Can I Do All This and Then Have a Kid? Graduate Students' Attitudes and Intentions about Family Formation.*

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ABSTRACT

Key words: STEM, academia, fertility, work-family balance

Fertility timing and work-family balance are pressing issues for many young adults. In academia, they can reflect large-scale gender inequities, especially for women in STEM fields. Drawing on a four-year mixed-methods panel study of graduate students enrolled at a research university in the southern United States, we examine the level of thought given to work-family balance among graduate students in STEM and non-STEM disciplines, and whether students believe that the ideal time to have a(nother) child would be different if not for graduate school. We find strong evidence that work-family balance is a more pressing issue for STEM women than it is for STEM men, even though women and men, regardless of discipline, do not differ significantly in their reports of when is the best time to have a child. We point to three explanations for graduate students' attitudes and intentions about family formation: current family roles, experiences with spillover, and the influence of faculty mentors.

INTRODUCTION

Over 95 percent of U.S. adults have children, want to have children, or would like to have children in the future (Newport 2003). While unintended pregnancies do occur, many childless young adults create an idealized plan of the best time in their life course to start a family, often based upon when they feel they will be able to best balance their family responsibilities with other responsibilities, including work. This plan varies widely according to young adults' social and demographic characteristics, such as gender, type of career, and student status. Typically, however, imagining the "ideal time" for children means seeking a balance between the desire to be a parent and the desire to finish education and/or have an established career. The introduction of a first or additional child raises questions for working parents about how to successfully manage both career and family responsibilities, and a plethora of literature documents the challenges working women face with regard to work-family balance (e.g., Gerson 2010; Hochschild 1990; Moen and Roehling 2005; Williams 2000).

Academics, and future academics, are no exception to this "time bind" (Hochschild 1997; Valian 1998), and the tone of this literature is both that women face challenges but also invest more time in thinking about how best to manage work and family demands. Illustrating this point, decisions about childbearing and issues of work-family conflict have been repeatedly referenced in current debates to account for the continued underrepresentation of female presence in the science, technology, engineering, and mathematics (STEM) workforce (Fouad and Singh 2011; Grant, Kennelly, and Ward 2000; Xie and Shauman 2003). This suggests that women in STEM fields face unique challenges regarding issues of family formation distinctive from both their male peers and women in other disciplines.

Because graduate students are in the initial phase of building their careers, an examination of their attitudes and intentions toward fertility has the potential to shed new light on the well-studied family formation trends that exist among faculty (Armenti 2004; Mason and Goulden 2004; Ward and Wolf-Wendel 2004; Wolfinger, Mason, and Goulden 2008). Graduate students are, in many ways, at the intersection of career and family decisions; they typically are in their prime childbearing years (aged 22-30) while simultaneously being involved in a multi-year career training process, and, as such, likely consider questions about family formation issues as they progress toward a doctoral degree. It is also likely that this process differs according to gender and field of study, as women, especially in STEM fields where they are gender minorities, face discipline-specific challenges that set them apart from their peers in terms of how they experience graduate school and family formation. Fertility delays may not be merely a response to the strict structure of "the job" but could also be the result of expectations transmitted to students before they enter the field – whether academia or industry – about what it takes to be successful in the academic sciences.

In this paper, we explore graduate students' attitudes and intentions toward fertility. With the persistence of the gender gap in STEM fields at the faculty level in mind, we center our focus on two key variables: gender and academic discipline (i.e., STEM fields vs. fields outside of STEM disciplines). We draw on a multi-year, longitudinal case study in which we track a matriculating cohort of graduate students who entered a doctoral program at a private research university in 2007 through their fourth year of school (spring 2011). Because of its longitudinal and mixed-methods nature, our data permit an examination of change over time during this important developmental stage in their professional and personal lives. In other words, we get to

see fertility intentions and decisions in "real time" as they change and unfold across individual trajectories.

We examine three research questions in terms of ideal fertility timing and the amount of thought given to work-family balance as graduate students progress towards their doctoral degrees. First, across gender and discipline groups, what are graduate students' intentions and attitudes about family formation? Second, do these intentions and attitudes change over time? Third, what explains the ways in which these intentions and attitudes change (or not) over time? We seek to account for differences across groups and over time through possible confounding, mediating, or moderating effects, including demographic characteristics, family status, perceptions of work-family spillover, and relationships with department and mentor. Uncovering differences in family formation attitudes and intentions among graduate students may be indicative of structural inequalities within academia, as well as other similar workplaces.

BACKGROUND

Research finds consistent gender difference in attitudes about family, particularly work-family balance. Coined the "ideal worker" by Williams (2000) and the "career mystique" by Moen and Roehling (2005), the "successful worker" is a person dedicated primarily to work, thanks to a stay-at-home spouse who manages family responsibilities. These models are conceived of as a form of gender discrimination because they privilege a stereotypical male model of family formation – an assumption, in other words, that there is a "wife" at home. These dynamics are relevant to graduate students, as both family and academia have been called "greedy institutions" that require exclusive and undivided loyalty (Grant, Kennelly, and Ward 2000), and Hochschild's "second shift" (1990) has been shown to persist even among highly educated academics (O'Laughlin and Bischoff 2005). Yet, the literature on this topic considers

only working women who already have families, with little information on women who are preparing for careers. Since most doctoral students do not yet have children (especially at the start of their graduate work), our study can illustrate how students react to this "greedy institution" structure in terms of decisions and attitudes about family formation. We expect that the "ideal worker" model lends itself to less concern about work-family balance among male graduate students and greater thought to work-family balance among female graduate students.

Deliberations on when is the best time to have a child, as well as the amount of time spent thinking about work-family balance, provide key markers of how women perceive and experience this greedy institution. The notion that women devote more time to these matters or understand their ideal for childbearing exclusively through when it is best for their career is a reflection of large-scale gender inequities in academia that are exacerbated by childbearing. In academia, women are 27 percent less likely to get tenure and 20 percent less likely to become full professors, regardless of whether they have children while on the tenure track (Mason 2006), and female professors tend to be less productive (Long 1990) and less mobile (Moen and Roehling 2005) than their male peers. Research shows that there is also a "baby gap" for academics who have children before tenure (referred to as "early babies"): among male faculty with early babies, 77 percent are tenured professors, as opposed to only 56 percent of female faculty members with early babies (Mason and Goulden 2004). Interestingly, men's science careers benefit from marriage and parenthood, while women's careers are impeded (Xie and Shauman 2003). As such, we expect female graduate students will give more thought to work-family balance than their male peers because they anticipate that combining the two will likely disadvantage their academic careers.

Deciding when to have a child can also be difficult, especially when the time demands of work are significant and increasing, and the availability of support with childbearing and childrearing tasks from family is unclear. This description applies to graduate students at U.S. research universities, especially women, who are typically in their prime childbearing years. These students grapple with the substantial time demands of academic work, often at universities located far away from family and close friends who might provide support should they have a child. Following the typical academic pattern, a substantial portion of women's fertile years occur pre-tenure, with their most fertile years occurring during graduate school – normally in their mid- to late-twenties (Van Anders 2004). As a result, graduate school is a time when students who want children are seriously considering how to fit them into their life plans (Van Anders 2004). Indeed, research shows that about two-thirds of female PhD students report age 28-34 as the ideal time for a first child, even though the average age for PhD conferral is 33 and most academics achieve tenure around age 39 (Mason 2009).

This overlap between desired timing of children with critical junctions of career work and advancement is associated with delayed childbearing, with studies showing that more educated women are more likely to postpone childbearing, or to intend childlessness altogether (Hayford 2009). Gatta and Roos (2004) find that women faculty either do not have children, wait until after tenure to have children, or time childbearing to occur during summer months or sabbaticals. Yet, it is unclear if this is a reaction to specific constraints of an academic job, or if it represents long-standing concerns that began while one was attaining the degree. Understanding the intentions of graduate students, the degree to which gender matters as they progress through school, and whether gender differences are stronger among those in STEM, can show if work-family issues we observe among faculty are representative of academics at large.

STEM vs. Non-STEM: Does Discipline Matter?

A growing body of literature has examined STEM fields as a unique context for gender-related dynamics to emerge (Etzkowitz et al. 1994; Hill, Corbett, and St. Rose 2010; Sonnert 1995; Xie and Shauman 2003). Although there is a wide range of disciplines studied in graduate school, we focus on the differences between those pursuing degrees within and outside of the STEM fields. We employ Hill, Corbett, and St. Rose's (2010: 2) definition of science, technology, engineering, and mathematics (STEM) fields as: "physical, biological, and agricultural sciences, computer and informational sciences, engineering and engineering technologies, and mathematics." STEM fields are unique from the Social Sciences and Humanities because of the nature of the work: research is conducted within a lab environment, which requires significant start-up and is more time-sensitive with delays causing significant loss of results and perhaps momentum (Riskin et al. 2007). We examine whether such a setting is distinctive in terms of how its graduate students envision combining work and life as parents.

What sets the STEM fields apart, more than the nature of the work, is the under-representation of women among faculty and the challenges that emerge as a result – challenges that we argue shape women's family formation attitudes and perceptions of work-family balance. At the faculty level, women made up 40 percent of all full-time faculty in 2005 at degree-granting colleges and universities in the U.S., but only 22 percent of full-time faculty in computational and information sciences, 19 percent in mathematics, 18 percent in physical sciences, 12 percent in engineering, and 34 percent in life sciences (Hill, Corbett, and St. Rose 2010). As occupational minorities, women may be seen as "tokens" and thus penalized for working in male-dominated fields (Yoder 2002; Taylor 2010). Furthermore, Taylor (2010) argues that women are aware of this violation so they expect to be treated differently. One

manifestation of this awareness may be a desire to delay childbearing. Although many scientists have children, the visibility of a pregnancy further distinguishes women from their male peers and, according to Taylor (2010), invites additional penalizations during this formative stage of their education and careers.

Research also shows that STEM fields are difficult workplaces for women, especially if they have a family: female STEM faculty report less satisfaction with how well they fit in their departments and with institutional support for having a family while working toward tenure (Hill, Corbett, and St. Rose 2010). In graduate school, STEM women more often receive insufficient funding, are less likely to be research assistants, have less prominent mentors and less contact and cooperation with male advisers, and find it difficult to handle the aggressive interaction style that can characterize STEM fields (Sonnert 1995). Female graduate students in STEM fields may also stand out relative to women in non-STEM fields, since women are much better represented in the Humanities and Social Sciences; in fact, they are the majority in some departments (e.g., English). If differences in intentions and attitudes about family formation are due to underrepresentation (as are STEM women), then we should find fewer such differences in fields where women occupy a greater share of academics (as in the Social Sciences and Humanities). Our study tests for this discipline-gender distinction in attitudes about family formation among graduate students.

Change Over Time in Intentions and Attitudes about Family

We also posit that understanding the intentions and attitudes about family formation among graduate students requires a longitudinal focus. As time progresses, graduate students are moving through their program, getting closer to their goal of attaining a degree, and entering the job market (academic or otherwise). Thoughts about family formation issues likely shift during

this period, as biological and professional realities become more concrete. First, over time graduate students are getting older, reaching (and often exceeding) the normative age to have had a first child in the United States (Morgan 1996). Second, moving closer to completing their doctoral degree and beginning their career may change graduate students' intentions when they confront the reality of their ideal fertility timing and work-family balance situations. Moen and Roehling (2005: 60) refer to this confrontation phase as the "launching stage," when adults are launching both careers and families, a time which forces them to "begin to assess whether earlier career aspirations are truly viable, especially combined with family."

Finally, this exclusive focus on work is reinforced by what graduate students see of experiences in family formation. Many scholars note that the tenure clock and the biological clock tick in sync with one another, which can cause internal conflict or concern as the two converge (Ward and Wolf-Wendel 2004), and women academics often perceive children as yet another challenge in the quest for tenure. As graduate students progress through their programs, finishing their coursework and working more closely with faculty on research, they are more likely to observe the outcomes of this biological-clock-versus-tenure-clock conflict in the outcomes of faculty members' family formation choices.

Explanations for Differences and Changes in Intentions and Attitudes about Family

What might explain shifts over the graduate school experience in students' childbearing intentions and time devoted to thinking about work-family balance? We anticipate little variation due to age, race, socioeconomic status, and nativity as our study population comprises a single cohort of graduate students at one university introducing a substantial degree of homogeneity compared with the U.S. population. All our respondents are of similar age, education level, and nearly all have received financial support from the university to attend their program. Racial and

nativity variation are likely minimal both because these patterns are driven by class and because Whites and Asians, who have highly similar fertility patterns (Morgan 1996) are the largest racial groups among the graduate students in our study. Finally, decreases in fertility among the more educated are global patterns (Keller 2001), impacting the native- and foreign-born alike.

We do expect that experiences within the graduate school community, department, and with a primary mentor will likely contribute to gender and discipline differences in fertility intentions and level of thought given to work-family balance. Satisfaction with department and personal relationships with faculty may influence graduate students' beliefs about the acceptability of certain fertility choices and of having a family as an academic. Most doctoral students (58 percent of women and 47 percent of men) report being dissatisfied with departmental support for work-family balance (Mason 2006). The lack of departmental and institutional support sends a pervasive message that children and family life are not a common part of graduate students' lives (Springer, Parker, and Leviten-Reid 2009). These processes likely differ by gender and discipline, as women perceive less support in both female-dominated and male-dominated occupations, and more support in mixed-sex occupations – while men perceive the least support in mixed-sex occupations (Taylor 2010). The underrepresentation of women in STEM fields would mean that STEM women perceive little support, especially in comparison with their male peers and non-STEM women. Because graduate students look to mentors to determine the choices and feasibility of balancing an academic career with a home life (Van Anders 2004; Austin 2006; Ward and Wolf-Wendel 2004), the scarcity of STEM women faculty may also have a negative impact on STEM women graduate students. When there are few women at the faculty level, women graduate students find few affirmative models.

At an individual level, personal performance and progress in school could explain some group differences, and perhaps changes over time, in intentions and attitudes about family. Human capital theory dictates that greater investment in education and career lessens the likelihood of leaving school or work; in the context of fertility and family life, "women who are more highly invested in their education are more likely to want to establish themselves in their occupational careers before becoming pregnant" (Moen and Roehling 2005: 66). Economic theory further extends this trend to personal performance: if graduate students are getting high returns to their investment with good grades and research productivity, then they would be less likely to put that investment at risk by adding the time commitment of a new baby. This fear is justified given the unfortunate realities for student parents, who have the least access to research assistantship positions and to opportunities to present their research outside of their university (Kennelly and Spalter-Roth 2006). Therefore, female students may choose to wait to have children until they have received their PhDs and are securely employed. Inversely, graduate students who experience little returns from their academic performance or who perceive fewer opportunities (women in STEM fields, for example) may see a new baby as less of a risk and perhaps more satisfying relative to a career that will likely have a weak start.

In addition, spillover between work and family most likely has a powerful influence on graduate students' attitudes and intentions about family formation, particularly among those with established partners and/or young children. Work-family spillover is defined as the "transfer of mood, affect, and behavior from one setting to another" (Almeida, Wethington, and Chandler 1999: 49) and can be positive or negative, operating in both directions – from work to family and from family to work. Research suggests that negative work-to-family spillover is highest for all working women with young children, but it is less severe for mothers in professional occupations

and more severe for people of both genders in their 40s (Moen and Roehling 2005). Negative work-family spillover may explain the impact of having a spouse or partner and/or young children on family formation attitudes. This group likely gives more thought to work-family balance and intends to delay having (additional) children more than other students. The role of gender is unclear as studies show that women experience higher levels of both positive work-to-family spillover and positive family-to-work spillover than men (Moen and Roehling 2005), which could lead them to think less about work-family balance as these worlds are apparently not in conflict.

DATA AND METHODS

Survey and Interview Data

This project utilizes data from an ongoing panel study of gender and graduate school performance at an elite, secular, private research university located in the southern United States that we term "Southern U." We collected data from first-year graduate students (fall 2007 cohort) from four disciplines (Natural Sciences, Engineering, Social Sciences, and Humanities) and we have followed these respondents, thus far, through their fourth year of school (completed spring 2011). We draw on a range of disciplines to identify whether the experiences of (female) STEM students is truly unique. Additionally, this comparison should capture any existing differences in disciplinary cultures that may aid or hinder women's graduate training.

Year 1 data collection began in February 2008 when we contacted 281 doctoral students in the selected disciplines who matriculated during fall 2007, asking them to participate in an online survey about their graduate school experiences. We sent a letter to each student through campus mail, and included a $5 bill as a non-conditional incentive. The letter informed them about the purpose of the study and told them that they would be contacted via email and asked to

participate. They were also told that after completing our survey they would be able to enter their names in a gift card drawing. Shortly after the contact letter was mailed, we sent a personalized email to each student that included a link to the survey. We re-contacted non-responding students via email twice, and closed the survey at the end of February 2008. At the end of data collection, 224 students opted in to take our survey; of those who did not respond, five were later determined to have already quit their program of study (response rate = 79.7 percent). Our survey collected information on demographic and background characteristics, undergraduate academic experiences, balancing work and family responsibilities, current experiences in graduate school (e.g., mentoring received, program satisfaction), and job market intentions. After survey data collection was completed, we drew a random selection of survey respondents (three men and three women from each discipline) and contacted them with a request for an interview. The in-depth interviews were conducted in faculty offices or over the phone. The typical interview was 45 minutes (range: 25 to 90 minutes). Digitally recorded and transcribed, all of the transcripts were reviewed for accuracy.

In Years 2, 3, and 4 (spring 2009, spring 2010, and spring 2011) we replicated the sequence described above, although the survey was shortened to remove a small number of time-invariant measures. Each year an online survey was administered in February to respondents who participated in the previous study wave (response rate at Year 2 = 78.1 percent; Year 3 = 73.1 percent; and Year 4 = 84.4 percent). Immediately following, we conducted in-depth interviews with 24 survey participants (three men and three women from each discipline). In Year 1 and Year 2, we did not repeat these interviews with respondents who had previously been contacted; however in Year 3 and Year 4 we did follow up with some participants, as sample attrition from

survey participation and population attrition from graduate programs necessitated re-contacting certain participants in areas with small cells (e.g., men in Humanities, women in STEM fields).

Analytic Sample and Measures

We evaluate two time-varying outcome measures in this paper, both relating to timing and time demands of family and children in relation to work demands and ideals. Each question is asked of students who report that they would like to have a(nother) child in the future (N = 175 Year 1 respondents). First, we examine how much students think about balancing career and family responsibilities, including childrearing, where 1 = no thought at all, and 5 = a lot of thought. Second, we examine whether students report that the ideal time to have a baby would be different if they were not in graduate school (where 1 = sooner, 2 = later or not sure, and 3 = no difference). Given our interest in the interaction between gender and discipline of study, we construct dummy variables derived by the cross-classification of these two variables, with STEM women as the reference category in all models.

In our analysis we present a modeling sequence that first controls for a set of demographic background characteristics, including time-invariant (measured only at Year 1) variables for age at interview (range: 20 to 46 years old), racial and ethnic identity (non-Hispanic white vs. all other), and nativity status (1 = foreign-born, 0 = U.S.-born). All remaining measures are time-varying across Years 1 through 4. In our analysis below we examine a series of nested models that first examine the mediating role of current family roles and obligations, including marital status (1 = currently married, 0 = otherwise), parental status (1 = any children, 0 = no children), and four scales designed to examine work-family spillover, both positive and negative (see Grzywacz and Marks 2000). For each scale (positive work-to-family spillover, negative work-to-family spillover, positive family-to-work spillover, and negative family-to-work

spillover) respondents answered four questions, where 1 = never and 5 = all the time, that query about the positive and negative aspects of spillover between school and family life (e.g., "Having a good day at school makes you a better companion when you get home"; "Stress at school makes you irritable at home"; "Your home life helps you relax and feel ready for the next day's work"; "Personal or family worries and problems distract you when you are at school"). Responses for each set of scale questions were averaged, with Cronbach's α scores ranging between .62 and .79 for each scale at Year 1.

We then examine the role of program satisfaction and mentorship. At each wave, satisfaction with graduate school is assessed by the question: "Overall, how satisfied are you with your Southern U graduate school experience?" Responses range from 1 = very dissatisfied to 5 = very satisfied. We dichotomize this measure so that 1 = satisfied or very satisfied with graduate school experience, and 0 = otherwise. We also examine two time-varying measures relating to the student's mentor in graduate school. We include dummy variables for mentor gender, setting male mentors as the reference in our models, contrasted against students who report a female mentor or no mentor (or mentor unknown), at each wave. We also examine a constructed measure of the frequency of socioemotional help provided by the mentor to the student, constructed from the average response to ten questions (e.g., "encouraged you to talk openly about anxiety and fears that detract from your work"), ranging from 1 = never to 5 = very often (α = .89 at Year 1).

Last, we consider how aspects of personal performance in graduate school, along with academic job intentions, influence gender-by-discipline disparities in fertility timing and work-family balance. First, we include a scale of respondents' views on their personal performance in school, based on eight questions (where 1 = strongly disagree and 5 = strongly agree) that gauge

how they feel about their academic abilities and performance in school (where higher response values = better; $\alpha = .63$ at Year 1).[1] Second, we include a dichotomous measure (where 1 = yes) of whether the respondent intends to pursue an academic job after they complete the PhD.

Analytical Approach

The questions posed in this study focus on individual differences in graduate student fertility intentions and work-family balance, as well as differences in how graduate students change on these measures as they progress toward the PhD. For the survey data, the best analytic strategy would capture individual variation in both the level and rate of change in our outcomes fully using respondent information at all four time points. Latent growth model (LGM) techniques meet these criteria and are appealing because of their ability to not only model change, but also to investigate the antecedents and consequences of change (Preacher et al. 2008). LGM can be thought of as an application of confirmatory factor analysis. They can include both time-invariant and time-varying covariates and have the ability to deal effectively with missing data (Preacher et al. 2008; Rabe-Hesketh and Skrondal 2008). Repeated measures of the phenomena under study (e.g., thought given to work-family balance) are used as indicators of a continuous, underlying (latent) trajectory, representing initial levels and change over time (Willet and Sayer 1994). For the 175 Year 1 students who completed our survey questionnaire and reported that they would like to have a(nother) child in the future, we use Stata 12.0 to run random intercept models using the *xtmixed* command for the ordinal work-family balance measure, and the *gllamm* command for multinomial logit models for the ideal timing of child measure. Preliminary tests for both outcome measures also included a random slope for interview wave – but results indicated minimal or no improvement in model fit; as such, random

intercept models are presented, which allow sampled students to differ in their baseline level for the outcome measure in our models.[2]

For the qualitative component of our study, the interview schedule probed for information about multiple aspects of the graduate student experience. From this in-depth interview data, we created codebooks for each of the four waves. We put all interviewee responses into broad themes and categories according to questions posed in the interview schedule. For this paper, we did "issue-focused coding" (Weiss 1994) on respondents' answers to questions about the best time to start a family, their experiences balancing work with family and children, and faculty as roles models for work-family balance. We then did more in-depth thematic coding of the data within those broad categories to identify potential response patterns and common themes in discussions about fertility intentions and work-family balance. The complimentary association between the qualitative and quantitative data led us to incorporate them simultaneously into our results, with themes from interviews adding greater depth and detail to trends in the quantitative data.

RESULTS

Descriptive Findings

Table 1 presents sample characteristics stratified by interview wave. In terms of gender-by-discipline composition, at Year 1 over three-quarters of students are enrolled in a STEM discipline, where men outnumber women in our sample by more than two-to-one (55.9 percent STEM men compared to 21.7 percent STEM women). Our sample is more gender-balanced in non-STEM disciplines, as non-STEM women are 13.1 percent of our Year 1 sample, compared to 10.3 percent non-STEM men. We see a relatively young cohort (average age: 25.0), nearly

half of whom are non-Hispanic white (46.9 percent), with 51.4 percent reporting that they were born outside of the United States.

--- Table 1 about here ---

Table 1 also shows that as doctoral students progress in their programs, an increasing proportion report that their ideal time to have a child would be sooner (40.2 percent at Year 1 compared to 48.8 percent at Year 4) – suggesting they have a sense of purposefully delaying fertility. In our interviews, graduate students explain this trend of delayed fertility in three main ways: caregiving to children would be too difficult to balance with schoolwork, providing economically for children would require better financial reserves than a graduate student can provide, and/or raising children would be easier once career/job security is achieved. Additionally, a number of female graduate students suggested that a potential solution might be to plan out childbearing for specific, less intense future periods of work, such as summer months or once they had completed their comprehensive exams. Similarly, in Table 1 we also see that students report thinking about work-family balance issues more frequently the longer they are in graduate school. To some extent, this likely reflects the changing status of graduate students over time. While just over 16 percent of our sample is married at Year 1, this rises to over one-third by Year 4, and the proportion parenting a child more than triples (from 5.1 percent at Year 1 to 17.9 percent at Year 4). However, measures of work-family spillover (positive and negative) show no change or a very slight decrease across program year.

Looking to satisfaction with graduate school experience, mentorship, and self-ratings of personal performance, Table 1 shows high and fairly stable reports of program satisfaction, as each year between 87-89 percent of students report that they are satisfied or very satisfied with their graduate school experience. Having a mentor is also more common over time. Nearly one-

quarter of graduate students had not secured a mentor by February of Year 1, but by Year 4 almost all students report that they have a mentor – only 3.6 percent report no mentor, compared to the majority who work with men (73.8 percent) compared to women (22.6 percent). Additionally, on average graduate students report that their mentors provide increasing levels of socioemotional help (such as going out of their way to promote their interests or conveying they have respect for the respondent) as they progress through school (mean at Year 4 = 3.2, where 3 = occasionally and 4 = often). Student self-assessments of their performance in graduate school are the same at Years 1 and 4 (mean = 3.5), and while the proportion who report that they want an academic job after graduation rises between Years 1 and 3 (from 37.3 percent to 47.8 percent), it drops back to 41.0 percent in Year 4.

Regression Models: Work-Family Balance

In Table 2 we present parameter estimates from random coefficient regression models predicting the amount of thought that students give to work-family balance. Model 1 shows that, over time, students think significantly more about work-family balance issues, and that discipline of study does matter. At a given year in school, STEM men are, on average, thinking significantly less about how to balance career and family life than STEM women. Differences between STEM women and non-STEM women and men are smaller and not significant. Model 1 also shows that foreign-born graduate students think significantly less about work-family balance issues than native-born graduate students.

--- Table 2 about here ---

In Model 2 we add measures of family status and work-family spillover. As expected, being married and being a parent both show strong, positive relationships to the amount of time that graduate students report that they think about work-family balance issues. In addition, work-

family spillover also matters, although, interestingly, while negative family-to-work or negative work-to-family spillover results in significantly more thought given to work-family balance, so does positive family-to-work spillover – and this effect is much stronger than either measure of negative spillover. Furthermore, while family status and spillover differences explain only a small portion of the excess time STEM women devote to thinking about work-family balance relative to STEM men, adjusting for these issues reduces the effect of year in school to non-significance, indicating that the apparent increase in time devoted to work-family balance reflects the dynamics among those actively engaging with a spouse/partner, a child, or who report higher than average spillover between work and home. Altogether, adjusting for marriage, parenthood, and work-family spillover in our regression models explains 30 percent of the intercept variance across graduate students in our sample.

Most of the student parents we interviewed reinforced this pattern. They report that while it was challenging to balance family and schoolwork, being a parent also could bring great satisfaction and happiness. Dean (Year 2), a STEM student, explains his search for balance: "It's been wonderful being a father. I absolutely loved it." He adds, as an afterthought, "I'd like to be home a little bit more than I have been able to… In our department we're expected to get a significant amount of results by the end of our second year, so I've been definitely in the lab a lot trying to push for that. But yeah, [being a father] has been absolutely wonderful and I wouldn't change it."

In Model 3, we add measures of program satisfaction and mentor characteristics. We find that when students report high levels of satisfaction with their graduate school experience, thought given to work-family balance decreases. However, we also see that, compared to students with male mentors, those with a female mentor report that they give significantly more

thought to work-family balance. Furthermore, adjusting for these measures actually amplifies the gender difference between STEM women and STEM men, while simultaneously explaining-away the negative work-to-family and family-to-work effects seen in Model 2.

In interviews, graduate students described mentors and other faculty as role models (both positive and negative) who can ease or heighten anxieties about work-family balance. Across all waves, many students felt heartened by their observations of mentors who were "doing it" – balancing their family lives with successful academic careers. Citing a female faculty member in her Humanities department who is "proud that she has children," Lisa (Year 1) explained, "It's so nice to see that wow, I can get married and have kids, even before tenure. It can be done." On the other hand, students expressed dismay over "workhorse" professors, some students jokingly wondering about their mentors in interviews: "does he sleep?" Students clearly view these types of professors as negative roles models in contrast with their own future goals. Illustrating this point, Angie (Year 1) spoke highly of her mentor – a woman without children – as a model for being a good scientist. But in terms of her family life (or her perceived lack thereof), she added, "I don't want her [family] life to be what my life will be like."

Last, in Model 4 we add measures of academic performance and job intentions. While neither is significant, we do see a small reduction in the difference between STEM women and men in the amount of thought they give to work-family balance issues. Altogether, however, measures added in Models 3 and 4 explain no additional variance in the intercept for work-family balance across students.

Overall, Table 2 shows that male graduate students in STEM think significantly less about work-family balance relative to their female counterparts. While the models in Table 2 test a framework designed to explore differences in the amount of thought that STEM women give to

work-family balance in relation to other students, we also examine whether status characteristics as they relate to gender and discipline, marriage, and parenthood also moderate the relationships illustrated in Table 2. To do so, we added interaction terms to Model 4 (not shown), testing whether gender-discipline, marital status, and parenthood interact with the other predictor measures in Model 4, finding four significant effects that also improved model fit: (1) gender-discipline * positive family-to-work spillover, (2) gender-discipline * mentor gender, (3) marital status * positive work-to-family spillover, and (4) marital status * negative family-to-work spillover.

--- Figure 1 about here ---

As illustrated in Figure 1 (using predicted values), there are wide differences along gender-discipline lines in the amount of time students spend thinking about work-family balance when positive family-to-work spillover is low. Indeed, when students report that they never experience this type of spillover, women in both disciplines report that they spend more time thinking about work-family balance than men. Figure 1 also shows that students differ by field of study, as men and women in non-STEM disciplines report thinking about work-family balance more often than STEM students. However, as positive work-to-family spillover increases, the impact is more severe for STEM students (especially men), who report a sharp increase in how often they think about work-family balance, while non-STEM students experience no change (men) or a slight decline (women) with increasing spillover. As a result, gender gaps within each discipline close with increasing positive family-to-work spillover, and among students who say that they think about spillover "all the time," men and women in both disciplines report an equivalent amount of time spent thinking about work-family balance, with values now higher among STEM than non-STEM graduate students.

--- Figure 2 about here ---

Next, Figure 2 graphs predicted values for the interaction between gender-discipline and gender of mentor. Here we see that, among STEM men, mentor gender is unrelated to how often they think about work-family balance issues, while non-STEM men think about work-family balance the most when they have no mentor. This contrasts with STEM women, who are similar to STEM men when they report no mentor. When STEM women report having a male mentor, they also report more thought given to work-family balance issues. STEM women with female mentors report even more thought to balance issues. Whereas a female mentor could serve as a positive role model, STEM women with male mentors may think about work-family balance in terms of questioning how they will manage in similar ways. Janet (Year 2), a STEM student, reported, "Anecdotally the professors are primarily male, so when they have to balance things it's magically done by their wife. They don't have those same stresses. It doesn't even come into their lives. Where if you think realistically, that's not going to be my reality." Among non-STEM women, however, the mentor-gender gap is the largest of any group, as working with a male mentor is associated with a relatively low amount of thought to work-family balance, contrasted against a relatively high amount of thought when they work with a female mentor. Jackie (Year 2), a non-STEM student reported, "So as a woman … to see women having children and being married and being a college professor is definitely a motivation." It appears non-STEM women in particular look to female mentors as role models for managing work-family responsibilities, especially within academia – perhaps because there are more female faculty in non-STEM fields in comparison to the substantial lack of female faculty in STEM fields.

Lastly, testing also revealed two significant interactions between marital status and (a) positive work-to-family spillover, and (b) negative family-to-work spillover. Due to space

limitations we do not graph the interactions, but each shows clear evidence that spillover, both positive and negative, strongly increases the amount of time that married graduate students spend thinking about work-family balance, while for non-married students the effect is slightly negative (positive work-to-family spillover) or null (negative family-to-work spillover).

Multinomial Logit Models: Ideal Timing of Children

Next, in Table 3 we replicate the model-building sequence above using multinomial logit models to predict the likelihood of reporting that the ideal time to have a(nother) child would be different if the respondents were not in graduate school (sooner and later/unsure vs. no difference). Model 1 shows no significant differences between STEM women and other students in their ideal timing for a child, nor do we see a significant effect of year in program – and these lack of effects are stable across all models. In interviews, however, fertility intentions differed quite a bit by gender. Most men express indifference and a lack of concern in regards to fertility, which they perceive as a far-off issue that they are still too young to consider. As Steve (Year 3), a non-STEM student, told us bluntly, "I'm a guy, so I don't really worry that much." There was even some uncertainty and indifference about future fertility timing among fathers. When asked if he would have another child while in graduate school, Dean (Year 2), a STEM student, was doubtful yet added, "but I don't really have it planned out." Several men who did have children during graduate school spoke of planning for more children as out of their control – an issue that was in the hands of fate, God, or their wives.

Several measures do, however, have a direct effect in the models on whether students report that their ideal time to have a child would be sooner. White students, married students, and parents are significantly less likely to say sooner than those who are non-white, single, and lack children, while students with higher levels of negative work-to-family spillover are more likely

to say sooner – but these effects are reduced to non-significance once we adjust for other controls. In comparison, we see a persistent negative effect of marriage on the likelihood of reporting that ideal timing is later/unsure, as married students are significantly less likely to say later/unsure than the non-married across all models.

--- Table 3 about here ---

We also see persistent effects of mentorship, performance, and job intentions. At any given wave, students who report that they do not have a mentor are significantly less likely to say sooner, relative to no difference in timing. In addition, as students self-assess their performance in graduate school more positively they are less likely to say that their ideal time to have a child would have been sooner if they were not in graduate school. As hypothesized, many graduate students do not want to slow down their academic progress to make time for children: in interviews, a few men described having children in graduate school as "counterproductive" or that it "would just prolong everything." At the same time, those who report that they want an academic job after their degree is completed are significantly more likely to report that their ideal time would have been sooner. In this respect, graduate students are delaying their fertility because of the obstacles they perceive in the organizational structure of academia. In interviews, students worried about timing childbearing within the unique academic trajectory. Andi (Year 3), a STEM student, wondered, "Let's see. If I graduate then get a post-doc then try and get tenured, can I do all this and then have a kid? Or do I have to like insert it somewhere in there and just deal with it?" Similarly, Erika (Year 1), a non-STEM student, recognizes this timing conflict and the norms about childbearing in academia: "But I don't want to wait until I'm like 40. So I figure I just have to do it and make everyone conform to the fact that I am having a child. I know it's sort of looked down on in academia."

We next tested interactions between each measure in Table 3 and gender-discipline, marital status, and parenthood to explore whether these characteristics moderate the relationships shown in Table 3. As before, we added interaction terms to Model 4 (not shown), finding two significant effects that also improved model fit: (1) gender-discipline * positive work-to-family spillover, and (2) gender-discipline * self-assessed performance in graduate program. However, since these interactions are tested in two different models (sooner vs. no difference, and later/unsure vs. no difference), for the sake of simplicity (and space) we only graph terms predicting sooner vs. no difference since the patterns shown for later/unsure vs. no difference are essentially the opposite of those shown in Figures 3 and 4 below.

Figure 3 graphs the predicted probability of reporting that the ideal time to have a child would be sooner if not for graduate school (relative to no difference), by gender, discipline, and amount of positive work-to-family spillover. Overall, it shows that the probability of reporting "sooner" decreases for STEM women as positive spillover increases, while for all other groups higher levels of positive spillover increases the probability of reporting that they would have a child sooner, if not for graduate school. However, this increase is much steeper for graduate students in non-STEM disciplines (especially women), whereas the positive slope for STEM men is much weaker.

--- Figures 3 and 4 about here ---

Figure 4 graphs the predicted probability of reporting that the ideal time to have a child would be sooner if not for graduate school, by gender-discipline and self-assessed performance in graduate school. Overall, it shows that for STEM men, self-assessments of performance in school are unrelated to when they would ideally have a child, while for all other groups (especially STEM women and non-STEM men) more positive self-assessments are related to a

lower probability of reporting that they would have had a child sooner, if not for graduate school. In the most basic terms, the gender-discipline groups driving the significant effect of self-assessed performance on ideal fertility timing are mainly STEM women and non-STEM men, who are less likely to report delaying their childbearing as their performance increases.

CONCLUSION

When to have a(nother) child and how to balance family responsibilities with a successful career are difficult issues that most working adults, including academics, encounter. In our study, we find that gendered distinctions in family experiences and expectations begin early in academia. From the first year in their program, graduate students perceive work and family as in conflict and thus almost half of our respondents report that they would have had children sooner if they were not in graduate school. Other literature finds that more educated people begin having children later in life than the less educated (Heck et al. 1997; Rindfuss, Morgan, and Offutt 1996); we extend this research as our findings imply that this trend may not be a result of more educated people desiring to have children later in life, but rather an outcome of actively delaying their fertility because of perceived work-family balance problems. As expected, graduate students' attitudes and intentions about family formation were marked by gender and discipline more so than age, race and ethnicity, or nativity. Indeed, we find strong evidence that work-family balance is a more pressing issue for STEM women than it is for STEM men, even though women and men, regardless of discipline, do not differ significantly in their reports of when is the best time to have a child. We point to three explanations for graduate students' attitudes and intentions about family formation: current family roles, experiences with spillover, and the influence of faculty mentors.

First, students who are married and/or have children give more thought to work-family balance, and married students are less likely to report their ideal fertility time as later. Contrary to our hypothesis, however, year in program is not significant for either outcome, suggesting that marital and parental status determine graduate students' attitudes and intentions, not their location in their career formation trajectory. Since almost all respondents were around the same age at Year 1 and had similar (generous) levels of funding, they represent a population that is relatively stable over time in its composition and intentions.

In addition to roles, experiences with spillover also shape graduate students' opinions about family formation. We expected a positive relationship between spillover and intentions, with students who described problematic intrusions of home issues into their schoolwork, or vice versa, being less inclined to report a sooner ideal time for a(nother) child. Instead, we find that positive family-to-work spillover (i.e. reporting that family life experiences positively impact their work lives) is significantly related to greater thought given to work-family balance. This suggests that those who experience positive spillover may achieve it by actively thinking about how to balance their lives. Furthermore, the interaction we identify shows this association is most prominent for STEM students (see Figure 1), whose work is more physically constraining due to the nature of the lab environment (Riskin et al. 2007) and who are thus more likely to be forced to actively balance their work and family lives.

Reports of positive spillover from work to family life also impact fertility intentions. Figure 3 shows that as positive work-to-family spillover increases, STEM men are more likely to report a sooner ideal time, whereas STEM women are less likely to say sooner and non-STEM women and men do not differ much. Again, this finding serves as further evidence that STEM women are unique from both their male peers and their non-STEM female peers. This interaction

effect may be due to graduate students' point in the program: STEM men likely feel satisfied with their work and family lives (evident in positive work-to-family spillover) and thus wish they would have had children sooner. STEM women, on the other hand, may remain skeptical given the gender-specific challenges they will likely confront before their STEM careers are established and are thus less likely to report a sooner ideal time for a(nother) child despite positive work-to-family spillover. At Year 4, this pattern is evident but we as our study is ongoing we will continue to track this relationship over time to investigate additional explanations for this complex interaction.

Third, faculty mentors greatly influence graduate students' attitudes and intentions about family formation, including ideal fertility timing. This finding supports the theory that mentors influence graduate students' lives beyond the sphere of academia (Austin 2006; Ward and Wolf-Wendel 2004). Furthermore, female mentors are particularly influential because they serve as both positive and negative role models of work-family balance for their students – especially for female students (Sonnert 1995). However, our study demonstrates a disciplinary difference in this relationship, as we find only a small difference in effect between having a female versus a male mentor for STEM women, compared to a large difference for non-STEM women. This difference likely occurs because there are fewer female STEM faculty available to serve as mentors and role models for female STEM student, but further research is needed to investigate this association in more detail.

Additionally, human capital theory and economic theory (Moen and Roehling 2005) offer explanations for why graduate students who are confident in their academic performance are less likely to report sooner ideal fertility timing. For these students, the benefits they receive from their hard work in school (through grades, publications, presentations, etc.) outweigh the costs of

delaying their fertility. Interaction effects reveal that this association is strongest among STEM women, who are occupational minorities (Taylor 2010) in their fields. Thus they may delay having children in order to avoid further disadvantages in addition to those they already face as "tokens" (Yoder 2002). The association between self-assessment of performance and sooner ideal time is slightly negative for non-STEM women perhaps because they face general disadvantages as women, but it is non-existent for STEM men, who are the most privileged group as both men and an occupational majority.

In sum, while STEM women may be more concerned about how they will balance their family and work lives, they still plan to have children despite these challenging issues. Women in science have increased their presence and influence in recent decades but they continue to face difficulties in balancing their work and family lives (Hill, Corbett, and St. Rose 2010; Xie and Shauman 2003), even early on as young graduate students who may not yet have children. We find that students willingly bypass their ideal fertility timing for the work demands and career formation incentives of graduate school. Following the role model paradigm, graduate students observe the difficulties that faculty members face in childbearing and work-family balance, and adjust their own fertility plans accordingly. Concerned about the penalization and disadvantages that result from having "early babies" (Mason and Goulden 2002), graduate students push back from forming families. This finding connects to themes of the ideal worker (Williams 2000) and career mystique (Moen and Roehling 20005) that reinforce gender inequality in various types of workplaces.

Our findings also represent academia as an extreme case for delayed fertility in the face of potential work-family conflict. The synchronization of the tenure clock and the biological clock (Ward and Wolf-Wendel 2004) exacerbates more general issues of gender and parenthood

inequalities in workplaces. As such, our study's generalizability may be limited to academia or to similar types of universities (e.g., small, elite, secular). However, readers should bear in mind that what we present comes from the "best case scenario" where students are fully funded and thus do not have to supplement course work and research with employment outside the university. While our overall case base is small, our sample size is able to sustain our statistical methods and the concordance in findings between the quantitative and qualitative data suggest that the patterns we uncover are far from "random noise." If anything, the qualitative element of this study further elaborates and explains the quantitative results, underlining the particular strength of a mixed methods approach (Small 2011). Future research should continue to address these themes by following graduate students into their careers to investigate whether these inequities persist and whether they contribute to attrition. Studies of attrition have great potential to reveal if the underrepresentation of women in STEM fields is due, in part, to the challenges they face in achieving successful work and family lives. Our study of graduate students' attitudes and intentions about family formation is a starting point for future research that seeks to understand graduate students' career trajectories, academic or otherwise.

NOTES

(1) In preliminary models we also tested count measures of the total number of conference talks/poster presentations given, and published journal articles and book chapters, at each interview wave. None were significant.

(2) We also explored whether gender, discipline, and marital status should be modeled as a random slope, but these models had convergence problems and are not presented.

REFERENCES

Almeida, David M., Elaine Wethington, and Amy L. Chandler. 1999. "Daily Transmission of Tensions Between Marital Dyads and Parent-Child Dyads." *Journal of Marriage and the Family* 61, 1: 49-61.

Armenti, Carmen. 2004. "May Babies and Posttenure Babies: Maternal Decisions of Women Professors." *The Review of Higher Education* 27, 2: 211-231.

Austin, Ann E. 2006. "Conclusion." Pp. 147-157 in *The Balancing Act: Gendered Perspectives in Faculty Roles and Work Lives,* edited by Susan J. Bracken, Jeanie K. Allen, and Diane R. Dean. Sterling: Stylus.

Etzkowitz, Henry, Carol Kemelgor, Michael Neuschatz, Brian Uzzi, and Joseph Alonzo. 1994. "The Paradox of Critical Mass for Women in Science." *Science* 266, 5182: 51-54.

Fouad, Nadya A. and Romila Singh. 2011. "Stemming the Tide: Why Women Leave Engineering." *Women in Engineering 2011 Report*.

Gatta, Mary L. and Patricia A. Roos. 2004. "Balancing Without a Net in Academia: Integrating Family and Work Lives." *Equal Opportunities International* 23: 124-142.

Gerson, Kathleen. 2010. *The Unfinished Revolution: How a New Generation is Reshaping Family, Work, and Gender in America.* New York: Oxford University Press.

Grant, Linda, Ivy Kennelly, and Kathryn B. Ward. 2000. "Revisiting the Gender, Marriage, and Parenthood Puzzle in Scientific Careers." *Women's Studies Quarterly* 28, 1/2: 62-85.

Grzywacz, Joseph G. and Nadine F. Marks. 2000. "Reconceptualizing the Work-Family Interface: An Ecological Perspective on the Correlates of Positive and Negative Spillover Between Work and Family." *Journal of Occupational Health Psychology* 5: 111-126.

Hayford, Sarah R. 2009. "The Evolution of Fertility Expectations over the Life Course." *Demography* 46, 4: 765-783.

Heck, Katherine E., Kenneth C. Schoendorf, Stephanie J. Ventura, and John L. Kiely. 1997. "Delayed Childbearing by Education Level in the United States, 1969-1994." *Maternal and Child Health Journal* 1, 2: 81-88.

Hochschild, Arlie. 1990. *The Second Shift: Working Parents and the Revolution at Home*. New York: Avon Books.

Hochschild, Arlie. 1997. *The Time Bind: When Work Becomes Home and Home Becomes Work*. New York: Metropolitan Books.

Hill, Catherine, Christianne Corbett, and Andresse St. Rose. 2010. *Why So Few? Women in Science Technology, Engineering, and Mathematics*. Washington, DC: American Association of University Women.

Keller, George. 2001. "The New Demographics of Higher Education." *The Review of Higher Education* 24, 3: 219-235.

Kennelly, Ivy and Roberta Spalter-Roth. 2006. "Parents on the Job Market: Resources and Strategies that Help Academic Parents Attain Tenure-Track Jobs." *The American Sociologist* 37, 4: 29-49.

Long, J. Scott. 1990. "The Origins of Sex Differences in Science." *Social Forces* 68, 4: 1297-1316.

Mason, Mary Ann. 2006. "Graduate Student Parents: The Underserved Minority." Council of Graduate Schools, Washington, D.C., December 9, 2006.

Mason, Mary Ann. 2009. "Why So Few Doctoral-Student Parents?" *The Chronicle of Higher Education* 11/21/09. Viewed 15 June 2010 <http://chronicle.com/article/Why-So-Few-Doctoral-Student/48872/>.

Mason, Mary Ann and Marc Goulden. 2002. "Do Babies Matter? The Effect of Family Formation on the Lifelong Careers of Academic Men and Women." *Academe* 88, 6: 21-27.

Mason, Mary Ann and Marc Goulden. 2004. "Do Babies Matter (Part II)? Closing the Baby Gap." *Academe* 90, 6: 10-15.

Moen, Phyllis and Patricia Roehling. 2005. *The Career Mystique: Cracks in the American Dream*. Lanham: Rowman & Littlefield Publishers.

Morgan, S. Philip. 1996. "Characteristic Features of Modern American Fertility." *Population and Development Review*, "Supplement: Fertility in the United States: New Patterns, New Theories" 22: 19-63.

Newport, Frank. 2003. "Desire to Have Children Alive and Well in America." *The Gallup Poll* 8/19/03. Viewed 15 June 2010 <http://www.gallup.com/poll/9091/desire-children-alive-well-america.aspx>.

O'Laughlin, Elizabeth M. and Lisa G. Bischoff. 2005. "Balancing Parenthood and Academia: Work/Family Stress as Influenced by Gender and Tenure Status." *Journal of Family Issues* 26, 1: 79-106.

Preacher, Kristopher J., Aaron L. Wichman, Robert C. MacCallum, and Nancy E. Briggs. 2008. *Latent Growth Curve Modeling.* Series: Quantitative Applications in the Social Sciences, #07-157. Thousand Oaks, CA: Sage Publications, Inc.

Rabe-Hesketh, Sophia and Anders Skrondal. 2008. *Multilevel and Longitudinal Modeling Using Stata, Second Edition.* College Station: Stata Press.

Rindfuss, Ronald R., S. Philip Morgan, and Kate Offutt. 1996. "Education and the Changing Age Pattern of American Fertility: 1963-1989." *Demography* 33, 3: 277-290.

Riskin, Eve A., Sheila Edwards Lange, Kate Quinn, Joyce W. Yen, and Suzanne G. Brainard. 2007. "Supporting Faculty during Life Transitions." Pp. 116-130 in *Transforming Science and Engineering: Advancing Academic Women,* edited by Abigail J. Stewart, Janet E. Malley, and Danielle LaVaque-Manty. Ann Arobor: The University of Michigan Press.

Small, Mario Luis. 2011. "How to Conduct a Mixed Methods Study: Recent Trends in a Rapidly Growing Literature." *Annual Review of Sociology* 37: 57-86.

Sonnert, Gerhard. 1995. *Who Succeeds in Science The Gender Dimension.* New Brunswick: Rutgers University Press.

Springer, Kristen W., Brenda K. Parker, and Catherine Leviten-Reid. 2009. "Making Space for Graduate Student Parents." *Journal of Family Issues* 30, 4: 435-457.

Taylor, Catherine J. 2010. "Occupational Sex Composition and the Gendered Availability of Workplace Support." *Gender & Society* 24, 2: 189-212.

Valian, Virginia. 1998. *Why So Slow? The Advancement of Women*. Cambridge: The MIT Press.

Van Anders, Sari M. 2004. "Why the Academic Pipeline Leaks: Fewer Men than Women Perceive Barriers to Becoming Professors." *Sex Roles* 51, 9/10: 511-521.

Ward, Kelly and Lisa Wolf-Wendel. 2004. "Academic Motherhood: Managing Complex Roles in Research Universities." *The Review of Higher Education* 27, 2: 233-257.

Weiss, Robert S. 1995. *Learning From Strangers: The Art and Method of Qualitative Interview Studies*. New York: Free Press.

Willet, John B. and Aline G. Sayer. 1994. "Using Covariance Structure Analysis to Detect Correlates and Predictors of Individual Change over Time." *Psychological Bulletin* 116: 363-381.

Williams, Joan. 2000. *Unbending Gender: Why Family and Work Conflict and What to Do About It*. New York: Oxford University Press.

Wolfinger, Nicholas H., Mary Ann Mason, and Marc Goulden. 2008. "Problems in the Pipeline: Gender, Marriage, and Fertility in the Ivory Tower." *The Journal of Higher Education* 79, 4: 288-405.

Xie, Yu and Kimberlee A. Shauman. 2003. *Women in Science: Career Processes and Outcomes*. Cambridge: Harvard University Press.

Yoder, Janice D. 2002. "Context Matters: Understanding Tokenism Processes and Their Impact on Women's Work." *Psychology of Women Quarterly* 26: 1-8.

Table 1. Sample Characteristics, Doctoral Students who Plan on Having Children, by Year in Program

	Year 1 (N = 175)	Year 2 (N = 134)	Year 3 (N = 107)	Year 4 (N = 84)
If not in graduate school, ideal time to have a(nother) child, %				
Sooner	40.2	45.5	49.5	48.8
Later/Unsure	34.5	27.6	22.4	23.8
No Difference	25.3	26.8	28.0	27.4
Amount of thought given to work-family balance, mean (SD)	3.3 (1.1)	3.4 (1.1)	3.5 (1.1)	3.5 (1.1)
Gender and discipline groups, %				
STEM women	21.7	23.1	25.2	25.0
STEM men	55.9	48.5	43.9	47.6
Non-STEM women	13.1	17.9	15.9	14.3
Non-STEM men	10.3	10.4	15.0	13.1
Age at Year 1, mean (SD)	25.0 (3.7)	25.2 (3.9)	25.2 (3.7)	25.2 (3.4)
White	46.9	48.5	51.4	46.4
Born outside of the United States, %	51.4	44.8	48.9	53.6
Currently married, %	16.6	22.3	27.2	35.6
Any children, %	5.1	10.4	14.0	17.9
Work-Family Spillover Scales, mean (SD)				
Positive work-to-family	3.0 (0.6)	3.1 (0.6)	3.0 (0.6)	3.0 (0.6)
Negative work-to-family	3.2 (0.7)	3.2 (0.6)	3.1 (0.7)	3.1 (0.7)
Positive family-to-work	3.5 (0.8)	3.5 (0.8)	3.4 (0.7)	3.4 (0.8)
Negative family-to-work	2.6 (0.7)	2.6 (0.6)	2.6 (0.7)	2.5 (0.6)
Satisfied or very satisfied with grad school experience, %	87.0	82.7	87.8	89.4
Mentor gender, %				
Male	53.6	65.7	75.2	73.8
Female	22.9	22.4	20.0	22.6
No mentor/unknown	23.5	11.9	4.8	3.6
Level of socioemotional help from mentor, mean (SD)	2.9 (0.9)	3.1 (0.8)	3.2 (0.9)	3.2 (1.0)
Self-assessed performance in program, mean (SD)	3.5 (0.5)	3.4 (0.5)	3.7 (0.5)	3.5 (0.5)
Wants an academic job once degree is completed, %	37.3	45.4	47.8	41.0

NOTE: Standard deviations in parentheses. Sample sizes can vary somewhat for selected measures (see data and methods section).

Table 2. Parameter Estimates, Latent Growth Models: Amount of Thought Given to Work-Family Balance

	Model 1	Model 2	Model 3	Model 4
Fixed Effects				
Year in Doctoral Program	.08 (.03)*	.04 (.03)	.02 (.03)	.02 (.04)
Gender and discipline groups				
STEM women (ref)	---	---	---	---
STEM men	-.31 (.18)+	-.28 (.16)+	-.33 (.16)*	-.28 (.16)+
Non-STEM women	.09 (.24)	.16 (.22)	.06 (.22)	.08 (.22)
Non-STEM men	-.19 (.27)	-.16 (.23)	-.13 (.23)	-.09 (.24)
Age at Year 1	.02 (.02)	.01 (.02)	.02 (.01)	.02 (.02)
White	.02 (.18)	.04 (.16)	.06 (.16)	.11 (.16)
Born outside of the United States	-.32 (.18)+	-.31 (.16)+	-.30 (.16)+	-.27 (.16)
Currently married		.53(.13)***	.51 (.13)***	.51 (.13)***
Any children		.44 (.18)*	.44 (.18)*	.45 (.18)*
Work-Family Spillover Scales				
Positive work-to-family		-.09 (.08)	-.06 (.08)	-.05 (.07)
Negative work-to-family		.14 (.08)+	.09 (.08)	.07(.08)
Positive family-to-work		.21 (.06)***	.20 (.06)**	.21 (.06)***
Negative family-to-work		.13 (.08)+	.13 (.08)	.13 (.08)
Satisfied/very satisfied with grad school experience			-.21 (.13)+	-.20 (.13)
Mentor gender				
Male (ref)			---	---
Female			.28 (.14)*	.28 (.14)*
None/unknown			-.01 (.17)	.02 (.18)
Level of socioemotional help from mentor			.04 (.06)	.07 (.05)
Self-assessed performance in graduate program				-.15 (.10)
Wants an academic job once degree is completed				.08 (.09)
Intercept	2.88(.50)***	2.01(.60)***	1.79(.64)**	2.10(.73)**
Random Effects				
Intercept variance	.69 (.10)	.48 (.08)	.48 (.08)	.48 (.08)
Residual variance	.48 (.04)	.48 (.04)	.46 (.04)	.46 (.04)
Log likelihood	-667.25	-631.36	-618.68	-609.26

NOTE: Standard errors in parentheses. ***p ≤ .001, **p ≤ .01, *p ≤ .05, +p ≤ .10

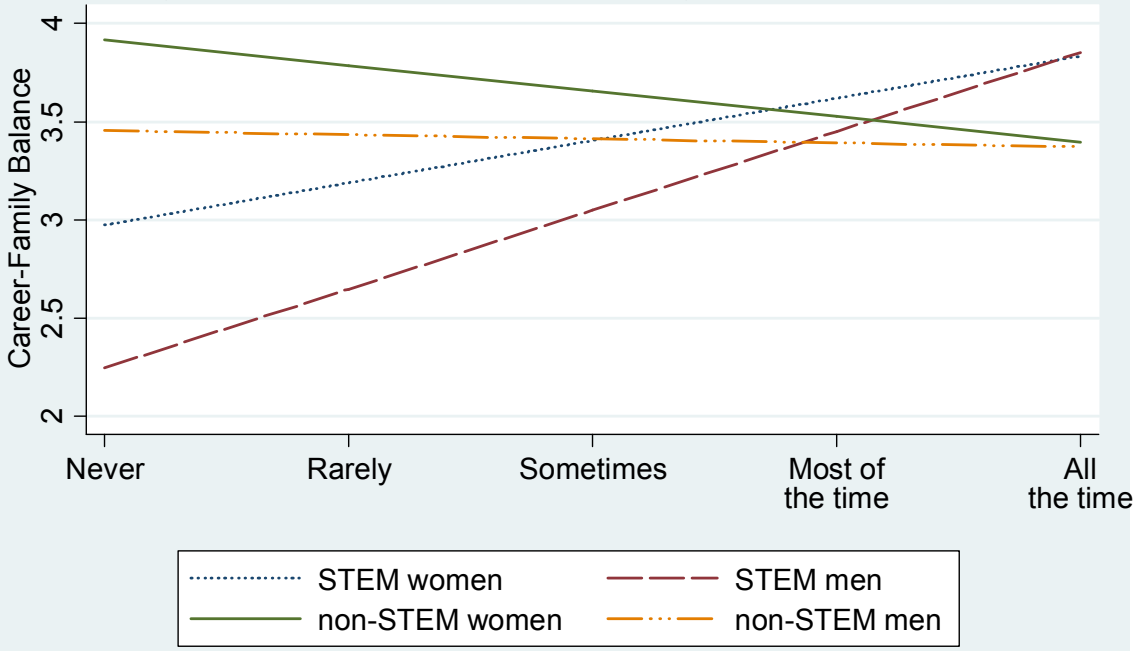
ent Growth Multinomial Logit Models: If Not in Graduate School, Ideal Time to Have a Child

	Model 1		Model 2		Model 3		Model 4	
	Sooner vs. No Difference	Later/Unsure vs. No Difference	Sooner vs. No Difference	Later/Unsure vs. No Difference	Sooner vs. No Difference	Later/Unsure vs. No Difference	Sooner vs. No Difference	Later/Unsure vs. No Difference
	.04 (.12)	-.18 (.13)	.14 (.12)	-.10 (.13)	.09 (.12)	-.06 (.14)	.09 (.13)	-.04 (.14)
	---	---	---	---	---	---	---	---
	-.10 (.42)	.04 (.44)	.09 (.41)	.22 (.43)	.04 (.40)	.36 (.43)	.18 (.41)	.36 (.44)
	-.65 (.55)	-.11 (.57)	-.72 (.53)	-.07 (.55)	-.61 (.54)	.08 (.56)	-.67 (.56)	.09 (.58)
	.66 (.62)	.30 (.67)	.78 (.59)	.44 (.66)	.82 (.58)	.46 (.65)	.78 (.61)	.51 (.68)
	-.03 (.04)	-.04 (.05)	-.00 (.04)	-.00 (.04)	.01 (.05)	-.02 (.05)	-.01 (.05)	-.01 (.05)
	-.66 (.40)+	-.51 (.43)	-.48 (.40)	-.27 (.43)	-.55 (.40)	-.25 (.44)	-.41 (.41)	-.19 (.44)
	-.39 (.41)	.02 (.44)	-.22 (.41)	.26 (.43)	-.22 (.40)	.34 (.44)	-.27 (.42)	.28 (.45)
			-.62 (.37)+	-1.27(.43)**	-.59 (.36)	-1.30 (.43)**	-.56 (.37)	-1.26 (.43)**
			-.91 (.51)+	-.74 (.59)	-.90 (.50)+	-.76 (.60)	-.76 (.51)	-.75 (.61)
			.19 (.26)	-.07 (.28)	.21 (.26)	-.11 (.29)	.29 (.27)	-.07 (.29)
			.44 (.25)+	.09 (.27)	.35 (.25)	.18 (.27)	.20 (.27)	.06 (.29)
			.24 (.20)	.08 (.21)	.24 (.20)	.09 (.22)	.28 (.21)	.13 (.22)
			-.17 (.25)	-.06 (.27)	-.15 (.25)	-.09 (.27)	-.22 (.26)	-.09 (.28)
hool experience					-.50 (.42)	.44 (.49)	-.25 (.45)	.57 (.52)
					---	---	---	---
					.16 (.39)	.23 (.41)	.17 (.40)	.23 (.43)
					-1.10 (.60)+	-.03 (.61)	-1.05 (.62)+	.01 (.63)
mentor					-.09 (.18)	.01 (.20)	.01 (.19)	.06 (.20)
ate program							-.85 (.36)*	-.52 (.39)
is completed							.57 (.31)+	-.06 (.34)
			-1.25 (1.70)	.58 (.27)	-.38 (1.82)	.11 (1.98)	2.33 (2.21)	1.64 (2.38)
	1.61 (.63)		1.21 (.56)		1.08 (.54)		1.16 (.55)	
	-513.29		-491.98		-477.45		-466.22	

ses. ***p ≤ .001, **p ≤ .01, *p ≤ .05, +p ≤ .10

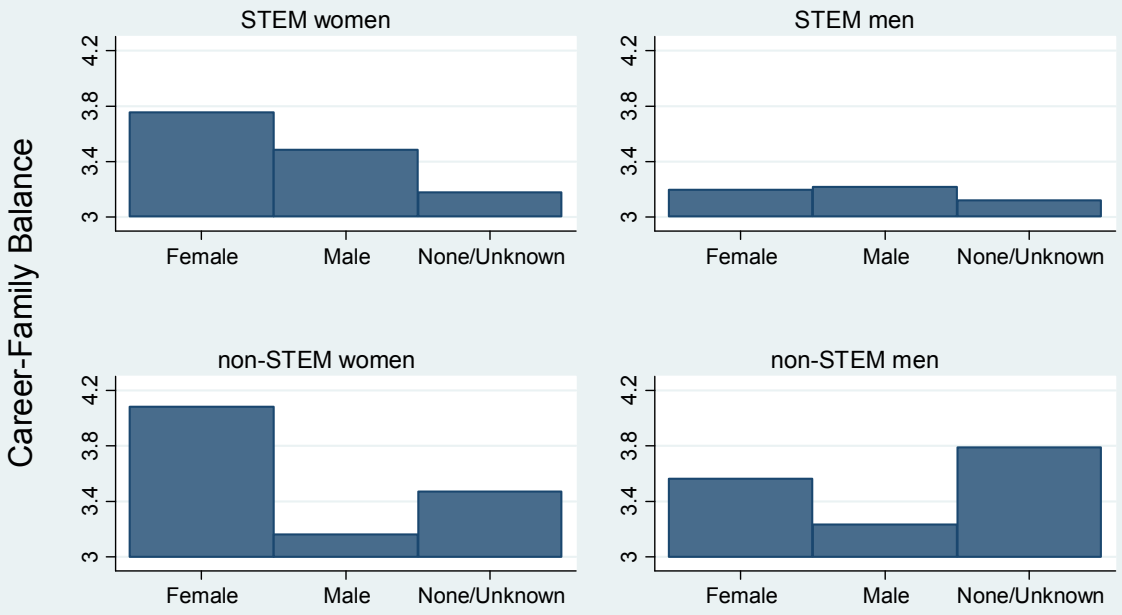
Figure 1. Predicted Values, Thought Given to Career-Family Balance

By Gender, STEM, and Positive Family-to-Work Spillover



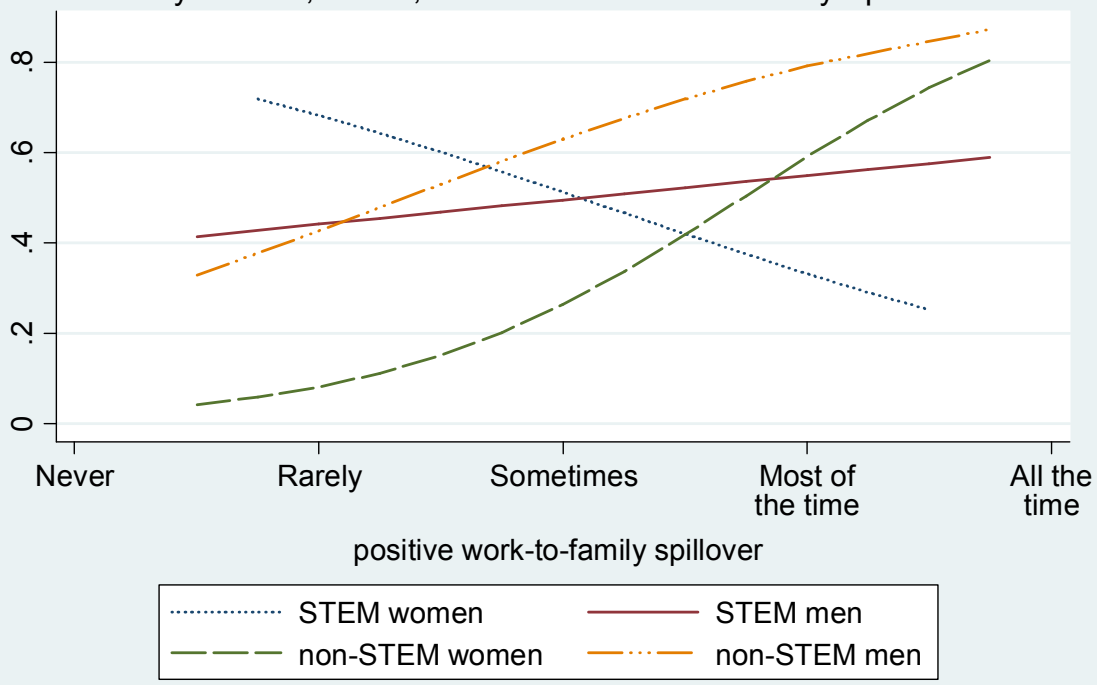
Model adjusted for all measures listed in Model 4, Table 2

Figure 2. Predicted Values, Career-Family Balance by Student Gender, Discipline, and Mentor Gender



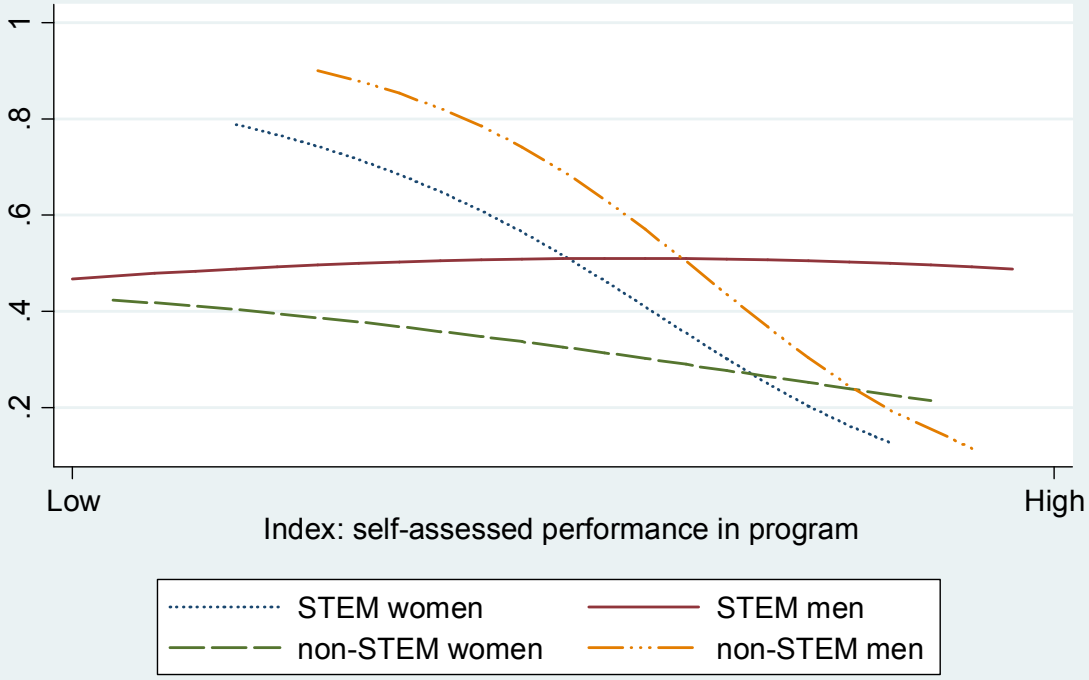
Model adjusted for all measures listed in Model 4, Table 2

Figure 3. Predicted probabilities: Child Sooner vs. No Difference
by Gender, STEM, and Positive Work-to-Family Spillover



Model adjusted for all measures listed in Model 4, Table 3

Figure 4. Predicted probabilities: Child Sooner vs. No Difference
by Gender, STEM, and Self-Assessed Performance in Program



Model adjusted for all measures listed in Model 4, Table 3