Published in final edited form as:

J Marriage Fam. 2018 April ; 80(2): 521–536. doi:10.1111/jomf.12449.

Fertility Preferences and Cognition: Religiosity and Experimental Effects of Decision Context on College Women

Emily A. Marshall and

Franklin and Marshall College, Department of Sociology and Public Health Program, Gerhart House, Lancaster, PA 19104, emily.marshall@fandm.edu

Hana Shepherd

Rutgers University, Department of Sociology, Davison Hall, New Brunswick, NJ 08901, hshepherd@sociology.rutgers.edu

Abstract

Better models of culture and cognition may help researchers understand fertility and family formation. We examine cognition about fertility using an experimental survey design to investigate how fertility preferences of college women are affected by two prompts that bring to mind fertility-relevant factors: career aspirations and financial limitations. We test the effects of these prompts on fertility preferences and ask how effects vary with respondent religiosity, an aspect of social identity related to fertility preferences. We find significant effects of treatment on fertility preferences when accounting for religiosity: less religious women who considered their career aspirations or financial limitations reported smaller desired family size, but this effect was attenuated for more religious women. Our study demonstrates how fertility preferences are shaped by decision contexts for some socio-demographic groups. We discuss how the findings support a social-cognitive model of fertility.

Keywords

culture; demography; fertility; religion; research methodology; work-family issues

Background

The fertility preferences of individuals have long interested demographers as a crucial element of the process of large-scale demographic transitions. Consequently, classic formulations of theories of demographic change have accounted for social and economic factors shaping desired family size (e.g., Notestein, 1953). More recently, demographers have closely examined changes in fertility preferences and their causes at the individual level, drawing attention to social processes that construct fertility preferences. Some studies have examined individual-level changes in fertility preferences and expectations over the life course, finding that background factors including family structure and religious background were stronger predictors of fertility preferences earlier in life (Heiland, Prskawetz & Sanderson, 2008; Rackin & Bachrach, 2016) and that variation in fertility expectations increased with age (Hayford, 2009). Another study examined changes in preferences over the life course by measuring the prevalence of uncertainty about preferences at different

ages, arguing that greater incidence of uncertainty at younger ages reflected a process of preference construction across the life course (Ní Bhrolcháin & Beaujouan, 2015). Additionally, Testa (2007) used cross-national comparison of fertility preferences to examine social factors related to fertility preferences, including gender role attitudes.

Within this literature, scholars have recently argued for a social-cognitive theory of demographic behavior that uses more realistic models of culture and cognition in studies of fertility and family formation behaviors, including the ways that culture and cognition shape fertility preferences (Bachrach, 2014; Bachrach & Morgan, 2013; Thornton et al., 2012; Johnson-Hanks, Bachrach, Morgan, & Kohler, 2011). They have argued that too often, demographers think of cultural factors as a stable collection of norms, values, and beliefs; instead, a more useful model of culture employs *cognitive models* as an important mechanism by which culture influences individuals' behavior (Bachrach, 2014). That is, people interpret the world using cognitive models (which include schemas, repertoires, and scripts) that give meaning to events and interactions through cognitive associations—encoded relationships between concepts in memory. For example, understanding that a man on one knee holding a diamond ring is proposing marriage depends on a collection of pre-existing knowledge. This knowledge is organized by cognitive models that define associations between concepts, in this case, the concepts *kneeling, man, diamond ring*, and *marriage*. Similarly, desired family size is influenced by cognitive models that define associations between the concepts of childbearing, parenting, career, family, and other relevant domains. A key feature of cognitive models is that they are made salient and relevant depending on the context an individual is in (Smith, 1998).

In this study, we draw on these theoretical insights to examine the fertility preferences of young women enrolled in college and how those preferences may reflect cognitive congruence or conflict between fertility and the related domains of career and finances. We use an experimental method to bring issues of career or finances front of mind, making them part of the context for thinking about fertility, and we examine how these variations in context affected subsequent reports of fertility preferences. We also examine how the relationship between context and fertility preferences is moderated by religiosity, showing that the effects of the immediate decision context are shaped by longer-term cultural influences and identities, in this case religiosity. In contrast to existing studies of cognitive representations and demographic phenomena, which are mostly qualitative, our methods pave the way for future use with probability samples of populations of interest. In addition to improving our understanding of fertility preferences—a topic of substantive importance to demographers—this study provides one model of how to use the social-cognitive model in replicable empirical studies of demographic variables.

Culture and Demographic Behavior

Bachrach and colleagues have proposed that improved understandings of cognitive processes can aid the empirical study of cultural influences, such as norms around marriage (Bachrach, 2014) or sex preferences for children (Bachrach & Morgan, 2013), on demographic behavior. By *demographic behavior*, we mean actions that are commonly objects of demographic research, including marriage, household formation, conception, birth, divorce,

and changing place of residence. Research in social and cognitive psychology has moved away from models of behavior as mainly or exclusively the result of deliberative decisions, toward models that stress the automaticity of judgments and associations (e.g., Kahneman, 2003). Which cognitive concepts and associations are made salient, or "activated," depends on context, and that activation is the product of automatic mental processes that largely bypass both formal reasoning and explicit intentions (Schwarz & Strack, 1999). Our study draws on research on cognition and culture in two ways: first, by considering the effect of immediate context on cognition, and second, by considering how cognitive models and sets of associations vary across socio-demographic subgroups that reflect cultural differences.

Accounts of cultural influences on demographic behavior need to recognize that the immediate context will affect how elements of culture are used (e.g., Bachrach, 2014). Elements of culture are not static across social contexts, but are learned and used by individuals in ways specific to the social contexts in which they find themselves (DiMaggio, 1997). Because people can be aware of many cultural models related to a given concept, it is important to understand which of these models is relevant to them in a given situation. Seeing one's boyfriend kneeling in the context of a church service would not activate the same associations with marriage proposals that seeing him kneeling at a scenic sunset would. In this study, we use the term *decision context* to describe the immediate context of cognition, which affects which models are considered relevant or salient to the cognitive task at hand. The concept of decision context is related to the concept of *conjuncture*—the "short-term, specific configurations of structures in which action can occur"— used by proponents of the social-cognitive model (Johnson-Hanks et al., 2011:15). However, conjuncture encompasses structural conditions that converge in a contingent situation, while our concept of decision context is narrower, referring to the immediate context itself, rather than including longer-term cultural influences and identities that are part of conjunctures.

The second insight from research on cognition and culture that our study draws on is that cognitive models may vary across groups with shared cultures, which may be defined by religious affiliation, age, ethnic identity, or other characteristics. Some meanings may be shared within subgroups of a population, whereas others are shared more widely (Hannerz, 1992). For example, many people share an association between marriage proposals and a kneeling man holding a diamond ring, learned from family stories or from cultural products like movies and television shows. However, other people will have different expectations for the forms that marriage proposals should take: for people whose model of a marriage proposal includes the bride and groom's parents, but not a diamond, a lone kneeling man holding a diamond ring would not activate associations with marriage proposals. The social-cognitive model of fertility behavior posits that established institutions like religious organizations influence thought and behavior by shaping cognitive associations (Bachrach & Morgan, 2013). Our study draws on this insight to examine how cognitive associations related to fertility vary by groups according to their degree of religiosity.

Our study uses a web-based experimental survey to assess whether survey prompts (which we also refer to as contextual cues) designed to change respondents' decision context and thus to activate cognitive associations relevant to fertility, affect reported fertility preferences. Changing the decision context that respondents use to evaluate their own

fertility preferences allows us to better understand how individuals cognitively represent the relationship between particular areas of social life and fertility. In particular, we are interested in how thinking about career aspirations or financial limitations affects reported fertility preferences among college women.

Career Aspirations

Two literatures in demography and sociology have identified career and family as competing concerns, particularly for women. Institutional explanations for low fertility in wealthier countries have focused on the difficulty of combining paid work with parenting (McDonald, 2000; Rindfuss, Guzzo, & Morgan, 2003; Castles, 2003; Morgan, 2003; Bumpass, 1990). Studies of women's employment have also detailed the challenges that women face in balancing demanding careers with family aspirations and commitments (Blair-Loy, 2003; Cohen & Bianchi, 1999; Gerson, 1985). These tensions between paid work and childrearing have received extensive press coverage in recent debates over "leaning in," highlighting conflicts between professional and family responsibilities, particularly for highly educated women (Sandberg, 2013; Slaughter, 2012). Our study engages these literatures by empirically examining how issues of family and career are cognitively related for women in college.

Financial Limitations

Financial hardship can have important implications for fertility. At the most basic level, childrearing requires economic resources. When those resources are less available, rates of childbearing decrease: economic downturns have been linked to lower fertility (Schneider, 2015; Sobotka, Skirbekk, & Philipov, 2011). Although some of the lower fertility caused by economic recession is due to postponement of births, not all is (Cherlin, Cumberworth, Morgan, & Wimer, 2013). Additionally, researchers have argued that fertility is shaped by normative prescriptions that only people who can afford to do so should have children (Rindfuss & VandenHeuvel, 1990; Lutz, Skirbekk, & Testa, 2006). This suggests that thinking of one's own financial limitations may decrease desired fertility for the college women in our study.

Religiosity and Fertility: Variation in Treatment Effects by Subgroup

The effects of experimental treatments can vary based on heterogeneity in population subgroups (e.g., Deaton & Stone, 2013; Ferguson, Carter, & Hassin, 2009; Wheeler & Berger, 2007). We expect that our survey prompts will affect reported fertility preferences because of cognitive associations that respondents have between the concepts brought to mind by the prompts and fertility. These associations are expected to vary across respondents. For example, some women may perceive conflict between professional and family roles, and may thus associate career aspirations with lower desired fertility, whereas such conflict may be less salient for other women. Some of this variation should be associated with observable aspects of social position, which are related to patterns of cognitive associations as well (Bachrach & Morgan, 2013).

Recent studies of U.S. fertility have found that religiosity, particularly the importance of religious beliefs, is a central predictor of fertility preferences and behaviors (Hayford & Morgan, 2008; Zhang, 2008; Frejka & Westoff, 2008; Voas, 2007). Studies have found that more religious women have higher fertility across denominations, although reported importance of religion is correlated with denomination in the U.S. In one study, a higher proportion of Protestants than Catholics reported that religion was "very important" in their daily life, and Fundamentalist Protestants were more likely than other Protestants to report the same (Hayford & Morgan, 2008). Lehrer (2004) found that religiosity influences behaviors like childbearing both by accentuating the effects of particular religious affiliations and by leading to better overall well-being and health. In addition, Hayford and Morgan (2008) showed that differences in realized fertility between more religious and less religious women were mainly accounted for by differences in fertility intentions, rather than differences in marriage rates, unintended fertility, or other proximate determinants of fertility. The strong established relationship between religiosity and fertility, and the fact that this relationship operates via fertility preferences, leads us to hypothesize that religiosity will be a salient factor for respondents' reported fertility preferences, and consequently may change how individuals respond to contextual cues. We thus analyze how fertility preferences, as well as the effects of our experimental manipulation, vary by a type of respondent identity that has been strongly associated with fertility preferences, religiosity.

Measurement of Fertility Preferences

Fertility preferences are key variables for demographic research. However, many studies have shown that relationships between preferences and behavior are far from straightforward, particularly at the individual level (e.g., Agadjanian, 2006; Quesnel-Vallée & Morgan, 2003). Although some demographers have questioned the reliability and validity of survey data on fertility preferences (e.g., Demeny, 1988), survey responses remain an important source of information for demographic researchers, and are powerful predictors at the population level (Westoff, 1990). Although there is a conceptual distinction between general ideals, personal ideals, expectations, and intentions, in practice much of the demographic literature uses these terms interchangeably (Hayford & Agadjanian, 2012). We refer to these concepts collectively as *fertility preferences*.

Variation in survey responses may reflect more than simple measurement error. Changes in responses may reflect meaningful adjustments to a changing environment, rather than lack of reliability (Yeatman, Sennott, & Culpepper, 2013). Or, responses may depend on more immediate contextual factors like survey design, the presence of others, or whether a survey is administered at home or at work (Couper, Tourangeau, Conrad, & Crawford, 2004; Schaeffer & Presser, 2003; Schwarz & Strack, 1991). Features of cognitive processing explain this variation; preceding survey questions or social context make certain concepts, beliefs, or cognitive associations more accessible to respondents, thus shaping their responses (Tourangeau & Rasinski, 1988). Psychological research has used this insight to design experiments using *priming*—a method for eliciting cognitive associations by making particular concepts salient and observing how subsequent cognitive associations and behaviors change. By exposing individuals to particular frameworks, ideas, contexts, or symbols, priming makes them psychologically salient, thus activating a particular set of

cognitive concepts, along with concepts that are frequently associated with the original concepts (Bargh, 2014; Chaiken & Trope, 1999). Our study uses similar methods to investigate cognitive associations between fertility preferences and either career aspirations or financial limitations.

The only studies that we know of that have used experimental manipulation of survey question order to study fertility examined the effects of prompts related to mortality on subsequent reports of desired fertility, but the goal of this earlier research was to investigate evolutionary theories of the relationship between mortality and offspring, rather than to explore the interaction of decision contexts and fertility preferences (Fritsche et al., 2007; Mathews & Sear, 2008; Wisman & Goldenberg, 2005). Instead, our study uses systematic variation in responses to learn more about the associations that people make between different realms of life.

Experimental Survey Method

This study uses an experimental survey to assess whether contextual cues, provided in survey prompts that bring to mind certain factors relevant to fertility, will affect reported fertility preferences. Rather than using a representative sample to obtain population estimates, the study uses random assignment to treatment and control groups to observe the causal effect of treatment. Although this research design does not allow generalization beyond the study sample to a wider population, the benefit is that it allows causal inference. This method is particularly well suited to our inquiry regarding the effect of decision context on preferences; a more broadly representative sample is not required to achieve the study's goals.

We focus on undergraduate women at a highly selective university because this is a group for whom tradeoffs and compromises between family and career opportunities are expected to be especially relevant. For this subpopulation of educated women, returns to work are greater, raising the stakes of potential tradeoffs between work and family (Jacob, 2002). This group is also of interest due to known associations between education, employment, and fertility: more educated U.S. women have fewer children than those with less education, and women with some college education and college graduates are significantly more likely to fail to fulfill their own fertility preferences than are women with no college education (Quesnel-Vallée & Morgan, 2003; Morgan & Rackin, 2010). Additionally, students at the university under study overwhelmingly belong to a narrow age group in which most of them have not had children yet, which greatly simplifies analyses, as fertility preferences often change over the life course to correspond to actual fertility (Morgan & Rackin, 2010).

For our study, respondents were randomly assigned to engage with a career aspirations contextual cue, a financial limitations contextual cue, or no cue, before reporting their fertility preferences. We use the condition in which respondents received no contextual cue as the control condition. This approach allows us to measure causal effects of the two contextual cues on reported fertility preferences, in order to make inferences about whether or not individuals have cognitive associations between fertility and these contextual cues. To the extent that changes in contextual cues affect reported fertility preferences, we can

assume that respondents cognitively associate childbearing with the content of the cue (in this case, career or finances). If individuals' cognitive associations between these domains lead them to see the domains as incompatible and opposed, making one domain salient may lead to the suppression or downplaying of features of the other domain. Thus, if thinking about career or finances leads women to report lower desired fertility, this is consistent with the hypothesis that these domains are in conflict or competition for these women.

Hypotheses

In order to empirically examine how fertility preferences of young women are affected by contextual cues designed to prompt cognitive associations by bringing to mind the domains of career aspirations and financial limitations, we use two measures of fertility preferences that have been used in previous studies: desired number of children, and preference for one of four hypothetical trade-offs between working and number of children, ranging from no children and a full-time job, to three children and no job outside the home.

Treatment Condition 1: Career Aspirations

The questions in the career aspirations condition ask respondents about their dream job in ten years and their personal characteristics that make them a good fit for their dream job. We expect that, if women's fertility preferences and career aspirations are cognitively associated and seen as potentially conflicting, then

Hypothesis 1: Respondents in the career aspirations condition will report a lower desired number of children than respondents in the control condition, on average.

When the tradeoff between career commitment and family size is made explicit in the work/family-size tradeoff question, we expect that:

Hypothesis 2: Respondents in the career aspirations condition will, on average, be closer to the "full-time job, no children" end of the spectrum than respondents in the control condition.

Treatment Condition 2: Financial Limitations

In the financial limitations treatment group, respondents answer questions about a time they have had to save up to buy something and a time they have not been able to buy something because of the cost. We expect that considering financial limitations should make salient constraints relevant to childbearing, so that:

Hypothesis 3: Respondents prompted with questions about their own financial limitations will report lower desired fertility than respondents in the control group, on average.

Similarly, we also expect that:

Hypothesis 4: The treatment group's response to the work/family-size tradeoff question will be closer to the "full-time job, no children" end of the spectrum than the control group's response, on average.

Interaction of Treatment with Social Identities—Variation by Religiosity

Religiosity, as an aspect of social identity known to be associated with fertility, may affect the ways that contextual cues are interpreted, or the kinds of associations that respondents make between contextual cues and fertility. We assessed religiosity after asking about fertility preferences in order to ensure that the question did not prime religion for participants. Because we expect the treatment conditions to decrease desired family size and move respondents toward the full-time/no-children end of the tradeoff spectrum, we expect that:

Hypothesis 5: Career aspirations and financial limitations contextual cues will have smaller effects on more religious women than on less religious women.

Regarding career aspirations, greater religiosity has been found to be associated with more conservative gender-role ideology in the U.S. (Hayford & Morgan, 2008; Lye & Waldron, 1997; Feltey & Paloma, 1991), so more religious women may be more likely to expect and desire a within-family division of labor in which men take more responsibility for providing for the family financially. Thus these women's career plans may be more compatible with their fertility preferences. Or it may be the case that more religious women's career plans conflict with their fertility preferences, but they place higher priority on fertility than career when considering both together. Regarding finances, religious beliefs may provide respondents with reasons to prefer large families that are not strongly affected by material considerations.

Data, Measures, and Analytic Strategy

Sample

Survey respondents were drawn from the population of undergraduate students at a large, prestigious state university in the Midwest. Data collection occurred in the spring of 2013. An invitation to participate in the survey was sent to the population of undergraduate students (about 26,000 students, 49% of which were women), with a link to the web survey. Both male and female students were invited to take the survey, but only female students' responses were analyzed for this study, because our research question only concerns female students. Students who completed the survey were entered into a drawing for ten prizes of $50 each. Twenty-two percent of women who received the survey invitation completed the survey. This response rate is in line with other web surveys of undergraduate students using similar recruitment methods (Kaplowitz, Hadlock, & Levine, 2004). A total of 264 women completed the survey in the Control condition, 276 in the Career Aspirations condition, and 238 in the Financial Limitations condition. (Some respondents were assigned to other treatment conditions designed to test different hypotheses, which are not addressed in this paper. See exact wordings of prompts in the Appendix.) Because our goal was to study variation resulting from experimental manipulation, low response rates would only threaten our findings if respondents react to experimental conditions differently than non-respondents would. Most selection into the study took place before respondents saw the first survey question, when they knew only that the survey concerned "life after college." Furthermore, completion rates for respondents who began the survey were similar across conditions: 84%

for the control group, 78% for the Career condition, and 75% for the Finance condition. This suggests that differential attrition did not threaten the random assignment of respondents to condition.

Dependent Measures

After the contextual cues, respondents in the treatment conditions responded to two questions on fertility preferences: 1) A version of a common measure of desired fertility commonly used in demographic surveys: "How many children do you want to have?" (*0* to *5 or more*), and 2) a choice among four specific trade-offs between work and number of children: "no children and a full-time job", "1 child and a three-quarter-time job", "2 children and a half-time job", or "3 children and no job". Lower values on this scale indicated a stronger preference for work over children and higher values indicated a stronger preference for children over work. We asked how many children respondents *want* to have, rather than how many they *intend* to have, as some studies have found that fertility desires predict realized fertility better than do fertility intentions (Miller, 2011). We were also more interested in the effects of context on fertility desires, rather than intentions.

The second measure of desired fertility, the hypothetical tradeoff measure, was originally developed to observe how respondents made a conjoint evaluation of their preferences for family size and work commitment, if they were constrained to trade-offs between the two (Coombs, 1979). It was included in the Intergenerational Panel Study of Parents and Children, which grew out of the Detroit Area Study (Thornton, Axinn, & Xie, 2007). An earlier study found this measure to be a significant predictor of the hazard of marital first births, controlling for socio-demographic characteristics (Barber, 2001). Because the question presents the tradeoff as hypothetical ("If you had to choose, which would you prefer"), for responses to be meaningful, respondents needed to accept the premise of this forced-choice survey question. Researchers have shown that survey respondents frequently accept the premise of research questions in a process similar to following conversational norms (e.g., Schwarz, 1999).

Other Measures

After responding to the dependent variable items, respondents answered questions about their background characteristics, including gender, age, race and ethnicity, number of siblings, parents' educational attainment, U.S.-born status (respondents' and parents'), number of cousins, mothers' work outside the home, and religiosity. Following Hayford and Morgan (2008), who used a similar one-item measure of religiosity in terms of fertility, we measured religiosity by asking respondents "How important is religion in your life?" with responses from 0 (*not at all important*) to 3 (*very important*). We used this measure of the importance of religiosity to individual identity because of the evidence provided by Hayford and Morgan (2008) regarding its utility and because other measures, such as specific religious practices, may have very different meanings by faith or denomination that our sample size could not accommodate.

Table 1 provides descriptive statistics for all respondents, pooled across control and treatment groups. Descriptive statistics on religious denomination are included, although sample size did not allow analyses by denomination.

Analytic Strategy

For each of the two treatment conditions, we estimated the effect of the treatment on each dependent variable (desired family size and work/family-size tradeoff) with linear regression models that include a dummy variable for whether the respondent was in the treatment condition or in the control condition. The coefficient of the treatment condition variable represents the effect of that treatment condition on respondents' reports of the dependent variable.

To test whether the effect of treatment varies by the religiosity of respondents, another set of models included variables for treatment condition, religiosity, and the interaction between treatment condition and religiosity. Because random assignment was used to create the control and treatment groups, controls for socio-demographic characteristics were not needed; respondents' characteristics were similar between control and treatment groups. Three of 8 background characteristics associated with fertility (number of cousins, amount respondent's mother worked outside the home, and mother's education) varied between conditions. To ensure that this variation did not affect results, we also estimated models with controls for family background and socio-demographic characteristics (number of own siblings, race, nativity, mother's educational attainment and work status). Results from models with controls for socio-demographic characteristics produced results similar to those presented here.

Results

Desired Number of Children Measure

Comparing desired number of children in the control group to each treatment group using linear regression models without interactions, we found that the Career Aspirations and Finance Limitations treatment conditions caused respondents to report fewer desired children—0.07 and 0.08 fewer children, respectively. However, these differences were not statistically significant (Table 2, Model 1). Because desired family size may not be a true interval variable, ordered logistic regression was also conducted; all coefficients had the same direction and significance level as reported in Table 2. Linear regression results are presented to simplify interpretation. While the estimates were in the expected direction, we could not reject the null hypothesis that prompting respondents with their own career aspirations or financial limitations would decrease reported desired family size. These results thus did not support Hypotheses 1 and 3 that the career aspirations and financial limitations prompts would lead women randomly assigned to those conditions to report smaller desired family size, compared to women in the control group.

Interaction with Religiosity—Linear regression models accounting for variation by religiosity in the effect of treatment on desired family size found significant effects of treatment and significant interactions between treatment and religiosity (Table 2, Model 2).

For both treatment conditions, models that included the interaction of treatment condition and religiosity found significant negative effects of treatment on desired family size for respondents who said that religion was “not at all important” in their lives. Table 2 shows that for the least religious women, contextual cues about career aspirations caused respondents to report wanting to have 0.43 fewer children on average, compared to the control group receiving no contextual cues. Cues about financial limitations caused respondents to report wanting to have 0.38 fewer children on average, compared to the control group receiving no contextual cues. These are large differences: The control group’s mean desired family size was 2.4 children, so the differences are about 18 and 16 percent of this total, respectively. We also found evidence of a positive interaction of religiosity with treatment condition in predicting desired family size—the negative effect of treatment on desired family size was attenuated by this interaction at higher levels of religiosity ($p < .05$).

Each panel of Figure 1 compares observed and predicted mean desired family size by religiosity for one treatment group, compared to the control group. Based on results from the linear models presented in Table 2, the light gray dashed line shows predicted values for the treatment group and the dark gray solid line shows predicted values for the control group.

In summary, treatment conditions that prompted college women to think about career aspirations or financial limitations caused no significant differences in desired family size when respondent religiosity was not accounted for. However, models that included interactions between treatment condition and religiosity showed that the Career Aspirations and Financial Limitations treatment conditions caused smaller desired family size for the least religious women, and that the effect of treatment condition was attenuated for more religious women. Thus, we found support for Hypothesis 5, that career aspirations and financial limitations contextual cues would, on average, have smaller effects on the fertility preferences of more religious women than on the fertility preferences of less religious women.

Work/Family-size Tradeoff Measure

Table 3 presents results of linear regression analyses of the effect of treatment on preferences for tradeoffs between number of children and work commitments. As with desired family size, the family size/work tradeoff measure is not a true interval variable, so ordered logistic regressions were also conducted. Again, results for the ordered logistic regression models were similar to those for the linear regression models: all coefficients had the same direction and significance level. Linear regression results are presented in Table 3 to simplify interpretation. Lower values on the tradeoff scale represent higher preferred work commitments and smaller families.

The negative coefficients in Table 3 (Model 1) indicate that both treatment conditions led women to prefer greater work commitments and smaller family sizes. However, these effects were not statistically significant for either of the treatment conditions. These results thus did not support Hypotheses 2 and 4 that the career aspirations and financial limitations prompts would lead women to choose greater commitments to work and smaller family sizes, compared to women in the control group.

Interaction with Religiosity—Table 3 (Model 2) presents linear regression models of preferences for the work/family-size tradeoff that included interactions of treatment condition and religiosity, to account for respondent heterogeneity. For both the Career Aspirations and Financial Limitations treatment conditions, we found evidence for significant effects of treatment on work/family-size preferences for respondents who said that religion was "not at all important" in their lives. We also found evidence that religiosity significantly interacted with both treatment conditions in predicting this outcome ($p < .01$): Again, the negative effect of treatment on work/family tradeoff preferences was attenuated for women with higher levels of religiosity.

Each panel of Figure 2 compares observed and predicted mean work/family-size tradeoff responses by religiosity for one treatment group, compared to the control group. Variation in treatment effects by religiosity—an aspect of social identity relevant to fertility—masked a significant effect of both treatment conditions on the work/family-size tradeoff measure for less religious women, one that is revealed in the models that include the interaction of treatment with religiosity. Again, we find support for Hypothesis 5: Both treatment conditions caused smaller desired family size and increased work commitment for the least religious women, while the effect of treatment condition was attenuated for more religious women.

Discussion

Using a web survey completed by over 750 undergraduate women at a prestigious state university, this study has applied findings from research on cognition to the study of fertility preferences, asking two central questions: First, does changing the decision context by prompting college women to think about their career aspirations or financial limitations affect subsequent reports of fertility preferences? Second, do the effects of these contextual cues vary by respondent religiosity, an aspect of social identity strongly related to fertility?

We found that prompting respondents to think of contextual cues before asking them to report fertility preferences did *not* significantly affect aggregated responses to the question "How many children do you want to have?" Instead, and in answer to the second question, for both measures of fertility preferences we found that models that included the interaction of treatment condition and religiosity revealed significant effects of treatment that varied by religiosity: both treatment conditions affected preferences for desired family size and work-family tradeoffs, but these effects were smaller for more religious women. That is, when less religious women thought of career aspirations and financial limitations, they expressed preferences for smaller family sizes, and chose more work and smaller families when considering work-family trade-offs, but these contextual cues did not have the same effect on more religious women.

These results suggest that respondents' reports of desired fertility are malleable, but that there are limits to this malleability: some social identities may provide either a stronger or more relevant set of associations that make desired fertility less susceptible to the activation of other considerations such as career and finances. We conjecture that for less religious women, conflicts between preferences related to career and family, or between preferences

related to finances and family, could account for the observed effects of the Career Aspirations and Financial Limitations treatment conditions. Because this effect was not the same for more religious women, we conjecture that either their preferences related to career and finances did not conflict with their family-related preferences, or that in cases of conflict, they gave more weight to their family preferences. In models without interactions, the lack of significant effects of treatment condition and the small amount of variance explained showed that, when considering a population in the aggregate, reports of fertility preferences may be more stable than studies on social priming might lead us to believe. This finding may be reassuring to researchers who are concerned about the effects of question order on measurement at the population level. However, our findings about religiosity also indicate that stability in aggregated responses can mask systematic variation in responses; researchers should consider how changes in fertility preferences might vary systematically for different groups of respondents.

Another possible explanation for the lack of significant effects of treatment condition and the small amount of variance explained in models without interactions lies in the limitation of manipulations in survey experiments. We may have underestimated the effects of decision context on fertility preferences because respondents completed our web survey at a time and place of their choosing, unlike psychological studies conducted in lab settings, which minimize the influence of social contexts other than those constructed by the experimenters controlling the environment. Because our prompts co-existed with other influential social contexts, respondents who completed the survey in different real-life settings may have been under different influences. This unobserved variation in the context in which the survey was interpreted may have reduced the size of treatment effects. It is possible that a stronger manipulation of social context, such as changing location from home to work, together with the changes in social roles that accompany such context differences, could have affected reports of this measure more strongly. Future studies that systematically observe such differences in context would provide a valuable contribution to understanding how cognitive associations vary across real-life contexts.

Conclusion

This study considers the relevance of a social-cognitive theory of demographic behavior in an empirical analysis of fertility preferences, which bear directly on the study of family. We use the observed variation in fertility preferences caused by contextual cues to better understand the cognitive associations between fertility and career and financial limitations. By treating variation in fertility preferences as a phenomenon of interest, rather than a source of error, our study demonstrates that context affects reported fertility preferences in a way consistent with theories from cognitive psychology regarding the structure and processes of human memory and representation (cognitive models), and less consistent with accounts of cultural concepts like norms or values as stable, deep-seated properties of individuals. If fertility preferences were stored as concrete, coherent attitudes or values that individuals held, we would not expect that the relatively slight contextual variations introduced by our experimental manipulations would significantly change reports of desired fertility for a subset of our sample. Instead, if we conceptualize fertility preferences at the individual level as cognitive models—organized sets of cognitive associations between

concepts relevant to fertility—then we can account for systematic variation in preferences based on context, because context makes particular associations more salient, thus shaping responses to survey questions about fertility preferences.

In line with a social-cognitive theory, which posits that these cognitive models are shaped through interactions with others in the context of various institutions, we have shown that the effects of short-term exposure to fertility-related concepts such as career aspirations vary systematically with more durable, but still environmentally conditioned, aspects of social identity such as religiosity. Our methods do not allow us to establish whether variation in responses to contextual cues between young women who identify as religious and those who do not is due to having cognitive models of fertility with different elements or with different strengths of associations between concepts, or to differences in how respondents understand contextual cues. In any of these cases, however, a model of fertility preferences that accounts for how information is cognitively stored is warranted.

In addition to providing support for a social-cognitive model of demographic behavior, our results highlight the importance of accounting for population heterogeneity when using survey measures of fertility preferences, which has implications for both researchers and practitioners. Because some respondents may be particularly susceptible to context cues, survey question order, or question wordings, researchers need to account for socially patterned sources of this variation in understanding results and in using measures of fertility preferences to predict fertility-related behaviors. Practitioners and policy makers need to account for the fact that how questions are asked and how discussions unfold may elicit different responses from different subgroups in the population. The effects of policy interventions may vary both with immediate social context, and with social identities that vary within the target population. Our study provides one way of learning more about the cognitive models of survey respondents, which can help in understanding the nature and the effects of such heterogeneity on demographic variables such as fertility preferences. By taking variation in cognitive associations among socio-demographic groups as a topic of study, demographers can also make an important contribution to studies of cognition, as the field of cognitive psychology has thus far paid relatively little systematic attention to relationships between social environments and cognitive processes (Falk et al., 2013).

Importantly, our experimental manipulation allows us to observe causal effects of decision context on cognitive associations, rather than relying on observational associations or post-hoc narrative accounts. Our findings demonstrate that this approach can lead to insights about factors shaping fertility preferences. These methods can be applied more broadly in future demographic research to representative samples of populations of interest. The growing use of web survey technology, including in large studies like the Health and Retirement Survey, presents new opportunities to use these methods in demographic research. The prompting methods that we used are common in cognitive and social psychology, but are rarely used in demographic research. As demographers seek to integrate theories of cognition into studies of demographic behavior, we suggest further incorporating existing methods for the study of cognition into demographic research.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

This research was supported by a Small Grant from the Freedman Fund at the Population Studies Center at the University of Michigan and a research grant from Princeton University. Emily Marshall also received support for this research from a National Institutes of Child Health and Human Development training grant to the Population Studies Center at the University of Michigan (T32 HD007339). We thank Arland Thornton, Barbara Anderson, Amy Kate Bailey, Amelia Karraker, Christine Percheski, and LaTonya Trotter for helpful comments on this manuscript. Thanks also to Mick Couper, Florian Keusch, Julie Josefosky de Jong, and Kristen Cibelli for helpful feedback on survey design. We also thank Stacey Sklepenski for research assistance and Naila Rahman for help with survey distribution.

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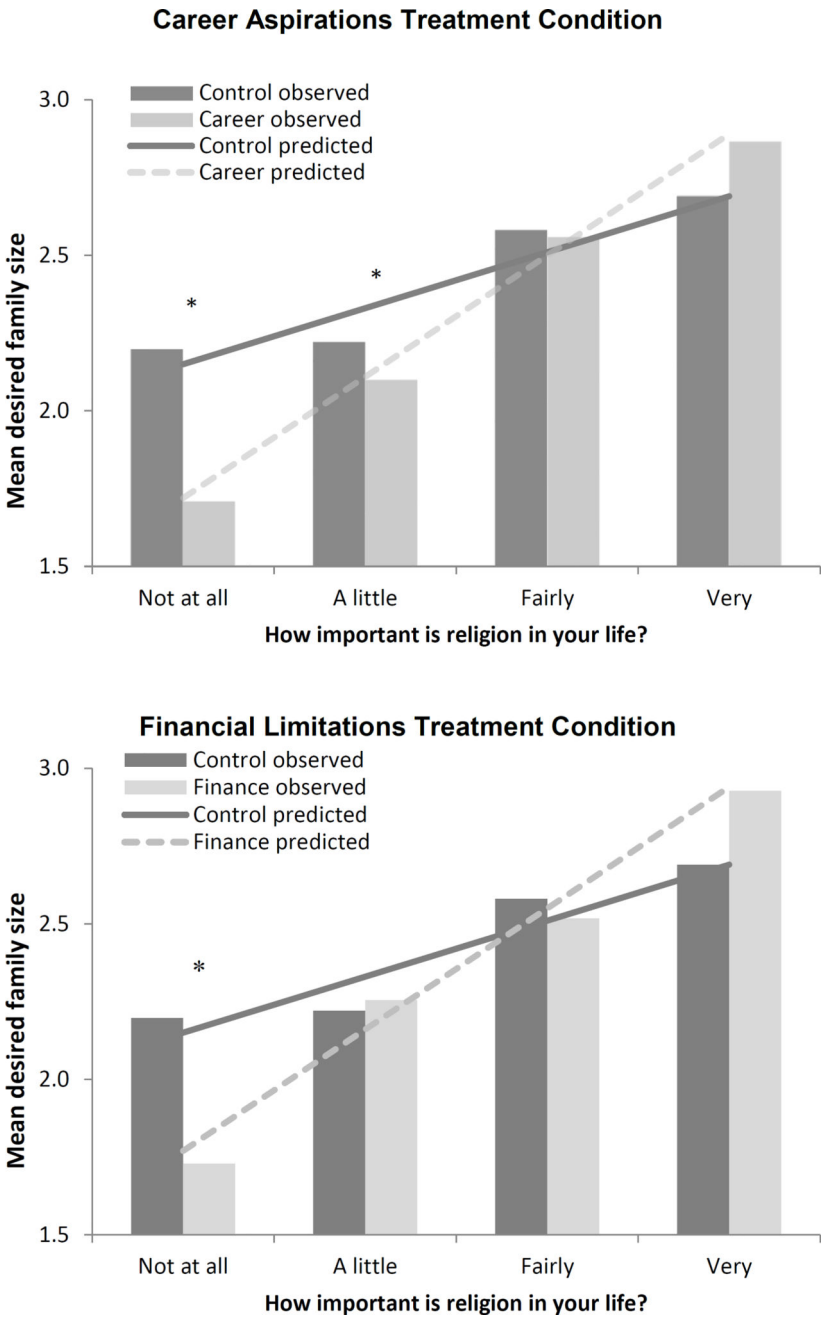

Figure 1. Effect of Treatment on Desired Family Size, by Religiosity. Observed and Predicted Values from Linear Regressions with Religiosity Interactions

Note: Bars represent observed values for Treatment and Control groups; lines represent predicted values for Treatment and Control groups from linear regression models (Table 2). Models that varied the value of religiosity that was coded as zero were used to test the significance of the treatment condition compared to the control condition at each level of religiosity. Asterisks indicate significance ($p < .05$).

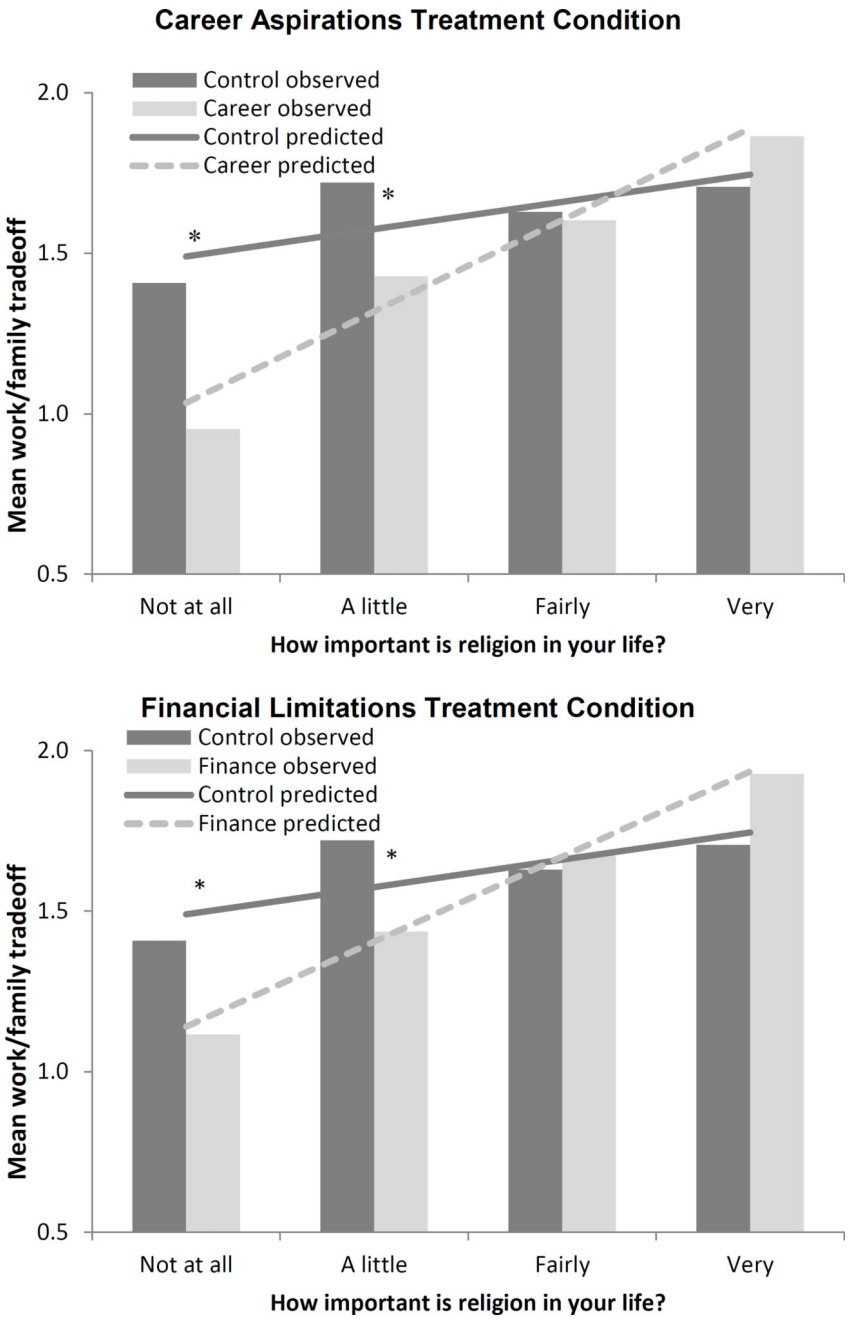

Figure 2. Effect of Treatment on Work/Family-Size Tradeoff, by Religiosity. Observed and Predicted Values from Linear Regressions with Religiosity Interactions

Note: Bars represent observed values for Treatment and Control groups; lines represent predicted values for Treatment and Control groups from linear models (Table 3). Models that varied the value of religiosity that was coded as zero were used to test the significance of the treatment condition compared to the control condition at each level of religiosity. Asterisks indicate significance ($p < .05$).

Table 1

Descriptive Characteristics of Sample

	%	N		%	N
Number of siblings		*778*	*Race and Ethnicity*		*774*
0	9		White	73	
1	42		Black or African-American	5	
2	30		Latino/a or Hispanic	4	
3	12		East Asian	9	
4 or more	7		South Asian	4	
Mother's Education		*775*	Other	4	
Less than 4-year college	30		*Religiosity*		*778*
4-year college	40		Not at all	27	
MA	21		A little	25	
Other graduate degree	10		Fairly	24	
Mother's work outside home		*778*	Very	24	
Full-time	54		*Religious Affiliation*		*702*
Part-time	33		Protestant Christian	31	
None	13		Catholic	28	
Nativity status		*776*	Jewish	9	
US-born	93		Muslim	1	
Non-US-born	7		Hindu	2	
Desired family size, 0–"5 or more"		*776*	Other Christian	2	
Mean	2.35		Buddhism	1	
Standard deviation	1.19		None	27	
Work/family-size tradeoff, 0–3 scale		*776*	*Age*		*778*
Full-time job, no kids	17		18	16	
3/4-time job, 1 kid	22		19	26	
1/2-time job, 2 kids	50		20	22	
No job, 3 kids	10		21	22	
Desired family size, 0–"5 or more"			22	11	
Mean	2.35		23 or more	2	

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	%	N	%	N
Standard deviation	1.19			

Table 2

Effect of Treatment Condition on Desired Family Size. Linear Regression.

	Desired Family Size					
	Career Aspirations Treatment			Financial Limitations Treatment		
	Model 1	Model 2		Model 1	Model 2	
Treatment condition	−0.07	−0.43	**	−0.08	−0.38	*
	(0.10)	(0.16)		(0.11)	(0.16)	
Religiosity		0.18	**		0.18	**
		(0.06)			(0.06)	
Interaction (Treatment × Religiosity)		0.21	*		0.21	*
		(0.09)			(0.09)	
N	538	538		502	502	
Adjusted R-squared	−.001	.081		−.001	.075	
F-statistic	0.5	16.7		0.6	14.6	
Significance level of F-statistic	.494	.000		.444	.000	

Note: Treatment condition coded as 1, Control condition coded as 0. Control is the reference group. Religiosity coded from 0 (Not at all important) to 3 (very important).

* p < .05.

** p < .01.

Table 3

Effect of Treatment Condition on Work/Family Size Tradeoff. Linear Regression.

	Work/Family Size Tradeoff					
	Career Aspirations Treatment			Financial Limitations Treatment		
	Model 1	Model 2		Model 1	Model 2	
Treatment condition	−0.13	−0.46	**	−0.09	−.35	**
	(0.08)	(0.12)		(0.08)	(0.12)	
Religiosity		0.09			0.09	
		(0.05)			(0.05)	
Interaction (Treatment × Religiosity)		0.20	**		0.18	**
		(0.07)			(0.07)	
N	539	539		501	501	
Adjusted R-squared	.003	.072		.001	.062	
F-statistic	2.7	14.9		1.4	11.9	
Significance level of F-statistic	.101	.000		.242	.000	

Note: Treatment condition coded as 1, Control condition coded as 0. Control is the reference group. Religiosity coded from 0 (Not at all important) to 3 (very important).

* p < .05.

** p < .01.