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## A Closer Look at the Second Demographic Transition in the U.S.: Evidence of Bidirectionality from a Cohort Perspective (1982–2006)

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### Abstract

Second demographic transition (SDT) theory posits that increased individualism and secularization have contributed to low fertility in Europe, but very little work has directly tested the salience of SDT theory to fertility trends in the U.S. Using longitudinal data from a nationally representative cohort of women who were followed throughout their reproductive years (NLSY79), this study examines the role of several key indicators of the second demographic transition (secularization, egalitarianism, religious affiliation, and female participation in the labor market) on fertility behavior over time (1982–2006). Analyses employ Poisson estimation, logistic regression, and cross-lagged structural equation models to observe unidirectional and bidirectional relationships over the reproductive life course. Findings lend support to the relevance of SDT theory in the U.S. but also provide evidence of "American bipolarity" which distinguishes the U.S. from the European case. Furthermore, analyses document the reciprocal nature of these relationships over time which has implications for how we understand these associations at the individual-level.

### Keywords

Second Demographic Transition; Low Fertility; U.S. Fertility; Reciprocal Models

## INTRODUCTION

Continued low fertility trends within Europe, North America, and much of Asia have incited much cause for concern from national governments. At the population-level, below replacement level fertility is forecasted to cause substantial mismatches in future age structures of populations, placing undue burden on comparatively smaller cohorts of young adults to support somewhat larger cohorts of older adults. This shift has been coined the "second demographic transition" (SDT) and is distinct from the first demographic transition in several ways (Lesthaeghe and Neels 2002; Lesthaeghe 2010). Since the introduction of SDT theory in the early 1980s (Lesthaeghe 1983; van de Kaa 1987), subsequent research has provided ample empirical evidence to support the instrumental roles of individualization and secularization—two key components of the SDT—in terms of explaining why continued low fertility trends have continued to grip European nations (e.g., Lesthaeghe and Neels 2002; Moors 2003; Odgen and Hall 2004; Surkyn & Lesthaeghe 2005; Moors 2008; Lesthaeghe 2010).

The U.S. is somewhat distinct from the European case in that continued low fertility, rather than below replacement level fertility, has taken hold. Perhaps as a result, how the SDT may explain continued low fertility trends in the U.S. has not received as much attention. One important exception is Lesthaeghe and Neidert (2006) who used census-level data in the U.S. to explore spatial patterns of attitudes and behaviors associated with SDT and found evidence to support its applicability at the aggregate-level. Importantly, they found that the U.S. case differed from the European case in one key way: in the U.S., there exists a diverging bipolarity between SDT “followers” and SDT “non-followers.” Yet the extent to which these trends may further explicate micro-level fertility trends remains an empirical question. This study will provide such an examination.

This study tests the theoretical applicability of second demographic transition theory in the U.S. using a nationally representative sample of women who were followed throughout their reproductive years (NLSY79).

Analyses employ both longitudinal and cross-lagged structural equation models to evaluate the effects of earlier attitudes on later fertility behavior, and to test for bidirectional effects between attitudes and fertility behavior over time. In doing so, this study contributes to the literature by providing the first-ever test of SDT in the U.S. using individual-level data, and exploring the relevance of feedback models which are becoming increasingly important in explaining changes in fertility and family behaviors around the world. By using longitudinal data and reciprocal models, this study goes beyond past research that is limited by demonstrating only “footprints” of the reciprocal effects of attitudes and fertility behavior (Surkyn & Lesthaeghe 2005).

### **The Second Demographic Transition in the U.S.**

As identified by its proponents, the second demographic transition is characterized by several demographic and social structural/cultural indicators. The former include fertility and marriage postponement (leading to long-term sub-replacement fertility), decreasing rates of marriage and remarriage, as well as increases in cohabitation, divorce, nonmarital fertility, childlessness and successful contraceptive use. On the other hand, the latter involve a heightened emphasis on individualization, civic and religious disengagement, political distrust, egalitarianism, female participation in the labor force, and “flexible” sequencing of life course events (Lesthaeghe and Neels 2002; Lesthaeghe and Neidert 2006; Lesthaeghe 2010). Thus, continued low fertility trends are not simply the result of shifting socioeconomic circumstances and increased female participation in the labor market. Rather, Lesthaeghe and colleagues argue that rising levels of secularization, egalitarianism, and individualism are paramount, leading to the postponement of family formation events as individuals spend more time attaining higher levels of education and achieving higher economic status.

Even though these trends were originally conceptualized to capture European fertility patterns, more recent questions have turned to its applicability in the U.S. context. To a large extent, fertility within the United States has exhibited similar but slightly different patterns than other developed nations—and particularly, European nations. Over the last several decades the total fertility rate in the U.S. fell from 3.5 births per woman in the 1960’s to 1.7 during the mid-1970’s (Kent and Mather 2002), and then steadily rose to just above 2 births per woman in 1990 (Martin et al. 2006). Recent estimates from the World Population Data Sheet report a total fertility rate of 2.1 births per woman in 2008 (Population Reference Bureau 2009), reflecting a sustained trend of replacement level fertility over the past two decades. This pattern exemplifies its major distinction—that the U.S. may well avoid the problems facing many European nations of negative population momentum (Reher 2007). One may presume this growth is largely due to its influx of immigrant populations.

However, Morgan (2003) demonstrated that the U.S. fertility differential is not entirely due to higher levels of fertility among immigrant subpopulations. Rather, the fertility rates of non-Hispanic Whites in the U.S. tend to be higher than the fertility rates of their counterparts in Europe.

Religious differences among subgroups in the U.S. have garnered particular attention among fertility researchers. This literature has traditionally focused on Catholic versus Protestant differentials, but these patterns have decreased in prominence over time (Mosher, Williams, and Johnson 2005; Westoff and Jones 1979). Rather, McQuillan (2004) argues that there are three necessary conditions for any religion to influence fertility: 1) a religion espouses specific norms governing behavior that impacts fertility, 2) the church has a means to communicate and enforce these norms with its members, and 3) the individual is strongly attached to the church. This brings other religions to the forefront of fertility research and emphasizes the role of *religiosity* in general—regardless of specific affiliation. Interestingly however, a recent study found that higher fertility behavior among Hispanics in the U.S. was related more to socioeconomic differences than to higher levels of religiosity (Westoff and Marshall 2010). Other work has examined the impact of religiosity on fertility intentions and found that more religious individuals report higher fertility intentions (Hayford and Morgan 2008). Importantly, this difference was not explained by higher levels of unintended fertility. The authors attribute these effects to “religious schemas” about broader family values such as marriage, parenthood, nonmarital sex, and gender ideologies—and not just pronatalist values. Overall, much research has explored the reasons for religious differentials in U.S. fertility, but less has focused on the extent to which these are linked with overall patterns of behavior, or the extent to which these patterns reflect the SDT in the U.S.

To address this broad set of concerns, Lesthaeghe and Neidert (2006) considered whether the U.S. has followed the behavioral patterns identified within the European second demographic transition. They concluded that, in many respects, the U.S. is following the same trend. Furthermore, spatial analysis revealed that in only a few states did non-Hispanic Whites (at the aggregate-level) exhibit above-replacement level fertility: Utah, Alaska, Idaho and Kansas. This suggests that there may be subgroups of non-Hispanic Whites disproportionately contributing to this differential.

They also identified two dimensions of statewide SDT trends: those following the second demographic transition, and those who are not (which will henceforth be referred to as “SDT followers” and “SDT non-followers”). They labeled the latter “vulnerable women and children,” since this group is differentiated by higher rates of nonmarital births, teen births and divorce, as well as a higher prevalence of individuals living with grandparents who are responsible for childrearing. These dimensions maintained unique relationships with religious and socioeconomic indicators. At the state-level, the dimension of SDT followers was positively correlated with Catholicism, income, and education but negatively correlated with Evangelical Protestantism and Mormonism. On the other hand, the dimension of SDT non-followers was positively correlated with Evangelical Protestantism and Mormonism, being in poverty and being Black, while it was negatively correlated with education, income, and being non-Hispanic White. This suggests that there are likely to be important differences in SDT indicators by race/ethnicity in the U.S. Overall, they conclude that the U.S. is not an exception to the second demographic transition, but introduce the term “American bipolarity” as a more appropriate means of describing these trends (although it is for the most part in accordance with patterns found in Europe and other developed nations).

### **Related Theoretical Frameworks of Low Fertility Trends**

Over the past several decades, researchers have explored some of the same indicators of the second demographic transition from a variety of perspectives. Lesthaeghe (1998) argued for

the integration of the three overarching theories of fertility: second demographic transition theory, ideational shift theory, and economic theory, each of which is articulated here. Considering different scenarios under which these can be interrelated, he concluded that the most appropriate integration is a “multi-causal theory with strong contextual variations” (8). Essentially, this infers that the claims made by each as to the origin of fertility decline can remain interconnected, but the context within which each is best applied can vary. In this way, he buttresses the utility of all three rather than pitting one against another.

In the spirit of his argument, the tenets of ideational shift theory and economic theory are described here. Broad-brushed family changes such as decreasing rates of marriage as well as increasing rates of cohabitation and nonmarital childbearing have been identified as part of a larger transformation—an “ideational shift”—in which increased individualism and secularization influenced fertility in a downward direction (Lesthaeghe 1983). Thus, fertility declines are reflective of a more complex mechanism: the extent to which individualism is emphasized within the social context. Lesthaeghe and Surkyn (1988) provided aggregate-level empirical evidence of a single dimension of individualism and secularization underlying this ideational shift, and identified specific values (including religion, “education-transmitted,” political, work, and marriage and family values) correlated with one another in the direction of higher individualism.

Preston (1987) conceptualized these changes slightly differently. He emphasized a dyadic framework of fertility behavior consisting of three elements representing the changing social construction of parenthood: economic changes, contraception, and shifting values. For social and individual-level characteristics to interact with one another in a dyadic manner, childbearing must be conceptualized as a social act to which individuals apply value systems. Social values then take on the ability to determine the *rate of acceleration* by which changes in fertility take place. He argued that decreased parity behavior became more socially acceptable as population growth became a topic of public concern, and that motivations to become a parent and remain in a given marriage weakened as the economic situation in the U.S. became more favorable. While underscoring Lesthaeghe’s finding that individualism has increased, Preston proposes an alternative explanation for its emergence. His perspective suggests that individualism as a more popular value system grew out of a reaction to “changed condition” in society instead of emerging independently. However, aside from these differences in its origin both perspectives focus on the ways in which societal-level forces are changing the way individuals consider having children and influencing the number of children they are willing to have.

Another substantial body of research focuses on economically-driven theories of fertility decline. Classic contributions in this area support the notion that individual-level fertility behavior is determined by the three central elements of economics: cost, supply and demand. Children are a “consumption good,” and fertility intentions and behaviors are conceptualized as acting within economic boundaries including the utility, quality, supply, and cost of children (Becker 1960). Quantity and quality of children interact inversely with one another and this interaction is seen as the key to solving the negative relationship between income and fertility (Becker 1991). That is, the rising cost of having many children stimulated individuals to seek fertility control methods, which in turn reduced fertility rates. Further, Becker argues that the relative price of children differs by family since it is determined by market wages and time of parents (really, of mothers). The higher the relative price of children, the lower the demand for children and the higher demand for other commodities. Interestingly, the number of children is inversely related to female wages but directly related to male wages.

However, as previously argued, these approaches need not be mutually exclusive. Robinson (1997) notes that ideational changes can reduce two of the three costs of children—the social and psychological costs (not the economic costs)—and that these changes can occur in conjunction with either rapid or moderate socioeconomic development. Further, Cleland and Wilson (1987) examined data to support several economic and demand theories of fertility and concluded that both were influential, but in many developing countries it was ideational factors – such as culture and education – which represented a stronger contribution to the diffusion of new fertility ideals and behavior as opposed to macro-structural or economic changes. Lesthaeghe and Surkyn (1988) argued that both economic and ideational factors influence cohort-specific fertility in unique ways and that a combined approach to studying variation in fertility behavior can be productive. Further, Caldwell (2001) emphasized the void in socioeconomic theories of global fertility decline, in that they do not account the simultaneous nature of the decline (in 1960) around the world. To fill this void, he highlights the role of ideological and attitudinal changes in any theory of fertility decline, in addition to other factors such as efforts to control population growth and access to contraception.

In general, it is clear that changes associated with ideational shifts tend to emphasize decreases in fertility. That is, as individuals focus more on their careers and self-fulfillment they tend to have fewer children and delay childbearing. The observed decreases in fertility can either result from having a “taste” for a smaller family size, or by delaying fertility so much that there is little chance to recoup desired fertility later in the childbearing years due to decreased fecundity or competing preferences (Quesnel-Vallée and Morgan 2003). However, increases in individualism and secularization can exert an upward pressure on fertility in some circumstances as well. Morgan (2003) argues that as social norms about nonmarital childbearing and childbearing within gay or lesbian unions become more tolerant, fertility may increase. However, the general trend is typically conceptualized as an inverse relationship between the two.

### **Empirical Support for the Second Demographic Transition and Potentially Bidirectional Effects**

Empirical support for the SDT has focused its efforts on Europe. Lesthaeghe and Neels (2002) provided an associative test of the second demographic transition in France, Belgium and Switzerland and found that (1) it is distinct in its behavioral patterns from the first demographic transition, and that (2) the social or cultural indicators of both transitions were correlated in a way that suggested a bottleneck condition has developed which impacted the spatial diffusion of behavioral innovations. Ogden and Hall (2004) operationalized the second demographic transition among French households using census data from 1980–2000 and found evidence of the SDT in terms of shifting household structure (in the direction of more people living alone).

A consistent theme in the literature on social norms, individual-level attitudes and behavior is the ways in which these interact with one another. This research has shown that social norms lag behind changes in behavior (Bumpass 1990), but constitute a major influence on the pace of the fertility decline through path dependence (referring to the difficulty of derailing a self-perpetuated trend once it gains momentum) and social influence (Casterline 2001). Importantly however, value systems and individual-level fertility behavior tend to influence one another in a dyadic manner (Preston 1987). Moreover, as changes in family behavior become increasingly diversified, expectations of what family behaviors are considered “normative” change. A feedback loop develops in which social norms shift toward increasing tolerance, mutually reinforcing one another over time (Bumpass 1990, Smock 2000). Accordingly, Surkyn and Lesthaeghe (2005) argue that any test of second demographic transition theory must (1) consider longitudinal data and (2) test for



bidirectionality. Otherwise, only “footprints” of SDT attitudes and behaviors are demonstrated.

Furthermore, changes in values can take place across the life course as they interact with the historical and social context. Lesthaeghe and Surkyn (1988) highlight this problem, particularly as it relates to cultural values, and urge future research to use a cohort-based or life course approach to explore the influence of ideational factors. Similarly, Morgan and Taylor (2006) emphasize the centrality of the individual (and by extension, life course or cohort-based approaches) to examining second demographic trends.

In sum, it is evidence that cohort-based, longitudinal analyses are required to sufficiently test the applicability of SDT theory to fertility behavior, and these analyses must also consider reciprocal effects between the two. Some work has taken such an approach. For example, Moors (2003) analyzed reciprocal effects between gender role attitudes and family formation behaviors using individual-level, longitudinal data from the Netherlands. With an extremely rich set of value-oriented survey questions, he was able to examine multiple latent variables of gender role attitudes indicating personal autonomy, traditional views on marriage, traditional orientation towards one’s household role, and the value of children. Even within a relatively narrow window of time between surveys (2 years, or, from 1982 and 1984), he found evidence of significant associations in both directions. That is to say, gender attitudes affect family formation behaviors and vice versa. In a related study, Moors (2008) examined similar effects but in only one direction: the effect of attitudes on the transition to parenthood at the individual-level. Here he combined two approaches—SDT and the extension of Fishbein-Azjen theory of planned behavior proposed by Barber (2001), and used a dataset of over 2,000 German women (ages 18–30). Importantly, he found that egalitarian women are least likely to make the transition while traditional women are most likely.

Similar evidence emerges from the U.S., based on a study using the Intergenerational Panel Study of Parents and Children (Cunningham, Beutel, Barber, & Thornton 2005). The authors show that egalitarian attitudes among women are negatively associated with marital first birth rates (relative to nonmarital first births), and that part of this association is mediated by higher levels of educational attainment among egalitarian women. However, it is interesting to note that neither marital nor nonmarital first births affected later-observed egalitarian attitudes.

While these studies constitute a pinnacle contribution to the literature on the second demographic transition, there is still a great deal we do not yet know. First, we do not yet know how the second demographic transition has shaped individual-level fertility behavior in the U.S. SDT theory was originally conceptualized to explain population-level trends in fertility rates (such as below replacement fertility), and therefore, there is much to be gained from examining the effects of SDT indicators on completed fertility behavior. Second, we do not yet know if SDT indicators and fertility behavior affect one another in a reciprocal pattern over the reproductive life course. This can be accomplished any number of ways, but one approach is to measure the same behaviors at two time points in the life course (such as before and after most reproductive behavior is enacted) using a cross-lagged structural equation model (Bielby & Hauser 1977). Third, we do not yet know how these unidirectional and reciprocal associations may emerge when multiple SDT indicators are included simultaneously. Such a test is a direct reflection of the core tenets of second demographic transition theory.

## The Current Study

This study draws upon longitudinal, nationally representative data from a single cohort of women in the U.S. (1982–2006) to address the predictive nature of the SDT framework on completed fertility trends as well as potential bidirectional influences between SDT indicators and fertility behavior over time. While not without its limitations (see Bhrolcháin 1992), a cohort approach is advantageous for several reasons. First, it allows for comparison across time within individuals. Although key indicators of SDT theory (such as secularization) do not tend to fluctuate greatly within individuals over time, individuals are dynamic beings that interact with their social context creating the potential for change. Second, for factors that impact fertility behavior but are difficult to measure (such as fecundity), individuals can, to a certain extent, act as their own “control” over time. Similar to the logic implicit in fixed-effects models, unmeasured, time-invariant characteristics within individuals are the same over time and thus drop out of the model. Third, cohort measures such as completed parity are often better measures than period measures (such as total fertility rates) since they avoid conflating individuals who desire to remain childless with those who delay childbearing (Quesnel-Vallée and Morgan 2003). Due to the rising prevalence of delaying childbearing in recent decades, this approach provides an extremely advantageous perspective of population-level fertility behavior. Lastly and most importantly, ideational shift theory was originally proposed under a cohort model. Testing the theory in this way maximizes its theoretical utility.

This study takes the following approach. First, I examine how indicators of the second demographic transition (secularization, religious affiliation, egalitarian attitudes, and female participation in the labor market) shape final parity among a population-based cohort of women with complete fertility histories. I examine these associations for the entire analytic sample and then separately among subsamples defined by racial/ethnic group (non-Hispanic White, non-Hispanic Black, Hispanic). Given racial differences documented at the aggregate-level in the U.S. by Lesthaeghe and Neidert (2006), I expect to see significant differences emerge within this comparison. This first approach addresses potential unidirectional associations between SDT indicators and final parity, and how these differ by race/ethnicity. Next, I investigate how SDT indicators may affect specific parity progressions, such as progressing from remaining childless to having at least one child, progressing from having one child to having at least two children, and progressing from having two children to having three or more. This identifies which parity progressions are the most and least affected by SDT indicators. Then, I evaluate evidence of a potentially bidirectional relationship between SDT indicators and fertility behavior across the reproductive life course, first for the entire analytic sample and then for subsamples by racial/ethnic group. This broadens our understanding of how earlier-timed fertility behavior affects later-measured SDT attitudes and behaviors, and, conversely, how early-measured SDT attitudes and behaviors affect final parity. Finally, I evaluate whether or not evidence of the second demographic transition, and particularly the concept of “American bipolarity,” emerges in this population-based cohort.

## DATA AND METHODS

This study utilizes data from the National Longitudinal Survey of Youth 1979 cohort (NLSY79), a longitudinal survey of over 12,000 male and female participants collected annually from 1979 to 1994 and biennially from 1996 to the present. The analysis uses information primarily from two waves of data: the 1982 interview when participants were 17–25 years old and the 2006 interview when participants were 41–50 years old. To provide a more useful contextualization of the findings as they relate to specific stages in the life course, I will hereafter refer to these time points “emerging adulthood” (1982) and “mid-adulthood” (2006). Most, but not all, SDT indicators were assessed in these two interviews.

When necessary, information was taken from other interviews that occurred closest in historical time to these two time points (i.e., 2000 and 2004). After selecting female respondents who completed a survey in each of these waves, the sample size was 3,617 women.

This analytic sample is similar to the full sample of women ( $n = 6,283$ ) in many ways. Comparisons across sociodemographic and SDT characteristics in emerging adulthood show that the analytic sample is similar to the full sample in age (21.1 years versus 21.4 years), level of parity (0.50 versus 0.51), rates of employment (0.52 versus 0.53), hours worked (17.1 versus 17.0), frequency of attending religious services (3.9 versus 4.0), and egalitarian beliefs (3.04 versus 3.01). (A thorough description of how these variables are coded is provided in the following section). The analytic sample does however exhibit slightly higher levels of final parity than the full sample (1.9 and 1.7 respectively), and contains higher proportions of Black respondents (31% and 25%, respectively) and Hispanic respondents (19% and 16%).

## Measures

**Parity**—Parity is measured by the number of children ever born by 2006 (0, 1, 2, or 3+).<sup>1</sup> Due to the age of respondents at the time of the 2006 interview (41–50), the fertility histories are arguably close to complete. In 2006, 99.2% of respondents with, and 92.1% without children reported that they no longer expect to have any subsequent births. Further, of the remaining childless individuals who expect to have at least one child in the future, over half (5.2% out of 7.9%) report being sterile in the final wave. This suggests that these individuals may be considering non-biological children in their responses (such as adoption). After accounting for this difference, we can state that 97.3% of childless individuals no longer expect to have any biological children. While fertility expectations are by no means a perfect measure of completed fertility (see Morgan and Rackin 2010 for a recent example of the prevalence of under- and overachievement of fertility in the U.S. using this same dataset), it suggests that these surveys likely capture a large proportion of the total reproductive life course of this cohort.

**Secularization and Religious Affiliation**—In 1982 and 2000, participants were asked about the frequency with which they attended religious services on a scale of 1 to 6 (1 = *not at all*, 6 = *more than once a week*). Consistent with an SDT approach, scores were recoded so that high values indicate high levels of secularization (or correspondingly, low levels of religiosity). Participants were also asked about religious affiliation which was divided into four groups: Protestant (the reference group), Catholic, Other, and No religion.

**Egalitarian Beliefs**—A set of eight questions from the 1982 and 2004 interviews regarding attitudes about women's role in the home and workplace were compiled into a scale representing egalitarian beliefs (i.e., "A woman's place is in the home," "A wife who carries out her full family responsibilities doesn't have time for outside employment"). Each question was rated on a 4-item scale (1 = *strongly agree*, 4 = *strongly disagree*); when necessary, questions were recoded so that high scores reflect high levels of egalitarianism. Indicators were summed and divided by eight ( $\alpha_{1982} = 0.76$ ;  $\alpha_{2004} = 0.68$ ).

**Female Participation in the Labor Market**—Employment status is indicated by a categorical variable created by the Bureau of Labor Statistics which reflects employment in the year prior to the survey. Comparisons are drawn across individuals who were employed

<sup>1</sup>In one case, completed fertility behavior is measured using a different specification: the total number of children ever born by 2006 (range = 0–11, mean = 1.83, standard deviation = 1.41). (See Poisson models presented in Table 3.)



or in active forces (reference group), individuals who were unemployed, and those who were out of the labor market. This final category includes women who were staying at home, in school, or unable to work in emerging adulthood, and women who were retired, disabled, or out of the labor market for other reasons in mid-adulthood. For employed individuals, the number of hours worked in the year prior to the survey is also included. This question was recoded according to guidelines in the NLSY79 Users Guide and then divided by 52 to represent the average number of hours worked in a given week over the past year ( $mean_{1982} = 18.8$ ,  $mean_{2006} = 29.6$ ).<sup>2</sup> Participants were also asked about specific aspects of their job satisfaction in 1982 and about their global job satisfaction (“How do you feel about your job?” on a scale of 1–4, 1 = *like it very much*, 4 = *dislike it very much*) in both 1982 and 2006. To facilitate the strongest comparison over time, global job satisfaction was retained in the analysis.<sup>3</sup>

**Sociodemographic Characteristics**—In accordance with prior research (e.g., Forste and Tienda 1996; Lesthaeghe and Neidert 2006; Mosher and Bachrach 1996; Ventura et al. 1995), several covariates of fertility behavior were included in the analysis. Sociodemographic characteristics from the 1982 survey included age (mean = 21.3), race/ethnicity (Black and Hispanic versus non-Hispanic White/Other), completed years of education (mean = 12.6), and (log) annual household income (median of untransformed income = \$16,771). Given the average age of women in the sample in 1982, the vast majority had the opportunity to complete at least a high school education. (In fact, only 70 women in the sample were 17 at the time of interview.) Educational disadvantages associated with early childbearing often focus on whether or not young women complete high school before making the transition to motherhood, as this is a pivotal educational marker for young women (see Hoffman & Maynard 2008 for a review). This suggests that the inclusion of education at this life stage can be informative. However, since not all women in the sample are at equal risk of completing the same level of educational attainment (such as high school), supplementary analyses explored a different indicator: completed years of education in the year prior to first birth, for mothers, in the sample (range = 0–20, mean = 12.24, standard deviation = 2.29). A similar approach was taken for household income (median of untransformed income = \$21,300). Results, which are in most respects substantively and statistically similar to those presented here, are discussed alongside the main findings only when differences emerge.

Two additional indicators are included for women who had a birth at some point before the 2006 interview: if she used birth control immediately before her first pregnancy (0 = *none used*, 1 = *some form of birth control used*) which may at least partially reflect if the pregnancy was intended or unintended (Musick, England, Edgington, & Kangas 2009), and if her first child was born outside of a marital union (1 = *nonmarital*, 0 = *marital*). Birth control use in general is important to include due to generally high levels of contraceptive use in post-industrialized nations which indicate strong social influences on fertility behavior (Ventura et al. 1995), while unintendedness of first births and nonmarital first births are generally linked with higher parity (e.g., Hofferth 1987, Morgan & Rindfuss 1999; Guzzo & Furstenberg 2007).<sup>4</sup> Supplementary analyses included measures of women’s union status in

<sup>2</sup>Women who were unemployed or out of the labor market received a value on this variable corresponding with the mean number of hours worked among employed women in the sample in a given year. This allows for a straightforward interpretation of the effect of the number of hours worked net of employment status, since point estimates in regression models indicate the effect of an independent variable on the dependent variable, net of all other covariates in the model. This logic is similar to calculating a predicted probability as a value of  $x$  changes, when all other values on the right side of the equation are held constant at their mean value. Thus, the point estimates from subsequent regression models can be interpreted as the effect of being employed, and the effect of the number of hours worked *net of* employment status.

<sup>3</sup>Similar to hours worked, unemployed women were assigned the mean level of job satisfaction for employed women in that year. This point estimate from subsequent regression equations can be interpreted as the effect of job satisfaction net of employment status.

emerging adulthood (married, cohabiting, and neither). Again, results did not significantly differ to those presented here.

### Analytic Strategy

First, to address the unidirectional effect of SDT indicators in emerging adulthood on total number of children, a Poisson regression model in Stata is estimated. Regression coefficients that are both unadjusted and adjusted for sociodemographic characteristics are presented for the analytic sample, followed by adjusted coefficients for each racial/ethnic group. Next, the same set of SDT indicators are used to estimate the log odds of progressing through each of the following parity changes using logistic regression models: parity 0 to 1+, 1 to 2+, and 2 to 3+ children.<sup>5</sup> Separate models by race/ethnicity are discussed in the text but not presented in the tables. Finally, to examine potential bidirectional influences between SDT indicators and fertility behavior over time, a cross-lagged structural equation model is estimated (using Mplus 6.1).<sup>6</sup> Figure 1 presents a conceptual diagram indicating the proposed relationships in this final model. As depicted, cross-lagged structural equation models allow for multiple regression equations to be estimated simultaneously and in this case, these include the following: parity at time<sub>2</sub> is regressed on each SDT indicator at time<sub>1</sub>, each SDT indicator at time<sub>2</sub> is regressed on parity at time<sub>1</sub>, and each time<sub>2</sub> measure is regressed on its time<sub>1</sub> correlate. All time<sub>1</sub> measures are also allowed to covary with one another. As a result, these models provide a stringent and useful test of potential bidirectionality between SDT indicators and fertility. Both unstandardized and standardized coefficients are provided for this model to facilitate comparisons between coefficients and across time. A multiple group comparison was performed which estimates this model separately for each racial/ethnic group. Again, both unstandardized and standardized coefficients are provided. All analyses are weighted to adjust for oversampling in the NLSY survey design.

The structural model of a Poisson regression is:

$$\mu_i = E(y_i | \mathbf{x}_i) = \exp(\mathbf{x}_i \boldsymbol{\beta})$$

where  $y$  is the number of events for individual  $i$ , with a conditional mean dependent on  $\mathbf{x}_i$ , a vector of individual characteristics.  $\boldsymbol{\beta}$  is a vector of regression coefficients. Exponentiating the product of  $\mathbf{x}_i$  and  $\boldsymbol{\beta}$  results in an expected count,  $\mu_i$ , that is positive, a necessary condition of the Poisson distribution. The probability of a count given  $\mathbf{x}_i$  is:

<sup>4</sup>Consistent with the coding strategy for women's participation in the labor market, women who remained childless by the 2006 interview were assigned the mean value of both indicators among mothers in the sample.

<sup>5</sup>Although Moors (2003, 2008) advocates for the use of latent class analysis to determine attitude profiles for the prediction of fertility behavior, these data do not include a sufficient number of variables within each domain to adequately produce such profiles. Instead, this analysis utilizes sparser but broader data to examine the impact of SDT indicators on *multiple* parity progressions over time to determine a similar profile.

<sup>6</sup>Mplus provides superior estimation of models including ordered or dichotomous dependent variables. Other programs geared towards structural equation modeling such as AMOS use algorithms which assume all dependent variables are continuous measures. Additionally, two goodness-of-fit statistics are provided for each model. Since the sample size is somewhat large, the chi-square statistic (which compares the observed and predicted covariances, testing the null hypothesis that the model fits the data perfectly) fails to provide the best measure of model fit. Instead, I draw upon the Tucker-Lewis Index (TLI) which performs well for large sample sizes and adjusts for model complexity. This statistic compares model fit between the given model and the independence model, and tends to range between 0 and 1 with higher scores conferring better model fit. Scores of 0.90 are required to accept the model as a good fit for the data. I also reference the Root Means Square Error of Approximation (RMSEA) which adjusts for error in the population, thus making it ideal for use with large population-level samples. Scores less than 0.05 indicate adequate approximation (Curran et al. 2003).

$$\Pr(y_i|x_i) = \frac{\exp(-\mu_i)(\mu_i^{y_i})}{y_i!}$$

and the measurement model is,  $\log_e(y_i) = \beta_0 + \beta_1 x_1 + \dots + \beta_n x_n$ , where  $n$  indicates the number of independent variables in the equation (Long 1997). Poisson regression coefficients indicate the difference between the log of expected counts with each unit increase of a given independent variable. When exponentiated, Poisson regression coefficients can be interpreted as incidence rate ratios which indicate, for every 1 unit change in the independent variable, the percent increase or decrease in the rate at which the dependent variable occurs (Mustillo, Landerman, & Land 2012).

Logistic regression models draw upon the typical binary response model (see for example, Long (1997) for a statistical specification of this model). Since analytic variables generally contained very few missing values (between 1 and 4%), single imputation of missing data was performed in Stata 12. However, replications of the analysis using listwise deletion produced substantively and statistically similar findings (results available upon request).

### Descriptive Statistics

Table 1 presents weighted descriptive statistics for the full sample. In emerging adulthood, most women had not yet had a first birth. On average, respondents report attending religious services about once a month in emerging adulthood and somewhere between once a month and 2–3 times per month in mid-adulthood. A similar proportion of women report Protestant affiliation (58% and 56%) or no affiliation (9% and 11%) at both time points although a greater proportion report Catholic affiliation in emerging adulthood (30%) than mid-adulthood (24%). Correspondingly, in mid-adulthood more women report affiliating with an “Other” religious group than in emerging adulthood (9% and 3% respectively). As expected, women report greater labor force participation in mid-adulthood; 77% were employed in mid-adulthood compared with 58% in emerging adulthood. More women were unemployed or out of the labor market in emerging adulthood (12% and 30%, respectively) than in mid-adulthood (3% and 20%, respectively). Those who were employed reported working, on average, 11 hours more per week in mid-adulthood than in emerging adulthood. The average level of egalitarianism was similar at both time points.

Differences in these indicators across racial/ethnic groups are then explored. Significant differences (indicating results from ANOVA tests) are presented in the final column. Consistent with SDT theory in general and a pattern of American bipolarity in particular, non-Hispanic White women exhibit lower parity, as well as higher levels of secularization, employment, education, and household income in emerging adulthood compared with non-Hispanic Black or Hispanic women. They also have lower rates of nonmarital first births than Black or Hispanic women and higher rates of birth control use prior to first pregnancy (net of motherhood status).

Individual difference scores are another source of meaningful comparison over time (these are not shown but are available upon request). As expected, these indicate that within-individual values on SDT indicators remain quite consistent over time. For the most part, individuals express similar religious affiliation and comparable levels of egalitarian attitudes, secularization, and job satisfaction over time (never diverging more than 1 standard deviation in each scale). Also as expected, hours of work within-persons increases over time as does the proportion of individuals involved in various union behaviors such as marriage, cohabitation, and divorce. By 2006, 10.7% of this sample had never married,

36.3% had experienced at least one divorce, 43% had cohabited at least once, and 15.6% remained childless.

Still another meaningful comparison is to evaluate SDT indicators and sociodemographic characteristics across final parity. Table 2 presents these results and shows that, for the most part, the differences across parity are in line with what is expected based on past research. Higher levels of egalitarianism, secularization, and participation in the labor market are negatively associated with final parity and this pattern is evident in both emerging and mid-adulthood. In other words, women who remain childless are the most egalitarian, the least religious, and had the highest rates of employment—even in emerging adulthood—which is consistent with an SDT perspective. In addition, smaller proportions of women affiliating with Catholic faith at either life stage remain childless, and women with higher levels of education and income in emerging adulthood exhibit lower final parity.

## FINDINGS

Table 3 presents the results of the Poisson regression of completed fertility behavior on indicators of the second demographic transition measured in emerging adulthood. Regression coefficients are presented for the full analytic sample (Models 1 and 2) followed by subsamples for each racial/ethnic group (Models 3, 4, and 5). Overall, the results support the tenets of second demographic transition theory. Higher levels of secularization and egalitarianism are associated with lower incidence rates of final parity. For example, a one unit increase in secularization—indicating the difference between a respondent who never attends religious services and one who attends at least one service per year—is associated with a 3% decrease in the incidence rate of final parity, net of sociodemographic characteristics ( $e^{-.03}=0.97$ ;  $1 - 0.97 = .03$ ). Similarly, a one unit increase in egalitarianism (or the difference between an average score of “strongly agree” versus any other response, including “somewhat agree,” “somewhat disagree,” and “strongly disagree”) is associated with a 14% decrease in the incidence rate of final parity ( $e^{-.15}=0.86$ ;  $1 - 0.86 = .14$ ). In terms of religious affiliation, the incidence rate for Catholic-affiliated women is 5% higher than the incidence rate for Protestant-affiliate women ( $IRR=1.05$ ). Being out of the labor market is associated with a 15% increase in the incidence rate of final parity, relative to being employed ( $IRR = 1.15$ ).

These associations remain significant and, for the most part, similar in magnitude after sociodemographic characteristics are included in Model 2, with the exception of labor market status which is no longer statistically significant. Model 2 also shows that transitioning to motherhood by emerging adulthood, along with being Black and Hispanic are associated with higher incidence rates of final parity. Not intending first pregnancy (or, using birth control immediately prior to becoming pregnant) and marital first births are also associated with higher incidence rates of final parity (net of motherhood status). Education and household income are not statistically significant here, but when an alternative specification of these variables was used (education and income in the year prior to first birth), both were inversely associated with final parity (results not shown but available upon request).

Examining these associations separately by race/ethnicity reveals important differences. Among non-Hispanic White women, nearly identical trends emerge (see Model 3). Secularization and egalitarianism are inversely associated with the incidence rate of final parity, while Catholic (versus Protestant) affiliation is positively associated. The magnitude of these coefficients is identical to that observed in the full sample. The same patterns also emerge with respect to pregnancy intendedness and nonmarital first birth status as noted in the full sample except that, among White women, having a nonmarital first birth is

associated with a much larger (43%) decrease in the incidence rate of final parity (compared with a 22% decrease in the full sample).

Among non-Hispanic Black women however, only one SDT indicator is statistically significant: each unit increase in global job satisfaction (among women who are employed) is associated with a 6% decrease in the incidence rate of final parity (IRR=0.94). Pregnancy intendedness (as measured by birth control use) is not statistically significant among Black women, and the converse association between nonmarital first birth status and final parity is observed here, relative to the full sample. That is to say, among Black women, having a nonmarital first birth is associated with a 25% increase in the incidence rate of final parity (relative to White women), net of motherhood status (IRR=1.25). Model 5 shows that, among Hispanic women, higher levels of egalitarian beliefs are associated with lower incidence rates of final parity (IRR=0.84). No other SDT indicators are statistically significant. It should also be noted that, among Hispanic women, having a nonmarital birth is negatively associated with final parity just as is observed among White women (IRR=0.93).

Next, I examine how SDT indicators are associated with specific parity progressions over time. Before considering the results however, recall the timing of the surveys. Women progressing from 0 to 1+ children between the two surveys are the most likely to mirror the larger population (due to increased delays in childbearing), while those progressing from 1 to 2+ or 2 to 3+ represent a more unique group of women. Having a single birth by emerging adulthood (or, by ages 17–25) is more normative given that the age at first birth of this cohort of women is 23, but having two children by this time is less normative.

Table 4 presents the results. Models 1 and 2 compare women who transitioned from 0 to 1+ parity over time ( $n = 1,904$ ) with those who remained at parity 0 ( $n = 579$ ). Results indicate that women who report higher levels of secularization and egalitarianism in emerging adulthood exhibit lower odds of ever having children by mid-adulthood. A one unit increase in secularization decreases these odds by 9% (adjusted OR = .91) whereas a one unit increase in egalitarianism decreases these odds by 39% (adjusted OR = 0.61). Catholic-affiliated women exhibit 44% greater odds of having children than Protestant-affiliated women (adjusted OR = 1.44). Being out of the labor market (relative to being employed) and working more hours per week, net of employment status, are each associated with greater odds of making this transition.

Models 3 and 4 compare women who transitioned from parity 1 to parity 2+ between the two time points ( $n = 630$ ) with those who remained at parity 1 ( $n = 136$ ). Adjusted odds ratios (presented in Model 4) show that, among women who have one child in 1982, being out of the labor market is associated with 50% lower odds of having at least one more child. Models 5 and 6 present the final comparison: women who progressed from parity 2 to 3+ ( $n = 224$ ) versus those who remained at parity 2 ( $n = 130$ ). Here, among women with two children in 1982, only being non-Hispanic Black (versus non-Hispanic White) is associated with progressing to a higher parity.

Supplementary models examined parity progressions by racial/ethnic group (results not shown but available upon request). Due to the already small subsample sizes of parity 1→2+ and parity 2→3+, only the findings for the first parity progression (parity 0 → 1+) separately by race are discussed here. Higher levels of secularization and affiliating with Protestant (versus Catholic) were associated with lower odds of transitioning to motherhood among non-Hispanic White and non-Hispanic Black women. Egalitarianism was also associated with lower odds of becoming a mother among White women, but not Black or Hispanic women.



Thus far, these results suggest that SDT indicators differentially impact fertility behavior over the life course depending on the timing of first births. Delaying fertility but eventually having children represents a different relationship than remaining childless; both of which are distinct from not delaying fertility altogether. These differences are reminiscent of “American bipolarity” in that SDT followers (or, fertility delayers) differ from non-followers (or, “vulnerable women and children”) according to levels of SDT indicators. This finding will be explored in more depth in the bidirectional models below.

### **Bidirectional Associations between SDT Indicators and Fertility Behavior**

Lastly, I evaluate the potentially bidirectional relationship between SDT indicators and fertility behavior across the reproductive life course. Table 5 presents unstandardized (Model 1) and standardized (Model 2) coefficients from a (weighted) cross-lagged structural equation model, first among the full analytic sample and then among each racial/ethnic group (Models 3–8). (Recall that each  $time_2$  variable is also regressed on its  $time_1$  correlate in this type of model, providing an extremely stringent test of bidirectionality.) Indeed, the results demonstrate that bidirectional associations are in fact present. The results portrayed in the lower panel of results reflect the earlier findings: higher levels of secularization and egalitarianism in emerging adulthood are associated with lower final parities whereas Catholic (versus Protestant) affiliation is associated with higher parities. Female participation in the labor market does not have a salient effect in the full sample.

On the other hand, the upper panel of results portrays a new dimension of these associations by exploring the effects in the opposite direction. These results indicate that higher parities in emerging adulthood are associated with lower secularization, being unemployed or out of the labor market (relative to employed), and affiliating with Protestant versus Catholic faith in mid-adulthood.

The possibility that one direction dominates the overall relationship between SDT indicators and fertility behavior can be evaluated by examining the magnitude of the standardized coefficients (presented in Model 2). Interestingly, the results presented here suggest that neither clearly overshadows the other; effects in both directions emerge and remain salient in this stringent cross-lagged model framework. However, it does appear that results in the upper panel, indicating the effects of earlier-timed fertility behavior on later-observed SDT indicators, may be slightly stronger overall. The standardized coefficients show that the strongest association in the entire model is between higher parities in emerging adulthood and being unemployed in mid-adulthood ( $b = 0.13, p < .01$ ). All other significant associations are nearly the same in magnitude (ranging from  $+/-0.6$  to  $+/-0.9$ ). The effect of secularization is slightly stronger when it predicts later parity ( $b_{secularization\ time1} = -.09, p < .001$  versus  $b_{parity\ time1} = -.06, p < .01$  in the opposite direction) but the reverse is true with respect to Catholic religious affiliation ( $b_{Catholic\ time1} = .06, p < .01$ , and  $b_{parity\ time1} = -.10, p < .001$ ). Interestingly, egalitarianism and participation in the labor market are only significant in one direction.

With respect to differences by racial/ethnic group, Models 3 and 4 present unstandardized and standardized regression coefficients for non-Hispanic White women (respectively) and demonstrate that the same patterns emerge as were apparent in the full sample. Only one difference is noted: working more hours per week in emerging adulthood (net of employment status) is associated with higher final parity among White women. Among Black women (see Models 5–6), it is apparent that greater job satisfaction in emerging adulthood is associated with lower final parities (net of employment status), an association which was previously observed in Table 3. Interestingly, when we observe these effects in the opposite direction we see that higher parities in emerging adulthood affect later-observed attitudes and behavior as well such as affiliating with Protestantism versus Catholicism,

being out of the labor market, and working fewer hours per week. Among Hispanic women (see Models 7–8), higher levels of egalitarianism in emerging adulthood are associated with lower final parities (an association previously observed in Table 3), but here we can also see that higher parities in emerging adulthood affect later-observed SDT behaviors such as being out of the labor market and working fewer hours per week.

Generally speaking, the standardized coefficients for each racial/ethnic group show that the effects of earlier-observed fertility behavior on later-observed SDT attitudes and behavior (such as secularization and unemployment status for White women; being out of the labor market and Catholicism versus Protestantism for Black women; and being out of the labor market and number of hours worked for Hispanic women) tend to be greater in magnitude than the reverse direction.

## DISCUSSION

Second demographic transition theory was originally formulated in the 1980s as an explanation for continued low fertility trends in post-industrialized nations (Lesthaeghe 1983; van de Kaa 1987). Prior studies have empirically tested SDT theory in European nations (e.g., Lesthaeghe and Neels 2002; Moors 2003; Moors 2008; Odgen and Hall 2004; Lesthaeghe 2010), but only one has directly explored the relevance of the second demographic transition in the U.S. (Lesthaeghe and Neidert 2006) and none have examined U.S. trends at the individual-level. The current study provides the first-ever test of SDT theory using individual-level data in the U.S., with the goal of further understanding population-level trends of completed fertility behavior. By examining these associations within a longitudinal context and using reciprocal models, it goes beyond past research that is limited in documenting only “footprints” of the associations between SDT indicators and family formation behaviors (Surkyn & Lesthaeghe 2005).

The analyses presented here contribute several new findings to the literature. First, results show that SDT indicators, when measured early on in the reproductive life course (or, in emerging adulthood), are relevant in describing completed fertility trends among this cohort of U.S. women. The theoretical utility of second demographic transition theory in the U.S. is supported by analyses based on unidirectional and bidirectional models showing that secularization and egalitarianism in particular exhibit salient associations with fertility behavior. These findings are consistent with the broader literature documenting the effects of SDT trends on fertility behavior in Europe (Lesthaeghe and Neels 2002; Moors 2008; Odgen and Hall 2004; Lesthaeghe 2010), and are largely consistent with a closely related study, Moors (2003), which examined reciprocal associations between gender attitudes and family formation behavior in the Netherlands. The current study however includes a broader range of SDT indicators than was possible in Moors’ analysis, and shows that egalitarianism is salient in its effect net of other SDT indicators such as secularization, religious affiliation, and female participation in the labor market. Unlike Moors’ study, the current analyses show that egalitarian attitudes are only significant in one direction (earlier-observed egalitarian attitudes predict lower final parity, but not the converse association). However, the lack of a significant effect in the reverse direction is consistent with the analysis of Cunningham and colleagues (2005) whose study examined the reciprocal association between egalitarianism and hazard of first birth.

Interestingly, female participation in the labor market during emerging adulthood does not have consistent, salient effects on final parity in this cohort after taking into account known sociodemographic covariates of fertility behavior. However, observing the reciprocal associations within the context of a cross-lagged structural equation model show that earlier-timed fertility behavior exhibits salient effects on later-observed employment behavior (for

example, being unemployed or out of the labor market (relative to being employed), and working fewer hours per week). These associations persist in the full analytic sample, as well as among subsamples of White, Black, and Hispanic women, and are largely consistent with the literature on the consequences of early childbearing for young women (see Hoffman & Maynard 2008 for a review).

Second, this analysis extends previous research on reciprocal associations between SDT indicators and family formation behaviors by demonstrating that, while associations in both directions are significant, the effects of earlier-timed fertility behavior on later-observed SDT attitudes and behaviors tend to be stronger than the converse associations.

Third, results provide evidence in support of Lesthaeghe and Neidert's (2006) notion of "American bipolarity" within this cohort of women. Two distinct profiles emerged from these analyses, and this distinction was perhaps most stark in the exploration of specific parity progressions (or those who transitioned from 0 to 1+ children, 1 to 2+ children, and 2 to 3+ children between emerging and mid-adulthood). Among women who initially delayed childbearing, childlessness by mid-adulthood was characterized by higher levels of egalitarianism and secularization as well as affiliating with Protestant versus Catholic faith. On the other hand, SDT indicators were not, for the most part, significantly associated with completed fertility behavior among women who already had at least one child in emerging adulthood. This suggests that SDT attitudes and behaviors in emerging adulthood are more relevant to explaining final parity differences among SDT followers, or those who initially delay childbearing. Women in this sample who already had one or two children in emerging adulthood were represented in higher-order parity progressions, and their trajectories appear to be more consistent with the dimension of SDT non-followers observed by Lesthaeghe and Neidert.

That the associations between SDT indicators and fertility behavior were clearly and consistently evident among the subsample of non-Hispanic White women, but not among Black or Hispanic women, is consistent with the findings of Lesthaeghe and Neidert and lends further evidence to the notion of American bipolarity. Interestingly however, this analysis diverged from their work in one interesting way—being Catholic was consistently associated with higher, rather than lower parity in this sample of women. However, this may be indicative of a cohort phenomenon. That is, the Catholic/Protestant differential diminished in the past several decades across the entire U.S. population (Mosher, Williams, and Johnson 2005; Westoff and Jones 1979), but perhaps the socialization of this specific cohort is a remnant from the time where the old nature of these relationships existed.

Generally speaking, nonmarital births are a component of the SDT, but Lesthaeghe and Neidert group nonmarital births together with the attitudes and behaviors of SDT non-followers, relating these to a broader portrait of disadvantage or vulnerability. Here, we see that nonmarital first births are more common among Black and Hispanic women and are associated with higher final parity among Black women. But for White and Hispanic women however, a nonmarital first birth is associated with lower final parity which suggests some measure of compliance with SDT for these subgroups.

The cross-lagged models also support the divergence of two groups of women by highlighting the difference between delaying versus not delaying first births. While those with higher earlier parities are less involved in the labor market over time (the more "vulnerable" group, according to Lesthaeghe and Neidert), they are also less engaged in religious services which suggests some measure of compliance with the second demographic transition. On the other hand, women ending up at higher parities were more engaged in church and less egalitarian in emerging adulthood.

As with any study, this is not without its limitations. First, including a broader set of SDT attitudes and behaviors would add further explanatory power to this analysis but are unavailable in the NLSY79 data. Political and civic engagement as well as attitudes towards abortion, cohabitation, and same-sex partnerships would be particularly interesting to consider in future research. As spatial trends emerged in Lesthaeghe and Neidert's analysis, young women's geographic location would be interesting to examine as well. Social context affects young women's attitudes and behaviors by shaping social norms that affect her life decisions, and by constraining or promoting certain activities that, in turn, can impact family formation behaviors. Second, SDT measures that are included here were not asked in all NLSY79 survey years, and as a result, this study limits the analysis to two points in time, each of which contain the entire set of SDT measures. Examining data that incorporate measures of values and attitudes at more than two points in time would enable future studies to explore the impact of values in the years immediately preceding and immediately following each birth across a woman's reproductive life course. Such an examination would paint an even richer portrait of the reciprocal effects of SDT attitudes and fertility behavior. Future research could also examine the associations documented here within the context of relationship trajectories, such as the effects of SDT indicators on marital fertility, and then on nonmarital fertility. Each of these are promising endeavors, but are beyond the scope of this analysis.

In sum, findings from this study demonstrate that SDT theory is a useful framework to further understand continued replacement-level fertility trends at the individual- (or cohort) level in the U.S. In addition, this study provides evidence that while SDT indicators such as egalitarianism and secularization predict lower fertility over the life course, these attitudes and behaviors also become involved in a mutually reinforcing or reciprocal relationship over time. This supports the importance of dynamically modeling these relationships (as originally suggested by Preston 1987, Bumpass 1990, and Smock 2000), but also directly extends current research that focuses on explaining continued low fertility trends. Future research that models reciprocal relationships between SDT indicators and fertility may be a useful way to gauge the worldwide progression of the second demographic transition.

The evidence presented here in support of American bipolarity maintain the distinction between two groups of women, one of whom is following the SDT and one of whom is not. McLanahan (2004) notes these same trends and argues that this divergence has important implications for children's well-being. Future research should further test American bipolarity using different cohorts and different datasets, but if a consensus emerges, intergenerational (mother-child) transmissions of disadvantage may become increasingly important to consider in future research and policy, particularly with respect to child well-being. A growing consensus could also identify American bipolarity as a useful construct to further understand population growth or decline in the U.S. For example, earlier-timed transitions to motherhood are consistently associated with higher final parity in this cohort. As long as American bipolarity continues then, it is likely that the U.S. will avoid problems of below-replacement fertility that are currently facing other developed nations.

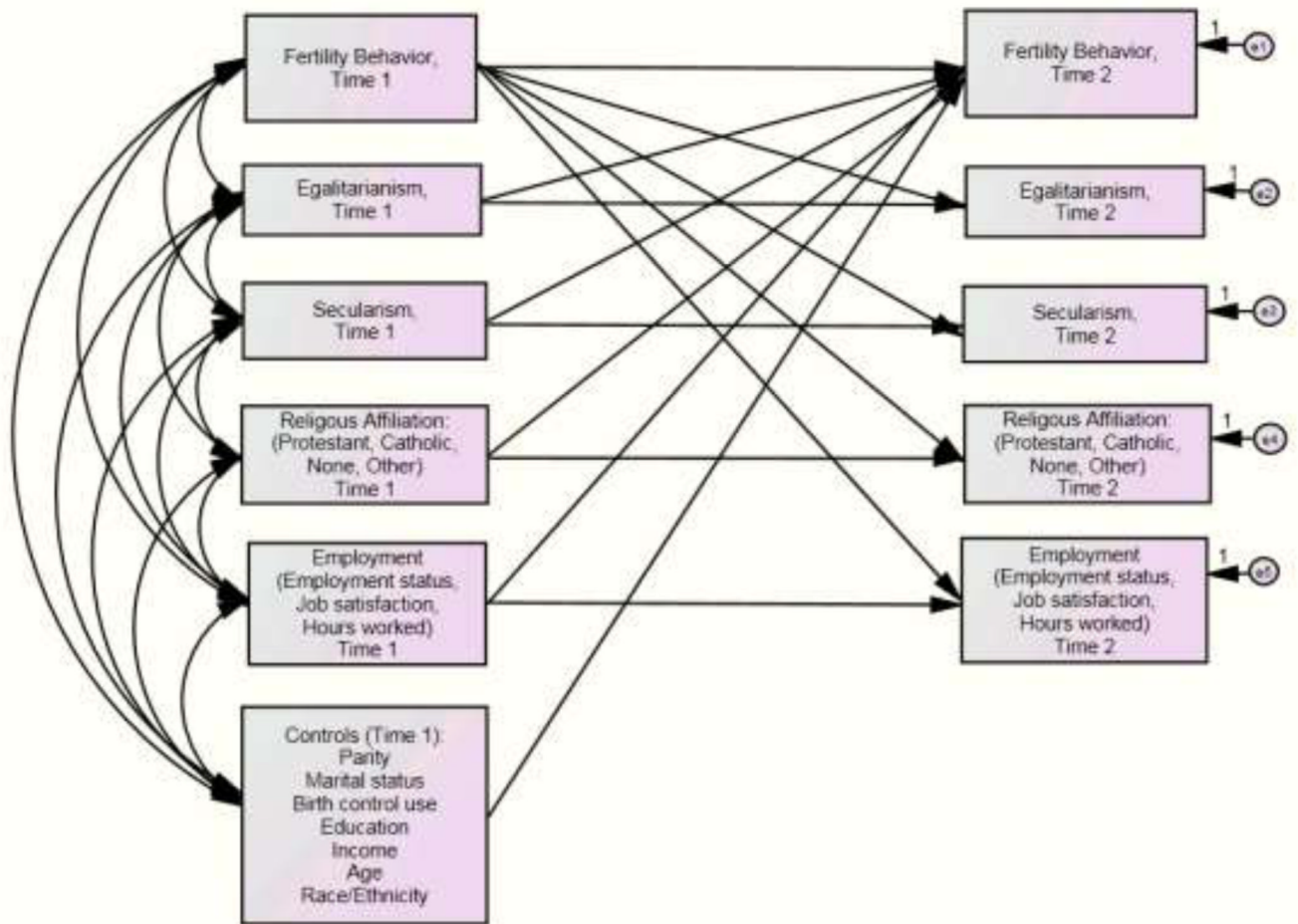
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**Figure 1.** Conceptual Diagram of Cross-Lagged Structural Equation Model Indicating Reciprocal Effects between SDT Indicators and Fertility Behavior (1982 – 2006)

**Table 1**  
 Weighted Descriptive Statistics of Analytic Sample (n=3,617) and Subsample by Race/Ethnicity

	Analytic Sample (n = 3,617)				Subsample by Race/Ethnicity				Significant Difference	
	Minimum	Maximum	Percent or Mean	Standard Deviation	Black (n = 1,119)	Hispanic (n = 671)	White/other (n = 1,827)	Percent or Mean		
<i>Parity and SDT Indicators - Time<sub>1</sub> (Emerging Adulthood)</i>										
Parity at time <sub>1</sub>	0	3	0.42	0.75	0.69	0.58	0.35	0.35	0.35	***
Secularization	1	6	3.97	1.66	3.66	3.74	4.03	4.03	4.03	***
Religious Affiliation										
Protestant (reference)	0	1	0.58		0.80	0.12	0.57	0.57	0.57	***
Catholic	0	1	0.30		0.09	0.82	0.31	0.31	0.31	***
Other	0	1	0.03		0.02	0.01	0.03	0.03	0.03	**
No religion	0	1	0.09		0.09	0.04	0.09	0.09	0.09	**
Egalitarian ism	1.25	4	3.04	0.44	3.10	2.98	3.04	3.04	3.04	***
Female Participation in the Labor Market										
Employment Status										
Employed (reference)	0	1	0.58		0.40	0.47	0.61	0.61	0.61	***
Unemployed	0	1	0.12		0.21	0.13	0.12	0.12	0.12	***
Out of the labor market	0	1	0.30		0.39	0.41	0.28	0.28	0.28	***
Hours worked per week	0	81.65	18.76	15.76	13.32	16.60	19.62	19.62	19.62	ns
Job satisfaction	1	4	3.16	0.72	3.08	3.15	3.18	3.18	3.18	***
<i>Parity and SDT Indicators - Time<sub>2</sub> (Mid-Adulthood)</i>										
Parity at time <sub>2</sub>	0	3	1.82	1.05	1.90	2.07	1.78	1.78	1.78	***
Secularization <sup>a</sup>	1	6	3.32	1.76	3.95	3.38	3.21	3.21	3.21	***
Religious Affiliation <sup>a</sup>										
Protestant (reference)	0	1	0.56		0.79	0.22	0.56	0.56	0.56	***
Catholic	0	1	0.24		0.06	0.64	0.24	0.24	0.24	***
Other	0	1	0.09		0.11	0.06	0.09	0.09	0.09	***
No religion	0	1	0.11		0.04	0.08	0.12	0.12	0.12	***

	Analytic Sample (n = 3,617)				Subsample by Race/Ethnicity				Significant Difference
	Minimum	Maximum	Percent or Mean	Standard Deviation	Black (n = 1,119)	Hispanic (n = 671)	White/other (n = 1,827)	Percent or Mean	
Egalitarianism <sup>b</sup>	1.25	4	3.01	0.41	3.05	2.98	3.01	3.01	**
Female Participation in the Labor Market									
Employment Status									
Employed (reference)	0	1	0.77		0.73	0.76	0.78	0.78	**
Unemployed	0	1	0.03		0.07	0.04	0.03	0.03	***
Out of the labor market	0	1	0.20		0.21	0.20	0.19	0.19	ns
Hours worked per week	0	148	29.63	19.16	29.39	28.54	29.71	29.71	**
Job satisfaction	1	4	3.42	0.64	3.35	3.44	3.43	3.43	**
<b>Sociodemographic Characteristics - Time<sub>1</sub></b>									
Used birth control before first pregnancy (1=yes)	0	1	0.44		0.38	0.34	0.46	0.46	***
Education	0	20	12.58	2.28	11.83	11.42	12.78	12.78	***
(log) Household income	0	13.87	9.86	1.29	9.26	9.47	9.99	9.99	***
Age	17	25	21.28	2.30	21.07	20.99	21.19	21.19	ns
First birth was nonmarital (1=yes)	0	1	0.23		0.62	0.28	0.15	0.15	***
Race/Ethnicity									
non-Hispanic White/Other (reference)	0	1	0.80		-	-	-	-	-
non-Hispanic Black	0	1	0.14		-	-	-	-	-
Hispanic	0	1	0.06		-	-	-	-	-

Source: National Longitudinal Survey of Youth (1979 cohort)

Notes: Descriptive statistics are weighted to approximate population parameters. Unless otherwise indicated, Time<sub>1</sub> measures were taken from 1982 survey and Time<sub>2</sub> measures were taken from 2006 survey. Significant differences indicate results from ANOVA tests by race/ethnicity:

\*\*\*  $P < .001$ ,

\*\*  $P < .01$ ,

\*  $P < .05$ ,

†  $P < .10$ .

<sup>a</sup>Measure taken from 2000 survey.

<sup>b</sup>Measure taken from 2004 survey.

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Table 2

Weighted Descriptive Statistics by Final Parity (0, 1, 2, 3+)

	Parity 0		Parity 1		Parity 2		Parity 3+		Significant Difference
	Percent or Mean	Standard Deviation	Percent or Mean	Standard Deviation	Percent or Mean	Standard Deviation	Percent or Mean	Standard Deviation	
<i>SDT Indicators - Time<sub>1</sub>(Emerging Adulthood)</i>									
Secularization	4.15	1.65	4.15	1.57	3.93	1.62	3.75	1.69	<i>ns</i>
Religious Affiliation									
Protestant ( <i>reference</i> )	0.60		0.54		0.57		0.56		<i>ns</i>
Catholic	0.26		0.31		0.32		0.32		*
Other	0.04		0.03		0.02		0.04		<i>ns</i>
No religion	0.10		0.12		0.09		0.08		<i>ns</i>
Egalitarianism	3.14	0.43	3.08	0.42	3.04	0.44	2.96	0.43	****
Female Participation in the Labor Market									
Employment Status									
Employed ( <i>reference</i> )	0.67		0.60		0.60		0.49		****
Unemployed	0.12		0.14		0.12		0.13		<i>ns</i>
Out of the labor market	0.21		0.27		0.28		0.38		****
Hours worked per week	26.72	11.45	27.56	10.74	26.28	10.54	26.09	9.94	†
Job satisfaction	3.16	0.78	3.20	0.72	3.17	0.70	3.13	0.68	*
<i>SDT Indicators - Time<sub>2</sub>(Mid-Adulthood)</i>									
Secularization <sup>a</sup>	3.58	1.75	3.42	1.75	3.17	1.70	2.86	1.74	****
Religious Affiliation <sup>a</sup>									
Protestant ( <i>reference</i> )	0.54		0.53		0.60		0.56		<i>ns</i>
Catholic	0.21		0.28		0.22		0.26		<i>ns</i>
Other	0.10		0.08		0.08		0.11		*
No religion	0.15		0.11		0.10		0.07		*
Egalitarianism <sup>b</sup>	3.09	0.37	3.05	0.39	3.02	0.42	2.94	0.42	****
Female Participation in the Labor Market									
Employment Status									
Employed ( <i>reference</i> )	0.83		0.80		0.78		0.73		****

	Parity 0		Parity 1		Parity 2		Parity 3+		Significant Difference
	Percent or Mean	Standard Deviation	Percent or Mean	Standard Deviation	Percent or Mean	Standard Deviation	Percent or Mean	Standard Deviation	
Unemployed	0.03		0.03		0.03		0.04		<i>ns</i>
Out of the labor market	0.15		0.17		0.19		0.23		***
Hours worked per week	38.69	12.21	36.48	11.87	36.08	12.87	35.23	13.37	***
Job satisfaction	3.41	0.65	3.42	0.64	3.42	0.63	3.42	0.64	<i>ns</i>
<b>Sociodemographic Characteristics - Time<sub>1</sub></b>									
Birth control use	0.42		0.40		0.48		0.44		***
Education	12.65	1.86	12.23	1.63	12.29	1.64	11.95	1.87	***
Household income (in dollars)	9.82	1.03	9.64	1.06	9.71	1.04	9.58	1.27	***
Age	21.16	2.22	21.03	2.27	21.27	2.31	21.33	2.31	<i>ns</i>
<b>Race/Ethnicity</b>									
non-Hispanic White/Other (reference)	0.82		0.79		0.82		0.72		***
non-Hispanic Black	0.14		0.16		0.12		0.19		***
Hispanic	0.04		0.05		0.06		0.09		***
Nonmarital first birth (1=yes)	0.31		0.24		0.15		0.26		***
<i>Sample size (n)</i>	<i>559</i>		<i>580</i>		<i>1,243</i>		<i>1,235</i>		

Source: National Longitudinal Survey of Youth (1979 cohort), *n* = 3,617 young women.

Notes: Descriptive statistics are weighted to approximate population parameters. Unless otherwise indicated, Time1 measures were taken from 1982 survey and Time2 measures were taken from 2006 survey. Significant differences indicate results from ANOVA tests by final parity:

\*\*\* *p* < .001,

\*\* *p* < .01,

\* *p* < .05,

<sup>†</sup> *p* < .10.

<sup>a</sup> Measure taken from 2000 survey.

<sup>b</sup> Measure taken from 2004 survey.

Regression Coefficients from the Poisson Estimation of Completed Parity (0, 1, 2, 3+) for the Full Analytic Sample and Subsamples by Race/Ethnicity

Table 3

	Full Sample	White/Other	Black	Hispanic	
	1	2	3	4	5
<i>Second Demographic Transition (SDT) Indicators - Emerging Adulthood</i>					
Secularization	-0.03*** (0.01)	-0.03*** (0.01)	-0.03*** (0.01)	-0.01 (0.01)	0.01 (0.01)
Religious Affiliation					
Catholic	0.05* (0.02)	0.08** (0.03)	0.08** (0.03)	0.04 (0.06)	-0.002 (0.06)
Other	-0.01 (0.08)	0.03 (0.08)	0.04 (0.09)	-0.04 (0.14)	-0.08 (0.13)
No religion	-0.02 (0.05)	0.02 (0.04)	0.02 (0.05)	-0.02 (0.05)	0.09 (0.09)
Egalitarianism	-0.15*** (0.03)	-0.1*** (0.03)	-0.1*** (0.03)	-0.02 (0.04)	-0.17*** (0.05)
Female Participation in the Labor Market Employment Status ( <i>employed = ref</i> )					
Unemployed	0.06† (0.03)	0.002 (0.03)	-0.02 (0.05)	0.003 (0.04)	0.09† (0.05)
Out of labor market	0.14*** (0.02)	0.03 (0.02)	0.02 (0.03)	0.04 (0.04)	-0.01 (0.04)
Hours worked per week	0 (0.002)	0 (0.001)	0.001 (0.001)	0.001 (0.002)	0.002 (0.002)
Job satisfaction	-0.01 (0.02)	-0.01 (0.02)	-0.01 (0.02)	-0.06* (0.03)	0.03 (0.03)
Sociodemographic Characteristics and Parity					
Parity (time <sub>t</sub> )	0.28*** (0.01)	0.28*** (0.01)	0.28*** (0.02)	0.26*** (0.02)	0.2*** (0.02)
Birth control use	0.07*** (0.02)	0.07*** (0.02)	0.07** (0.02)	0.02 (0.03)	-0.04 (0.03)
Education	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)
(Log) Household income	-0.01 (0.01)	-0.01 (0.01)	-0.02 (0.01)	0.001 (0.01)	0.01 (0.02)

	Full Sample				
	1	2	3	4	5
			White/Other	Black	Hispanic
Age		-0.03*** (0.01)	-0.03*** (0.01)	-0.03*** (0.001)	-0.01 (0.01)
Nonmarital first birth		-0.25*** (0.03)	-0.56*** (0.07)	0.22*** (0.04)	-0.07* (0.04)
Race/Ethnicity ( <i>non-Hispanic White/Other = ref</i> )					
Black		0.1*** (0.03)	-	-	-
Hispanic		0.06* (0.03)	-	-	-
Intercept	1.15***	1.52***	1.63***	1.25***	1.36***
Likelihood Ratio Chi-Square	86.16***	369.03***	185.36***	191.42***	59.65***
Sample size	3,617	3,617	1,827	1,119	671

Note:

\*\*\*  $p < .001$ ,

\*\*  $p < .01$ ,

\*  $p < .05$  (two-tailed).

All estimates are weighted; robust standard errors are presented in parentheses.

Table 4

Odds Ratios from Logistic Regression Models of Each Parity Progression (Parity 0 → 1+, 1 → 2+, 2 → 3+)

	Parity 0 → 1+		Parity 1 → 2+		Parity 2 → 3+	
	1	2	3	4	5	6
<i>Second Demographic Transition (SDT) Indicators - Emerging Adulthood</i>						
Secularization	0.88*** (0.03)	0.91* (0.04)	0.86† (0.07)	0.88 (0.07)	1.11 (0.1)	1.08 (0.11)
Religious Affiliation						
Catholic	1.54*** (0.2)	1.44* (0.21)	1.77* (0.52)	1.65 (0.56)	1.17 (0.42)	1.19 (0.56)
Other	0.96 (0.33)	0.89 (0.29)	0.39 (0.23)	0.36† (0.21)	1.09 (1.04)	1.4 (1.75)
No religion	1.33 (0.28)	1.44 (0.33)	1.46 (0.62)	1.53 (0.68)	0.72 (0.39)	0.56 (0.32)
Egalitarianism	0.68** (0.1)	0.61*** (0.09)	0.92 (0.31)	0.89 (0.31)	0.64 (0.22)	0.5† (0.18)
<i>Female Participation in the Labor Market</i>						
Employment Status ( <i>employed = ref</i> )						
Unemployed	1.01 (0.19)	1.46† (0.32)	0.49† (0.18)	0.5† (0.2)	0.6 (0.31)	0.4† (0.2)
Out of labor market	1.4* (0.23)	1.49* (0.26)	0.52* (0.15)	0.5* (0.15)	1.09 (0.42)	0.83 (0.34)
Hours worked per week	1.01† (0.01)	1.02* (0.01)	0.98† (0.01)	0.98† (0.01)	1 (0.01)	1 (0.01)
Job satisfaction	1.04 (0.08)	1.01 (0.08)	1.15 (0.21)	1.14 (0.21)	0.74 (0.2)	0.79 (0.21)
<i>Sociodemographic Characteristics</i>						
Birth control use		1.27** (0.12)		1.38 (0.37)		0.55† (0.18)
Education		1 (0.05)		1.06 (0.08)		0.99 (0.08)
(Log) Household income		0.87† (0.07)		1.11 (0.09)		1.04 (0.16)
Age		0.87*** (0.03)		0.92 (0.06)		0.87+ (0.07)

	Parity 0 → 1+		Parity 1 → 2+		Parity 2 → 3+	
	1	2	3	4	5	6
Nonmarital first birth		0.13 <sup>***</sup> (0.03)		0.72 (0.22)		1.29 (0.46)
Race/Ethnicity ( <i>non-Hispanic White/Other = ref</i> )						
Black		1.54 <sup>*</sup> (0.29)		1.31 (0.39)		1.99 <sup>*</sup> (0.71)
Hispanic		1.3 (0.26)		1.71 (0.65)		1.38 (0.71)
Likelihood Ratio Chi-Square	39.53 <sup>***</sup>	97.7 <sup>***</sup>	20.78 <sup>*</sup>	33.72 <sup>**</sup>	16.76 <sup>*</sup>	41.03 <sup>***</sup>
Subsample size of each parity progression (# progressing to next parity)		n=1,904		n=630		n=224
Subsample size of each reference group (# remaining at each parity)		n=579		n=136		n=130

Note:

<sup>\*\*\*</sup>  $p < .001$ ,

<sup>\*\*</sup>  $p < .01$ ,

<sup>\*</sup>  $p < .05$  (two-tailed).

All estimates are weighted; odds ratios and robust standard errors (in parentheses) presented



Regression Coefficients from Cross-Lagged Structural Equation Models of Reciprocal Effects between Second Demographic Transition (SDT) Indicators and Parity (1982 – 2006)

Table 5

	Full sample							
	1	2	3	4	5	6	7	8
<b>Parity (time<sub>1</sub>) → SDT Indicators (time<sub>2</sub>)</b>								
Parity (time <sub>1</sub> ) → Secularization	-0.14*** (0.04)	-0.06*** (0.02)	-0.11*** (0.02)	-0.11*** (0.02)	-0.02 (0.06)	-0.01 (0.03)	-0.15† (0.08)	-0.08† (0.04)
Religious Affiliation								
Parity (time <sub>1</sub> ) → Catholic	-0.35*** (0.09)	-0.1*** (0.03)	-0.09*** (0.03)	-0.09*** (0.03)	-0.6* (0.24)	-0.23* (0.09)	-0.11 (0.14)	-0.04 (0.05)
Parity (time <sub>1</sub> ) → Other	-0.03 (0.1)	-0.01 (0.04)	-0.01 (0.05)	-0.01 (0.05)	0.01 (0.11)	0 (0.05)	-0.13 (0.22)	-0.06 (0.11)
Parity (time <sub>1</sub> ) → No religion	-0.02 (0.09)	-0.01 (0.04)	0.04 (0.04)	0.04 (0.03)	0.11 (0.16)	0.05 (0.08)	-0.02 (0.16)	-0.01 (0.08)
Parity (time <sub>1</sub> ) → Egalitarianism	0.12 (0.08)	0.03 (0.02)	0.04 (0.02)	0.04 (0.02)	-0.01 (0.02)	-0.01 (0.04)	-0.01 (0.02)	-0.02 (0.04)
Female Participation in the Labor Market								
Employment Status ( <i>employed = ref</i> )								
Parity (time <sub>1</sub> ) → Unemployed	0.34** (0.12)	0.13** (0.05)	0.16** (0.06)	0.16** (0.06)	-0.08 (0.13)	-0.04 (0.06)	0.16 (0.23)	0.08 (0.11)
Parity (time <sub>1</sub> ) → Out of labor market	0.22*** (0.06)	0.09*** (0.02)	0.07* (0.03)	0.07* (0.03)	0.42*** (0.08)	0.2*** (0.04)	0.35** (0.13)	0.16** (0.06)
Parity (time <sub>1</sub> ) → Hours worked per week	0.4 (0.32)	0.02 (0.02)	-0.02 (0.03)	-0.02 (0.02)	-1.92* (0.88)	-0.08* (0.04)	-3.23*** (1.06)	-0.15** (0.05)
Parity (time <sub>1</sub> ) → Job satisfaction	-0.02 (0.02)	-0.03 (0.02)	-0.03 (0.02)	-0.03 (0.02)	-0.01 (0.02)	-0.01 (0.03)	-0.01 (0.03)	-0.01 (0.05)
<b>SDT Indicators (time<sub>1</sub>) → Parity (time<sub>2</sub>)</b>								
Secularization → Parity (time <sub>2</sub> )	-0.11*** (0.03)	-0.09*** (0.02)	-0.09*** (0.03)	-0.09*** (0.03)	-0.05 (0.04)	-0.04 (0.03)	-0.04 (0.06)	-0.03 (0.04)
Religious Affiliation								
Catholic → Parity (time <sub>2</sub> )	0.26** (0.09)	0.06** (0.02)	0.07** (0.02)	0.07** (0.02)	0.41 (0.27)	0.05 (0.03)	0.2 (0.28)	0.04 (0.05)
Other → Parity (time <sub>2</sub> )	0.18 (0.32)	0.02 (0.03)	0.02 (0.03)	0.02 (0.03)	0.01 (0.5)	0 (0.03)	-0.31 (0.51)	-0.02 (0.03)

	Full sample		White/Other		Black		Hispanic	
	1	2	3	4	5	6	7	8
No religion	0.1 (0.13)	0.01 (0.02)	0.02 (0.02)	0.02 (0.02)	0.14 (0.22)	0.02 (0.03)	0.9† (0.5)	0.09† (0.05)
Egalitarianism	-0.05** (0.01)	-0.08*** (0.02)	-0.09*** (0.02)	-0.09*** (0.02)	-0.16 (0.17)	-0.03 (0.03)	-0.8*** (0.21)	-0.16*** (0.04)
Female Participation in the Labor Market Employment Status ( <i>employed = ref</i> )								
Unemployed	-0.07 (0.12)	-0.01 (0.02)	0.03 (0.03)	0.03 (0.03)	0.12 (0.19)	0.02 (0.03)	0.44 (0.29)	0.06 (0.04)
Out of labor market	0.07 (0.09)	0.02 (0.02)	0.04 (0.03)	0.04 (0.03)	0.22 (0.18)	0.05 (0.04)	-0.05 (0.22)	-0.01 (0.05)
Hours worked per week	0.01 (0.004)	0.03 (0.02)	0.07* (0.03)	0.07* (0.03)	0.01 (0.01)	0.03 (0.04)	0 (0.01)	0.03 (0.05)
Job satisfaction	-0.07 (0.06)	-0.02 (0.02)	-0.03 (0.02)	-0.03 (0.02)	-0.21* (0.09)	-0.06* (0.03)	0.15 (0.12)	0.05 (0.04)

Note:

\*\*\*  $p < .001$ ,

\*\*  $p < .01$ ,

\*  $p < .05$  (two-tailed).

All estimates are weighted; robust standard errors presented. Models 1, 3, 5, and 7 present unstandardized regression coefficients; Models 2, 4, 6, and 8 present standardized coefficients. Each time2 variable is regressed on its time1 correlate. All models control for the following covariates at time1: birth control use, education, (ln) income, age, and nonmarital first birth status. Models 1 and 2 also control for race/ethnicity (Black, Hispanic vs. non-Hispanic White). Model fit indices: RMSEA = .033, AGFI = .958, TLI = .923 Squared multiple correlation of final parity=0.20.