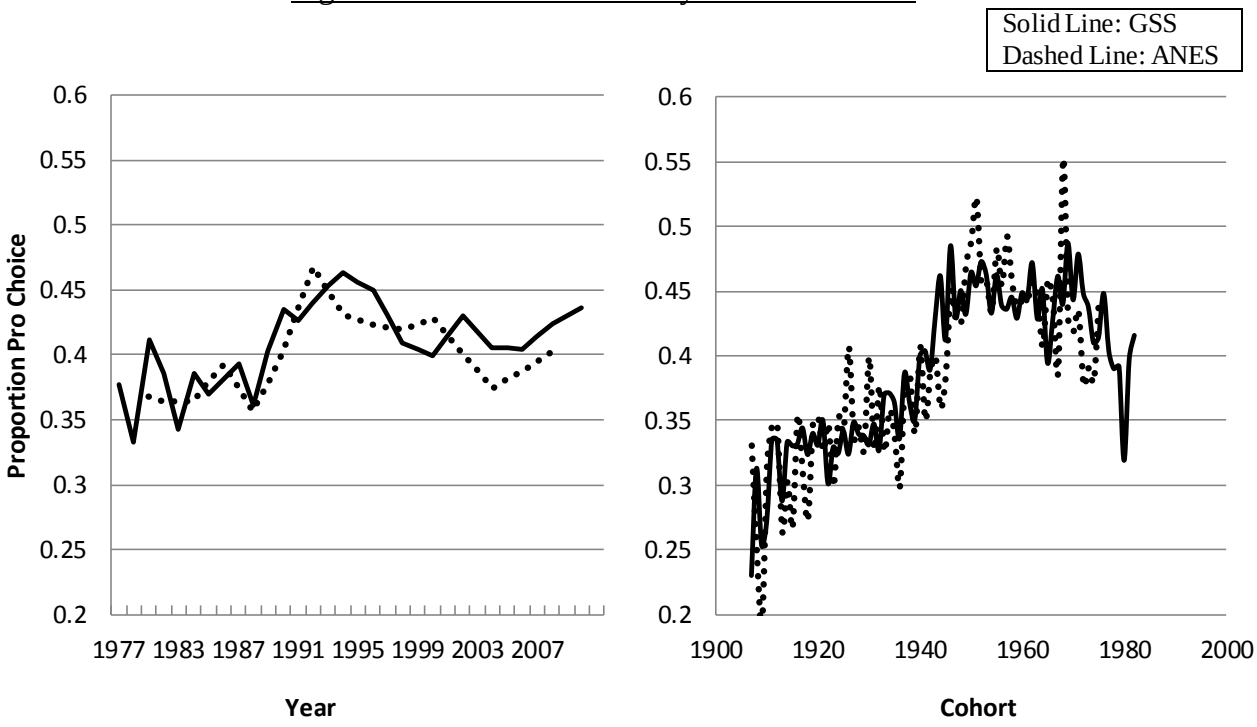
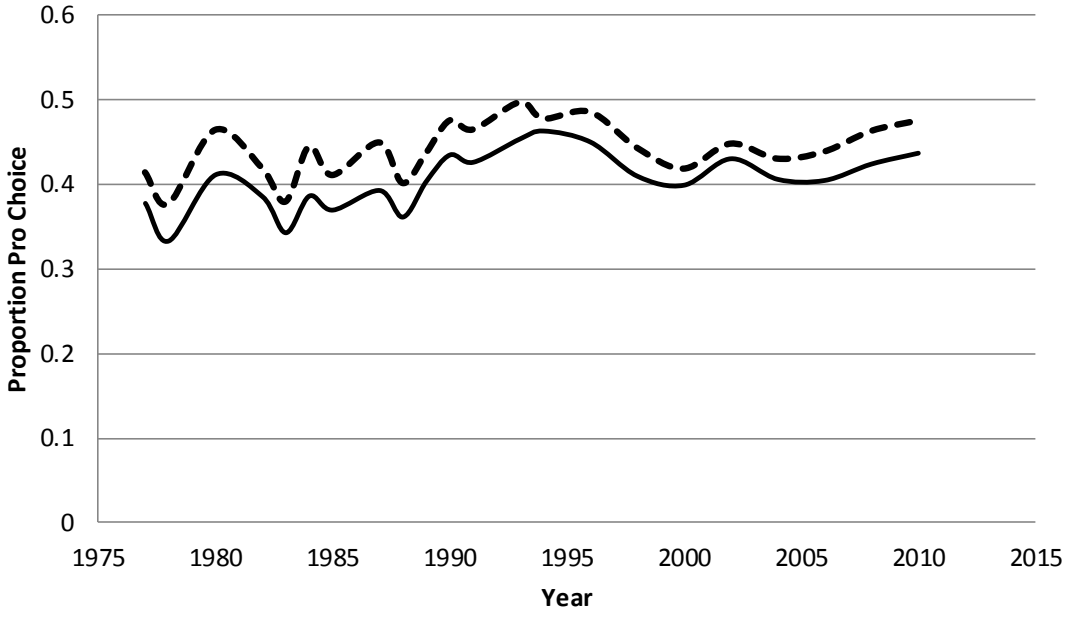
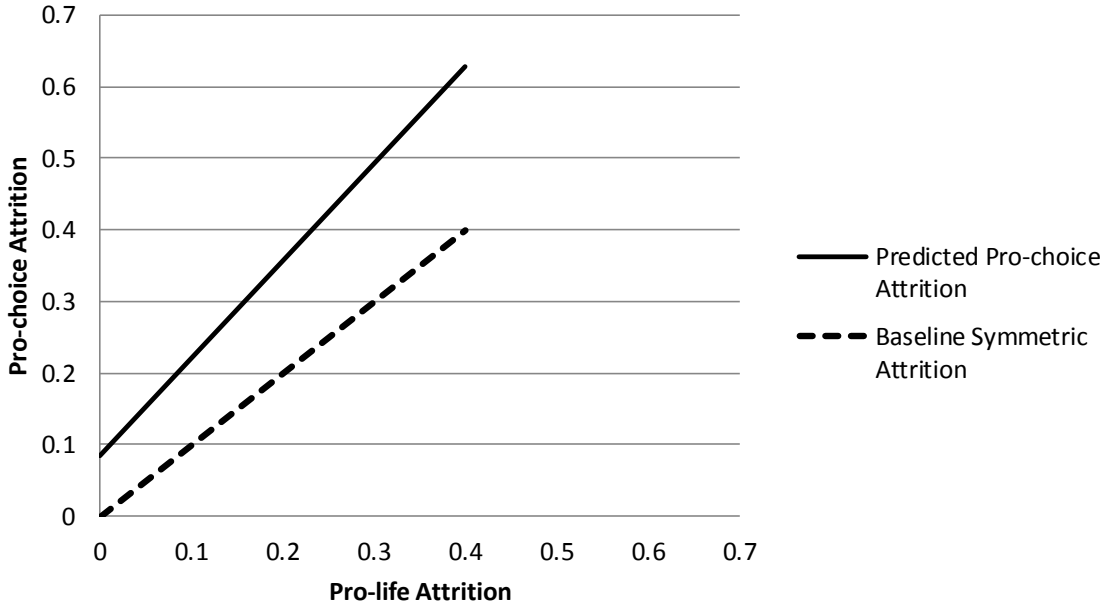


Figure 2: Proportion Pro-choice with Sibship weights, Year and Cohort



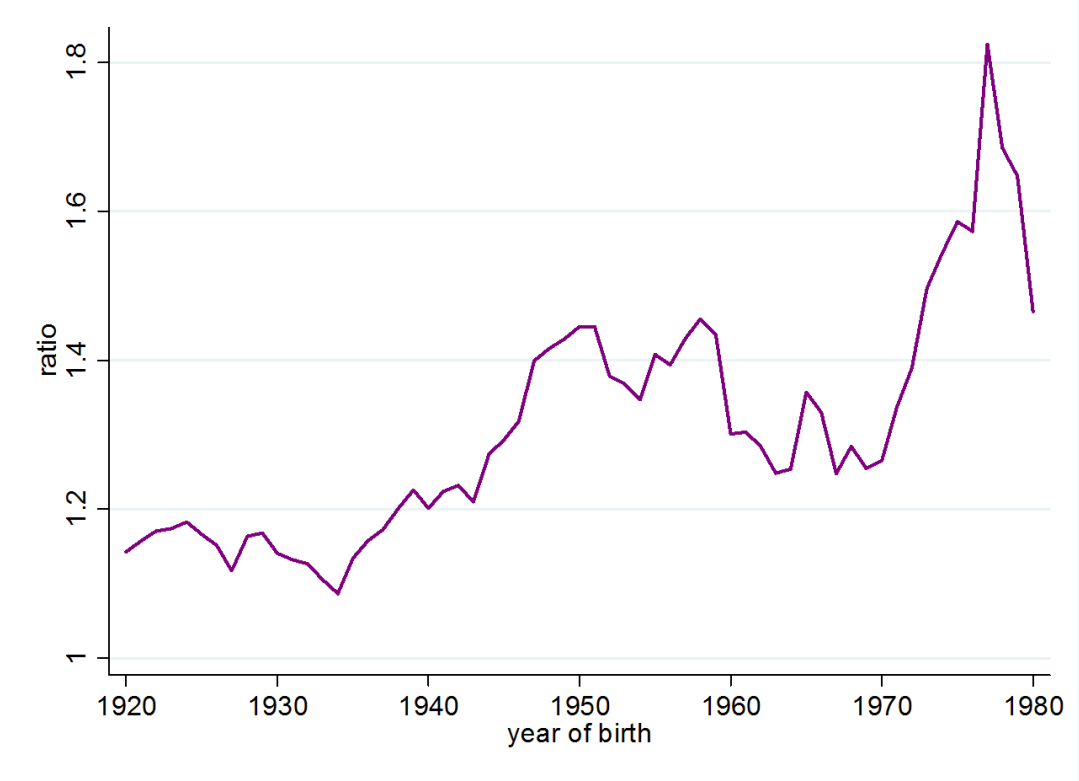
Weighted: Dashed; Observed: Solid

Figure 3: Predicted Asymmetric Attrition between Pro-life and Pro-choice Individuals

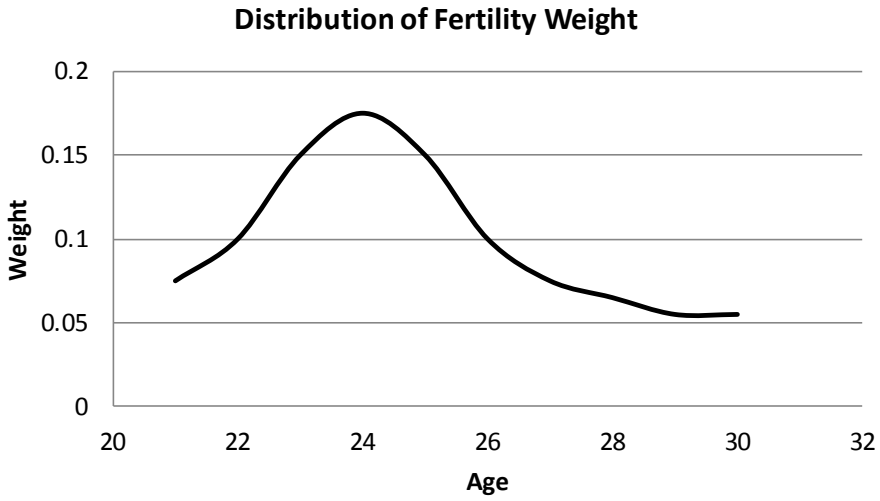


APPENDICIES

Appendix A: Fertility Ratio between Pro-Choice and Pro-Life Women by Birth Cohort



Appendix B: Calculation of Lagged Fertility Ratio:



Age	Weight
21	0.075
22	0.1
23	0.15
24	0.175
25	0.15
26	0.1
27	0.075
28	0.065
29	0.055
30	0.055