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How Personal Is the Political? Democratic Revolution and Fertility Decline

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Abstract

Existing theory has identified the capacity of political revolutions to effect change in a variety of social institutions, although relationships between revolution and many institutions remain unexplored. Using historical data from 22 European and four diaspora countries, I examine the temporal relationship between timing of revolution and onset of fertility decline. I hypothesize that specific kinds of revolutionary events affect fertility by engendering ideological changes in popular understandings of the individual's relationship to society, and ultimately the legitimacy of couples' authority over their reproductive capacities. Results demonstrate that popular democratic revolution – but not institutionalized democratic structures – predict the timing of the onset of fertility decline.

Keywords

Fertility; Revolution; Demographic Transition; Ideological Individualism; European Fertility Decline; Democratic Movements

Europe under the *ancien regime* was a continent of hierarchical relationships, with power concentrated in the hands of a few. The individual was in no sense master of his (and certainly not mistress of her) own destiny; individuals enjoyed rights only by virtue of membership in particular groups.¹ Concepts of self and place in society were dramatically altered in conjunction with evolving social institutions following the Reformation, Enlightenment, and “dual revolution” that tipped the balance of elite power from landed nobility to industrialists and bourgeoisie.² These economic and spiritual changes must have turned the existing worldview on its head, even without significant political change.

However, political change did occur, frequently visited on societies as dramatic, transformative events. Within a span of 150 years nearly every country in Europe experienced popular challenges to established order and expansion of civil rights. The Revolutionary Era's political upheavals differed from earlier unrest in that demands were not exclusively focused on economic redress, but on reweaving the web of social relationships.³ Even countries not experiencing revolutionary social movements overhauled their political structures, with democratizing reforms often implemented in attempt to prevent popular uprisings.

The effects of revolutionary social movements on political outcomes are well documented.⁴ If we believe that political revolutions, as both social movements and historical events, influence a variety of social structures and relationships,⁵ however, we must interrogate links between revolution and changes in other social institutions. In this paper, I hypothesize that ideas about individual autonomy engendered during revolutions led to declining rates of marital fertility in the “European world.”⁶ In light of the central role that ideologies of modernization and individuation play in theories of fertility decline, it is reasonable to posit a relationship between the macro-level changes wrought by revolutionary social movements and the ideology that individual couples use in making fertility decisions.⁷

My main data come from public-use aggregate data, published research, and secondary sources.⁸ While this paper primarily makes a conceptual contribution, I use ordinary least squares regression analysis to test whether the timing of revolution predicts the onset of fertility decline in 22 European world countries, and confirm my findings with two supplementary model estimations. The first incorporates four additional countries, incorporating a measure of institutional democracy; the second uses revolution to predict subsequent primary school enrollment, a measure representing individualistic ideologies.⁹

Political Revolution

Some theorists situate causes of revolutionary action almost exclusively within structural conditions.¹⁰ Purely structural explanations, however, may inadequately specify causal mechanisms, and fail to explain why *all* structural opportunities do not develop into widespread rebellion.¹¹ Alternative approaches allow for interplay between structure, historical circumstance, and human action.¹² Ideological factors are crucial for maintaining a regime's power,¹³ and play a key role in mobilizing actors, influencing the course of events, and determining the outcomes of revolutionary behavior.¹⁴ When ideologies of legitimate authority change, the existing regime is likely to be challenged.

While political change does not always imply social revolution,¹⁵ in societies with increasingly powerful and centralized states, radical social reform requires radically transforming the state.¹⁶ Ideologies that are present or emerge during revolutions may be adopted in other social arena. Revolutionary events are *historical* not only because of their causes and outcomes, but also their transformative capacity to redefine social structures, allow creation of new social identities or relationships, and alter the balance of power among social actors¹⁷ in ways that gradual change does not. Ostensibly *political* events accelerate change along other social dimensions and may have a "ripple" effect, transforming social relationships within the family, workplace, or pew. Following Bendix,¹⁸ the ideological revolution required for a country's population to push for democratization implies changing understandings of legitimate authority, and may shift other social relationships.

If we conceptualize revolutions as social movements with the capacity to redefine *nonpolitical* social relationships, revolutions should signal changes in other institutions. Broader social changes may occur due to social movement "spillover effects,"¹⁹ reshaping individual identities²⁰ and civic culture or social values as an unintended outcome of revolutionary activity.²¹ Much as the 1960s social movements produced a civic culture of political activism,²² democratizing Revolutionary Era struggles may have created a culture of individualism that pervaded other institutions. The family may be one of these institutions and fertility, one of the family's major social functions, may change in the wake of revolution.

Fertility Decline

Fertility fell dramatically throughout the European world over a short period of time, concentrated from the mid-nineteenth through the mid-twentieth centuries.^{23,24} This drop is *described* by classic Demographic Transition Theory (DTT), which postulates that declining fertility typically follows mortality decline, responding to rapid population growth. DTT focuses on economic correlates, understanding fertility as a function of the demand for children: when children are an asset, as agricultural labor and old-age or risk insurance, and mortality is sufficiently high that parents cannot expect all children will survive, fertility will be high. As industrialization and modernization lower mortality and increase childrearing costs, parents no longer want large families, and fertility falls.²⁵ However, predictive factors cited in DTT -- urbanization, industrialization, increasing education, and falling infant and child mortality -- are irregularly related to fertility decline,²⁶ and provide an incomplete explanation of this phenomena.

Alternative theories focus on cultural diffusion and ideation, claiming couples had long produced more children than desired. As knowledge about family planning traversed channels of social contact, fertility declined.²⁷ This argument is bolstered by the fact that cleavages in fertility levels frequently fall along linguistic, cultural, and religious divisions.²⁸ Cultural arguments also focus on changing social pressures for large families and the psychic and status “costs” of restricted fertility.²⁹ “Modernizing” European couples did not simply limit their family size in response to macro-level pressures: intervening cultural variables made restricting fertility a newly-acceptable choice.³⁰ Once social supports for high fertility disintegrate, individuals gain the moral authority to make decisions about their own lives and the futures of the groups to which they belong. This moral authority may be generated partly via democratic revolution and expanded acceptance of individualism. Demographic theorists have found ideational or economic “modernization”,³¹ increasing autonomy³² and individualism,³³ and cultural ideals of “modern” family structure³⁴ to be critical to fertility decline.

The link between political factors and fertility has been suggested in prior literature. Watkins hypothesizes that shifts toward common national, rather than provincial, identities may be responsible for the convergence of fertility levels within national boundaries.³⁵ Lesthaeghe links leftist voting trends to declining fertility, and notes the United States and France had the earliest democratic revolutions *and fertility declines* in the European world.³⁶ Benz links groups of political actors with specific fertility patterns.³⁷ My work is the first attempt to systematically link revolutionary movements to subsequent fertility decline. I hypothesize that the social transformations facilitated by political revolution might include the onset of fertility decline, and seek to establish a temporal link between the two processes. I expect that countries in which ideas about *political* autonomy and self-determination found earliest collective expression will provide early social endorsement for couple-based family limitation, and should experience the earliest onset of fertility decline.³⁸ Conversely, countries in which traditional authority is most strongly entrenched should experience delayed revolution and delayed fertility decline. The goal of this paper is to identify temporal linkages between revolutionary events and fertility decline.

II. Data and Methods

I use measures of fertility decline from the European Fertility Project (EFP) *Master File*³⁹ and numerous monographs and articles written by EFP scholars. Michael Hechter’s International Colonialism Study: National Integration in the British Isles, 1851-196640 provided disaggregated social measures and fertility rates for England, Scotland and Wales. I constructed additional social statistics using various sources, including Mitchell’s monographs on historical statistics and the 1912 *Catholic Encyclopedia*.⁴¹

The dependent variable is the year of onset of fertility decline -- the year in which a country’s marital fertility level fell 10-percent from the highest recorded level. Van de Walle and Knodel and Coale have determined that year for many of the countries included in this analysis.⁴² For countries for which no EFP documents report the date at which marital fertility had declined by 10 percent, but for which EFP data exist, I calculated that date assuming a mean annualized rate of fertility growth.⁴³ For countries not included in the original EFP analyses, I employed other scholars’ estimates.⁴⁴ For countries with multiple reliable estimates of fertility decline, the mean of the earliest and latest estimates is used.

I use Coale’s I_g to measure marital fertility. This compares a society’s marital fertility rate to that of the Hutterites, a population with early, universal marriage and very high marital fertility. It is calculated:

$$I_g = \frac{\text{Total births in period X}}{\sum (\text{Number of women in age interval} * \text{Hutterite age-specific marital fertility rate})} \quad \text{Eq. 1}$$

The 10-percent decline is used for several reasons. First, while populations exhibit pre-transition fertility fluctuation, once a 10-percent decline is attained, fertility typically continues to shrink irreversibly.⁴⁵ Second, wide variation in fertility levels existed both within and between pre-transition societies. Using a *percentage* decline rather than *threshold* value essentially weights each society's "natural" fertility for the influence of unknown behavioral factors that affected its pre-transition fertility, such as breastfeeding or age at marriage.⁴⁶ Finally, the European fertility decline was primarily caused by restricting fertility within marriage, rather than changing nuptiality patterns or controlling extramarital childbearing. Marital fertility, then, provides a parsimonious summary of overall fertility trends.

As is true for nearly all historical demographic research, this approach has limitations, especially since we are not able to directly record European couples' behavior, and must use the proxy of national rates of marital fertility. Problems with the index of marital fertility are aptly summarized by Guinnane, et. al, who use computer simulation to demonstrate that sizable minorities may be intentionally limiting fertility before this threshold decline in marital fertility is attained.⁴⁷ Thus, initial stages of fertility control may be missed. Coale's index also may not capture strategic differences in strategies to reduce family size – the change from "spacing" (non-parity-specific control) to "stopping" behavior.⁴⁸

The key independent variable is the year in which each country experienced its revolutionary event. Selection of revolutionary events *that signal changes in popular ideology* poses conceptual and methodological challenges. Although each society included here experienced a mass democratizing social movement, not every country's experience included *violent* revolution,⁴⁹ not all achieved durable expansion of individual rights, and many countries revolted on multiple occasions. Finally, some democratizing movements mainly involved small groups of elites, and in some instances were actively opposed by peasants and urban workers.

It is unlikely that my efforts will identify a perfect measure: even revolutionary specialists disagree on what constitutes a revolution. Tilly has constructed perhaps the best-known typology, coding events as revolutionary if: 1) Multiple claims to sovereignty are made; 2) There is popular involvement in revolutionary action; and 3) The existing regime is unable to maintain control.⁵⁰ Goldstone classifies political crises according to eight dimensions including: loss of the existing regime's legitimacy; elite and/or popular revolt; widespread violence; and changes in political institutions, the status of traditional elites, economic organizations, or ideologies of stratification. His baseline criteria for state breakdown include "a crisis of central state authority, elite revolts, popular uprisings, and widespread violence or civil war".⁵¹

However, neither Tilly's nor Goldstone's typology links political revolt to *ideology*. Because I am concerned with revolutions as transformative events in the development of *popular ideology* my analysis must bifurcate political strategies and the durability of results from popular claims on sovereignty. I therefore include movements that fail to garner institutional change as well as non-violent movements. Movements that failed to become violent because elites acquiesced to popular demands, or because early state development provided existing channels for protest, may have affected popular ideology as dramatically as violent revolutions. Critical features of a revolutionary movement, then, would be the character of public discourse,

the population segments involved, and the insurgency's halt in response to *expectations* of democratization.

I code revolutionary events as the first mass event in a country that is broader in scope than local or regional unrest, and satisfies the following criteria: 1) Claims for redress focus on democratic goals (expansion of voting rights, guarantee of individual civil rights, etc.); 2) Two or more social classes, including peasants and/or urban workers, collaborate for common goals; and 3) The existing regime is toppled and/or agitation ceases because the regime makes credible promises of reform. Nonviolent multi-class action is included under this rubric. A listing of the event identified for each country, as well as a brief description of why each event was selected, appears in Table 1. For countries with violent revolutions, the year of revolution is defined as the year violence erupted. For countries with nonviolent revolutionary movements, this date is the year political concessions were made or promised.⁵² While this is not a perfect measure, there is no reason to believe that any error introduced will result in findings that are more supportive of, rather than contradictory to, my main research hypothesis.

To isolate more effectively the influence of individualistic ideology on fertility, I must control for other factors causing fertility to decline. However, the number of countries with reliable historical data yields an awkward number of cases: too few for complex statistical analyses and too numerous for a "case study" approach.⁵³ Additionally, while a parsimonious statistical model is required, it is critical that variables included in the model represent the major factors DTT and ideation and diffusion theories identify as affecting couples' decisions to restrict their fertility: changing wealth flows within the family; declining benefits from high fertility; and linguistic or cultural barriers to implementation of fertility control. My regression analysis, then, can only contain a small number of variables, each carefully selected to allow demographic, socioeconomic, and cultural factors to fairly compete with year of revolution for statistical significance. Table 2 presents the demographic variables considered for use in the model, along with values for each country.⁵⁴

To select variables for this model, I grouped them along major theoretical dimensions of within-family wealth flows, cultural/linguistic diffusion, and declining benefit from high fertility. I then calculated bivariate (Pearson's R) correlations between each pair of variables, presented in Table 3. From each of the three conceptual dimensions, I selected the variable having the lowest level of correlation with other variables to maximize the variance explained by the final models and verified these selections using factor analysis. Based on this process, the Demographic Model includes: the percent of women in the paid labor force, representing changing intrafamilial wealth flows,⁵⁵ the percent of the population living in urban areas, signaling reduced economic benefit from high fertility, and the percent of each country's population that is Roman Catholic, reflecting cultural barriers to diffusion of information about fertility control.⁵⁶ Women's labor force participation and the percent of the population that is urbanized are measured within one to four years of fertility decline. The percent Catholic is measured in 1905. While the Catholic measure has reduced temporal correlation with the dependent variable, and may be measured several decades after fertility decline begins, it is an appropriate measure to include because religious affiliation exhibits durability over time.

Despite careful variable selection, it is possible that my results will be affected by omitted variable bias. With a small sample, I can include a limited number of predictor variables. However, I conducted supplementary analyses using different combinations of variables and am confident that the possibility of severe bias is reasonably low. It is difficult to think of theoretically appropriate, omitted predictor variables that (1) are not highly correlated with variables in the equation, and (2) are strongly related to the timing of both revolutions and of fertility decline.

I regress the timing of fertility decline on that of revolution using Ordinary Least Squares (OLS). Because France and the United States may exert undue influence based on their early revolutions and fertility declines, regression equations are estimated with the complete sample (22 cases) and with a restricted sample (20 cases) excluding these countries.⁵⁷ I confirmed OLS results using both Iteratively Weighted Least Squares (IWLS) and bootstrapping. IWLS iteratively estimates the regression equation, reweighting each time to reduce the influence of unusual cases that might unduly affect the results. Bootstrapping uses repeated sampling⁵⁸ with replacement to estimate a sampling error and construct confidence intervals for sample statistics.⁵⁹

For both samples, I estimate two regression equations. The first (Demographic Model) uses variables representing changing within-family wealth flows, declining benefits of high fertility, and cultural/linguistic barriers to information diffusion, to predict the timing of the onset of fertility decline. The second model (Revolution Model) regresses year of fertility decline on the variables included in the Demographic Model plus the year of revolution.

III. RESULTS

Using the Demographic Model to predict the onset of fertility decline yields disappointing results. The model has virtually no power to explain variance between observations ($R^2 = .007$), regardless of whether all 22 cases are included or the U.S. and France are excluded. The F statistic is less than one for the Demographic Model with both samples, and all predictor variables fail to approach statistical significance. Results of these model estimations appear in Table 4.

Incorporating year of revolution changes the picture substantially; this measure has far greater power to predict the onset of fertility decline. When all 22 cases are included, the model explains more than half of the variance between cases ($R^2 = .506$). The F-statistic is 6.382, significant at the $p \leq .01$ level. While Demographic Model variables still fail to attain statistical significance, the coefficient for year of revolution is significant at the $p \leq .001$ level, with a t-value of 4.44. Excluding France and the U.S. reduces the predictive power of the model and level of statistical significance of the year of revolution, but results for the Revolution Model remain quite similar. The restricted sample model still explains more than one-quarter of the variation between cases ($R^2 = .288$), and the model F-statistic remains significant, with a value of 2.919 and a p-value just over .05.

IV. SUPPLEMENTARY ANALYSES

It is possible that the effects of democratic revolution are related not to effects on popular ideology, but to factors related to institutionalized democratic political structures. If the main effects of democratizing political outcomes operate through the changes they impose on political *structures*, it is possible that measures of institutionalized political change may account for the relationship between political and demographic regime changes. To isolate the transformative effects of revolutions from those of institutional political changes – which may or may not be related to revolutionary activity – I conduct a secondary analysis using Political Regime Characteristics and Transitions, 1800-2004.⁶⁰

The Polity IV Project provides standardized measures of autocratic modes of governance and institutionalized democracy, and is primarily concerned with the selection process for a country's chief executive, institutionalized constraints on executive power, and openness and competitiveness of political participation. Democracy and autocracy measures are constructed additively based on a variety of dimensions, with possible values ranging from 0 to 10. Component variables include the extent to which the executive is chosen through open elections, the degree of non-elite access to institutional political structures, and whether

institutionalized procedures exist for the transfer of executive power. The overall polity score is calculated by subtracting the autocracy score from the democracy score, for possible values ranging from -10 through +10.⁶¹

To examine the temporal relationship between institutionalized democracy and the onset of fertility decline, I use the date at which a threshold total polity score of +5 was achieved. At this level, the highest possible autocracy dimensions score would be in the middle-range, and then only with extremely high levels of institutionalized democracy. Under this scenario, the most “undemocratic” government possible would fit into one of two schemes: it could have low levels of emergent democracy, with no vestiges of autocracy; or it could have an advanced democratic system in which full competition and participation were stymied by persistent autocratic tendencies (as with retention of an hereditary executive, or systematic exclusion of certain groups from the political process).⁶²

For the Political Institutions Model, I use the 22 countries from the revolutionary analysis plus four additional European world countries that did not experience democratizing revolutionary events.⁶³ I estimate models using three samples: the full sample of 26 countries; a sample restricted to the 22 countries that experienced a democratizing revolutionary movement; and a final revolutionary sample, excluding the U.S. and France. Again, I confirmed all results with IWLS and bootstrapping. While many countries in the Political Institutions Model also experienced political revolution, the social and ideological changes concomitant to revolutionary events should not obtain for institutional changes that occur gradually or without passionate public engagement.⁶⁴ I hypothesize, therefore, that the statistical significance of any relationship that exists between non-revolutionary structural political change and fertility decline will be attenuated when examined in concert with date of revolution.

Results from this analysis are presented in Table 5. The year each country attained the threshold level of institutionalized democratic structures significantly predicts the onset of fertility decline in regression models using all three samples. However, overall model fits and variance explained are much lower for the Political Institutions Models than for the Revolutions Models (Table 4). Results from the Combined Political Model, which includes variables for both the year of revolution and the year of institutionalized democracy, also demonstrate that revolution has greater power to predict the timing of fertility decline than do institutionalized political structures. The amount of variance explained roughly doubles with the addition of the year of revolution for both the sample including all revolutionary countries as well as the sample excluding France and the U.S. Additionally, although the coefficient for year of revolution is significant in both models, the institutionalized democracy variable is reduced to borderline significance when all 22 revolutionary countries are included in the sample, and becomes nonsignificant when the U.S. and France are excluded.

Clearly, revolution has more power to predict the timing of fertility decline than does the institutionalization of democratic political structures. But how do we know that these results reflect links to individualistic ideology? To further test this hypothesis, I use revolution to predict another social institution associated with individualistic ideology: the percent of children enrolled in primary school. As identified by Boli and colleagues, “it is individualism that gave rise to visions of the necessity of mass education.”⁶⁵ State capacity for educational provision should be correlated with same institutional factors associated with Polity IV. However, provision of – and enrollment in – primary education in the historical European world generally resulted from populist social action. Laws mandating primary school generally trailed enrollment increases,⁶⁶ with governments focused on provision of elite levels of education – secondary and university.

I again use OLS regression, confirmed using IWLS and bootstrapping, to predict the percent of children enrolled in primary education in 1905. This figure is calculated by dividing the number of children enrolled in primary school by the sum of [(70 percent of the children aged 5 – 9) + (all of the children aged 10 – 14)]. I estimate three pairs of models, first using all 22 revolutionary countries and then excluding the US and France. Results are presented in Table 6. Using predictor variables from the Demographic Model shown in Table 4, I identify virtually no capacity to predict primary school enrollment. Only the variable for women's labor force participation approaches statistical significance ($p = .081$), and the model fit statistics perform poorly. Using all 22 revolutionary countries in this analysis yields an adjusted R^2 of .022, and an F statistic of 1.159. With the sample restricted to exclude the U.S. and France, the adjusted R^2 falls to .007 and the F statistic to 1.048. The coefficient for women's labor force participation falls below borderline significance.

The second pair of models adds the year the Polity score first met or exceeded 5 points. Using all 22 revolutionary countries, no variables approach statistical significance, and the model explains only five percent of the variance ($R^2 = .050$). The F-statistic is a nonsignificant 1.277. Excluding the U.S. and France from the sample yields a similar picture. If the percent of children enrolled in primary school reflects the prevailing level of individualistic ideology, there is no measurable relationship between this ideology and the level of institutionalized democratic political structures.

Incorporating year of revolution into the model changes the story. Including all 22 countries that experienced a revolution explains more than half of the variance (adjusted $R^2 = .545$) and the F statistic of model fit is 7.129, significant at the $p \leq .001$ level. No demographic variables attain significance, but the coefficient for year of revolution is negative and significant at the $p \leq .001$ level, indicating that countries with earlier democratic revolutions had a greater share of children enrolled in primary school in 1905. Excluding the U.S. and France strengthens the model's performance, with adjusted R^2 reaching .757 and the F statistic 15.789. Using the restricted sample, the coefficient for the percent of the population living in urban areas attains modest significance ($p = .047$). The coefficient for year of revolution retains its statistical power, at $p \leq .001$ level. These results indicate that at least for the countries examined here, the ideological linkage between revolution and educational expansion is borne out. This suggests revolution and the ideological changes it triggers may have the capacity to predict the onset of fertility decline.

VII. DISCUSSION

To the best of my knowledge, this paper represents the first systematic exploration of political variables as explanatory factors in demographic regime change, and the first marriage of theories of revolution and fertility transition. This approach has implications for scholars studying both fertility patterns and revolutionary movements, in that it signals the critical role that ideology may play in effecting major social change, and ways that changes in one social institution may trigger ideological changes in other institutions. More to the point, the relationship between political autonomy and reproductive control evidenced here underscores the importance of studying fertility in concert with additional cultural and institutional factors.

The effect of the year of revolution further indicates that aspects of culture not previously explored by demographers may have lasting effects on population trends. My findings suggest that the transformative experience of revolutionary social movements may influence arena commonly understood to be quite separate from politics, and that the current scope of demographic research may pay too little attention to relationships between the overlapping spheres of influence of major social institutions.⁶⁷ Indeed, political processes appear to provide a better predictor of timing of fertility decline than do variables traditionally associated with

DTT or diffusion and ideational perspectives, at least for these countries and this time period. Theories of revolutionary ideology may provide greater leverage on the causative factors of demographic transition than “demographic transition” variables themselves.

These results support my hypothesis that cultural endorsement of individual autonomy creates a social climate allowing greater latitude in personal decision-making. However, the results also suggest that ideological changes may manifest in different behavioral outcomes for different groups. In this analysis, for example, male claims to political autonomy and female claims to reproductive autonomy appear to have gone hand-in-hand, mapping onto nineteenth-century ideologies of the gendered public and private spheres. The historical record demonstrates that women in the modernizing European world adopted new economic roles within the family – withdrawing from economically productive labor and focusing on household production – as industrialization expanded. That these women may have simultaneously appropriated emergent revolutionary ideals of individualistic autonomy and applied them to the newly-feminized domestic sphere provides insight into the process of cultural diffusion and subsequent behavioral adaptation.

Finally, the hypothesis that revolutionary shifts in ideation are more predictive of changes in fertility behavior than are structural variables was supported. Year of revolution was strongly predictive of the onset of fertility decline in each model in which it was used. Conversely, while institutional political measures have a significant relationship to fertility decline when used in isolation, their significance is all but eliminated when used with year of revolution. This indicates that something specific about the cultural transformation that occurs during revolutionary movements is involved, rather than simply the degree of democratization a country’s populace enjoys. Supplementary analyses using year of revolution to predict primary school enrollment clarify that it may be the cultural adoption of ideological individualism that matters. While relative contributions of structural opportunities and cultural ideology to the *causes* of political revolutions remains in question, this finding invites increased attention to structural and ideological *outcomes*, particularly to those in supposedly non-political arena.

VIII. CONCLUSIONS

The analyses presented here are limited in important respects, including the restricted methodological repertoire which can be brought to bear on a small N study and the inability to precisely and directly measure the processes of cultural diffusion through which political and fertility regimes might be linked. Despite careful crafting of the statistical models employed, I cannot claim to have explored the full range of possible causal relationships, nor to have fully explicated the mechanisms through which this transformation might have occurred. Indeed, that was not the intent of this work. Rather, I linked theoretical insights from the literature on political revolutions to a question that has long plagued demographers: What cultural factors might be involved in hastening the onset of fertility decline? The results presented here should be viewed as suggestive, and the primary contribution of this paper as providing insights into an under-theorized area of study. I am not, for example, able to directly observe the fertility behavior of individual historical couples, or identify the relationship between political activism and demographic behavior at the sub-national level.

I leave it to future researchers to more fully explore the nature of the relationship I have identified. A more fine-grained analysis of revolutionary action might provide greater statistical leverage on the relationship between politics and fertility. The inclusion of additional countries or more specific political variables – perhaps indications of the percentage of the population involved in revolutionary activity, or of provinces in which political unrest occurred – might increase the explanatory value of the model. Interactions between major institutions may be critical, and more substantive indicators of shifts in religious participation and/or the

economic structure may also increase the model's usefulness. However, analyses of this type are beyond the scope of this paper, and therefore left for future researchers.

My results do, however, support the supposition that ideological changes wrought in the heat of revolutionary movements may influence popular support for individualistic decisions about fertility. Secular individualism did not check its hat at the bedroom door. Certainly one who believes he can participate in the governance of his nation and assumes responsibility for understanding God's intentions might also believe that he has the ability to determine with his wife whether and when to have another child. These results support the hypothesis that the process of revolution – and changing understandings of power and authority – plays some role in hastening the onset of fertility decline. It implies that radical social movements have the capacity to change not only the social arrangements explicitly targeted through collective action, but also to alter a panoply of power relationships, cultural values and behaviors.

These results also may be limited by a number of minor irregularities in the data, particularly since data for many of the variables came from more than one source. For example, there is not complete uniformity on the percent urbanization variable, as the estimates reflect a mix of numeric thresholds and official designations. The percent Catholic in each country was calculated based on the number of Catholics reported in the 1912 *Catholic Encyclopedia*. Because Catholic Church doctrine invalidates decisions made by those who were once practicing Catholics and subsequently leave the Church for other religious organizations, this number probably includes "lapsed Catholics," who may be active in Protestant denominations, or adhere to no particular religious affiliation.

In general, however, these results provide strong support for the question at hand and a solid basis for further exploration of the relationship between fertility and various social and political factors. Future researchers may wish to examine whether the relationship between political democratization and fertility obtains for non-European populations, during different time periods, or under non-Christian majority religious structures. There may also be additional nodes of social interaction affected by changing political structures that have not as yet been researched, as well as additional ideological or cultural influences on fertility patterns. These findings suggest that relationships between social structures may be more complex and overlapping than previously believed, and further investigation is warranted.

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52. This approach risks measurement error due to differences in temporal classification. However, early stages of social movements are difficult to identify, making precise measurement impossible.
53. For example, Event History Analysis might appear to be an appropriate methodological approach. However, significant theoretical and practical concerns make Event History Analysis inappropriate for the question and data, particularly the difficulty of identifying a “Time 0” for entering the risk pool. Structural Equation Modeling might also seem useful, since I am investigating the latent construct of “ideological individualism” and its manifest influence on the relationship between revolution and fertility. Unfortunately, standard errors for SEM assume large sample sizes, rendering the number of cases in this analysis far too small to support SEM. I rely on statistical approaches that are more appropriate for the limitations of the data.
54. The shrinking lag time between year of revolution and onset of fertility decline likely reflects greater availability of more effective contraceptive methods. Early fertility control efforts primarily involved restricting coitus and reliance on abortion. The availability and adoption of barrier methods occurred much later (see, e.g., Seccombe, Wally. Starting to Stop: Working-Class Fertility Decline in Britain. Past and Present 1990;126:151–188.). Given the high failure rate of “natural” methods—monthly pregnancy risk remains above 5% until the wife nears 40 years old for couples with *monthly* coitus

(Weinstein, Maxine; Wood, James W.; Stoto, Michael A.; Greenfield, Daniel D. Components of Age-Specific Fecundability. *Population Studies* 1990;44:447–467. 462.)—and historic misunderstanding of the timing of a woman's fertile period, the extended lag time among countries with earlier revolutions is unsurprising. The important point is that countries with earliest revolution experienced earliest fertility decline, and those with later revolutions had delayed fertility declines.

55. Caldwell's theory applies to the direction of inter-generational wealth flows. Women's labor force participation should capture this measure because women's willingness to engage in paid labor has been linked to an emphasis on providing resources for children (See, e.g., Perlmann, Joel. *Ethnic Differences. Schooling and Social Structure Among the Irish, Italians, Jews, and Blacks in an American City, 1880-1935*. Cambridge University Press; New York: 1988.).
56. In supplementary analyses, I substituted in a measure of the total proportion of the population that was Catholic or Orthodox Christian, to account for the variety of religious adherence among the countries analyzed. For example, Orthodox Christianity is the primary religion in both Greece and Russia, and is similar to Catholicism structurally and theologically in ways that may influence the relationship between the religious and cultural landscape and the prevailing fertility regime. Results were substantially the same.
57. This restricted sample is used for theoretical, and not methodological, reasons. Using dfBeta and Cook's Distance to identify influential cases reveals that no country exerts undue influence on either the overall goodness of fit of the model, or the size and significance of individual regression coefficients.
58. The analyses presented here were confirmed by bootstrap with 1,000 draws per regression estimation.
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62. Including this measure has empirical as well as theoretical grounding. Preliminary explorations tested four separate threshold measures. This value demonstrated the strongest relationship to fertility decline, measured by both the amount of variance explained and the coefficient value.
63. Those countries are Australia, Canada, New Zealand, and Romania. Romanian fertility data are from the European Fertility Project. Additional fertility estimates are from: Caldwell, John C.; Ruzicka, Lado T. The Australian fertility transition: An analysis. *Population and Development Review* 1978;4:81–103. for Australia. Jones, Elise F. Fertility decline in Australia and New Zealand, 1861 – 1936. *Population Index* 1971;37:301–338.; and McInnis, Marvin. The population of Canada in the nineteenth century. :371–432. chapter 9.
64. For example, many countries that experienced revolution only crossed the Polity Score threshold following World War I, when reforms were imposed on them by the coalition of victorious nations.
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Table 1**Democratic Revolutionary Events Identified for 22 European-Origin Countries**

Country	Year	Event/Notes
Austria	1848	Urban protests demanded democratic reform. Serfdom abolished. Constitutional reforms short-lived.
Belgium	1830	Nationalist revolution won independence from Netherlands and guaranteed civil rights.
Bulgaria	1899	Bulgarian Agricultural National Union united peasants and intelligentsia, pushed for lower-class policy concerns. Violence ended with government concessions.
Denmark	1848	Society of Friends of the Farmers expanded constitutional civil rights, limited powers of monarchy.
England	1832	Great Reform Law expanded suffrage, eliminated tithe tax, allowed proportional representation.
Finland	1905	Broad coalition of elites and workers gained national independence, universal suffrage (men and women).
France	1789	Multi-class coalition unseated monarchy, gained Declaration of the Rights of Man and of Citizen, constitution.
Germany	1848	Revolutions in several states. Monarchs instituted constitutional reforms, abolished serfdom. National Assembly drafted constitution before Friedrich Wilhelm crushed movement.
Greece	1909	Popular movement for democratic reform, military opportunities for non-elites. Prime minister resigned.
Hungary	1848	Mass demonstrations demand civil rights. Russia's intervention reverses initial reforms.
Ireland	1829	Emancipation movement won political rights for majority Catholics.
Italy	1848	Popular unrest overwhelmed every ruler in Italy, including the Pope, and all granted limited constitutions.
Netherlands	1848	King avoided revolution with constitutional reform; multi-class coalition forced additional concessions.
Norway	1836	Peasantry mobilized for reforms including local self-government, reorganization of state fiscal functions.
Portugal	1910	King deposed and democratic political structures installed; nationalistic rhetoric also used.
Russia	1905	Multi-class coalition gained reforms, including constitutional rights. Political maneuvering sabotaged reforms.
Scotland	1832	Great Reform Law expanded suffrage, eliminated tithe tax, allowed proportional Parliamentary representation.
Spain	1854	Urban proletariat and middle-class Progressives revolted, form two-year coalition government. Reforms included universal manhood suffrage and a constitution (never implemented).
Sweden	1866	Riksdag Reform Bill allows adult male suffrage via property qualification, shifting participation from caste-based to individualized class-based system.
Switzerland	1831	Revolutionaries forced reforms, including universal manhood suffrage and limits on clerical power.
United States	1776	Originally a bourgeois, nationalist/economic battle, incorporating civil liberties and democratic principles into public discourse successfully recruited mass participation.
Wales	1832	Great Reform Law expanded suffrage, eliminated tithe tax, allowed proportional Parliamentary representation.

Table 2
Values for Political, Demographic, Cultural & Socioeconomic Variables for 22 European World Countries

Country	Year of Revolution	Year of Fertility Decline	Percent Urban	Infant Mortality Rate	Adult Literacy Rate	Pct. Speaking Official Language	Percent Catholic	Percent Women in Labor Force	Year Women Attained Vote
Austria	1848	1908	37	207	80	35	91.00	62.64	1918
Belgium	1830	1882	44	158	70	52	99.00	47.77	1948
Bulgaria	1899	1912	18.5	146	41	81	0.74	65.80	1945
Denmark	1848	1899	31	127	94	98	2.12	41.34	1915
England	1832	1892	72	146	92.5	100	4.87	41.99	1928
Finland	1905	1911	15	111	56	88	0.03	42.95	1906
France	1789	1814	19	185	46	52	98.00	32.72	1945
Germany	1848	1889	30	220	94	92	36.43	27.23	1918
Greece	1909	1913	25	203	35	80	1.68	24.80	1952
Hungary	1848	1900	16	227	51	51	51.84	27.25	1945
Ireland	1829	1926	24	69.5	88	77	90.37	32.92	1922
Italy	1848	1912	67	142	54	97	97.12	41.03	1945
Netherlands	1848	1897	54	151.5	94	98	35.17	23.92	1919
Norway	1836	1904	28	77	95	98	0.08	34.28	1913
Portugal	1910	1916	23	154	33	100	99.89	43.91	1968
Russia	1905	1922	16	198	25	43	10.64	71.86	1917
Scotland	1832	1894	54	120.5	94	94	10.93	27.74	1928
Spain	1854	1919	55	136	43	66	99.85	13.94	1931
Sweden	1866	1897	19	94	81	99	0.05	32.87	1921
Switzerland	1831	1886	22	163.5	95	70	41.50	38.88	1971
United States	1776	1848	14	217	68	96	16.32	12.73	1920
Wales	1832	1892	16	127.5	85	49	4.90	13.75	1928

Table 3
Bivariate Correlations Between Demographic, Socioeconomic, and Cultural for 22 European World Countries

	Cultural Factors		Value of Children		Intra-Family Wealth Flows		Year of Revolution	Year of Onset of Fertility Decline
	Percent Catholic	Percent Speaking Dominant Language	Percent Living in Urban Areas	Infant Mortality Rate	Women's Labor Force Participation	Adult Literacy Rate		
Pct. Speaking Dominant Language	-.342 [†]	1.000	.325	-.468*	-.243	.329 [†]	.060	.060
Percent Urban	.249	.325	1.000	-.228	-.074	.279	-.160	.122
Infant Mortality Rate	.119	-.468*	-.228	1.000	.161	-.403*	-.044	-.230
Women's Labor Force Participation	-.028	-.243	-.074	.161	1.000	-.362 [†]	.468*	.336
Adult Literacy	-.217	.329 [†]	.279	-.403*	-.362 [†]	1.000	-.524*	-.168
Year of Revolution	-.211	.060	-.160	-.044	.468*	-.524*	1.000	.726**
Year of Onset of Fertility Decline	-.081	.060	.122	-.230	.366	-.168	.726**	1.000

*** Notes: $p \leq .001$;

** $p \leq .01$;

* $p \leq .05$;

[†] $p \leq .10$.

Table 4

Effect of Demographic Variables and Revolutions on Timing of Fertility Decline

	Demographic Model		Revolutions Model	
	All Countries	Excluding US & France	All Countries	Excluding US & France
Women's LFP	.509 (.348)	.160 (.187)	-.086 (.227)	-.009 (.169)
Percent Catholic	-.081 (.136)	.087 (.073)	.017 (.098)	.106 (.062)
Percent Urban	.279 (.320)	-.163 (.171)	.371 (.225)	-.003 (.155)
Year of Revolution			.557*** (.125)	.269* (.098)
Intercept	1872.641*** (17.507)	1899.427*** (10.010)	857.060*** (229.148)	1399.265*** (181.294)
Adjusted R-Square	.007	.007	.506	.288
F-statistic	.953	.954	6.382**	2.919 [†]

Notes: Coefficients are unstandardized. Standard errors in parenthesis.

p ≤ .001;**
p ≤ .01;*
p ≤ .05;[†]
p ≤ .10.

Table 5
Relationship between Fertility Decline, Institutional Political Factors, and Demographic Variables

Demographic Model	Political Institutions Model			Combined Political Model	
	All Countries	All Countries	Revolutionary Countries	Excluding US & France	Excluding US & France
Women's LFP	.476 [†] (.272)	-.074 (.286)	-.027 (.346)	.004 (.194)	-.111 (.172)
Percent Catholic	-.069 (.120)	-.042 (.102)	-.053 (.115)	.085 (.068)	.102 (.059)
Percent Urban	.243 (.280)	.295 (.236)	.308 (.269)	-.091 (.164)	.035 (.149)
Year of Institutional Democracy Threshold		.326 ^{**} (.102)	.336 ^{**} (.116)	.137 [†] (.074)	.106 (.064)
Year of Revolution				.451 ^{**} (.131)	.240 [*] (.094)
Intercept	1874.408 ^{***} (14.370)	1271.088 ^{***} (189.460)	1249.773 ^{***} (214.869)	1640.088 ^{***} (139.850)	1253.115 ^{***} (193.115)
Adjusted					
R-Square	.031	.316	.288	.127	.361
F-statistic	1.266	3.891 [*]	3.121 [*]	1.689	3.149 [*]

Notes: Coefficients are unstandardized. Standard errors in parenthesis.

p ≤ .001;

**
p ≤ .01;

*
p ≤ .05;

[†]
p ≤ .10.

Table 6

Relationship between Primary School Enrollment, Political and Socioeconomic Characteristics

	Demographic Model		Political Institutions Model		Revolutions Model	
	22 Countries w/ Revolution	Excluding US & France	22 Countries w/ Revolution	Excluding US & France	22 Countries w/ Revolution	Excluding US & France
Percent Catholic	.038 (.143)	-.040 (.154)	.026 (.141)	-.034 (.154)	-.064 (.100)	-.091 (.076)
Percent Living in Urban Areas	.006 (.359)	.113 (.385)	-.022 (.355)	.002 (.399)	-.103 (.246)	-.446* (.206)
Women's Labor Force Participation	-.668 [†] (.361)	-.656 (.385)	-.388 (.422)	-.459 (.431)	-.026 (.282)	-.083 (.207)
Year Polity Score Attained 5			-.174 (.141)	-.169 (.166)		
Year of Revolution					-.591*** (.127)	-.849*** (.120)
Intercept	91.618*** (17.340)	89.734*** (19.899)	414.975 (262.077)	409.452 (314.709)	1169.507*** (231.958)	1664.516*** (222.214)
Adjusted R ²	.022	.007	.050	.010	.545	.757
F-statistic	1.159	1.048	1.277	1.047	7.279***	15.789***

Notes: Coefficients are unstandardized. Standard errors in parenthesis.

p ≤ .001;**
p ≤ .01;*
p ≤ .05;†
p ≤ .10.