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The self-expressive edge of sex segregation : the role of gender schemas and self-conceptions in college major selection and career launch

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The Self-Expressive Edge of Sex Segregation: The Role of Gender Schemas and Self-Conceptions in College Major Selection and Career Launch

A dissertation submitted in partial satisfaction of the
requirements for the degree Doctor of Philosophy

in

Sociology

by

Erin Ann Cech

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2011

The Dissertation of Erin Ann Cech is approved, and is acceptable in quality and form for publication on microfilm and electronically:

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

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It is hard to express my deep gratitude to my mentors without sounding effusive. I have been blessed with more remarkable mentors than any one student should be allowed. I am the outcome of their tireless encouragement, advice, patience, and editing skills. I will do my best to pay it forward to my own students one day.

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ABSTRACT OF THE DISSERTATION

The Self-Expressive Edge of Sex Segregation: The Role of Gender Schemas and Self-Conceptions in College Major Selection and Career Launch

by

Erin Ann Cech

Doctor of Philosophy in Sociology

University of California, San Diego, 2011

Professor Mary Blair-Loy, Chair
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Men and women occupy very different sectors of the labor market and women continue to be disadvantaged by this segregation in prestige, pay and power. Much research has examined how segregation is reproduced by discrimination and coercion, but as such actions become increasingly culturally illegitimate, we must begin to ask why gender inequality persists in the face of its illegitimacy. This project examines how two culturally-informed, individually-held sets of beliefs, gender schemas (beliefs about the

appropriate roles and "essential natures" of men and women) and self-conceptions (gendered beliefs about the self) inspire decision-making that reproduces occupational gender segregation. Using 5-year longitudinal panel data of students from four institutions (MIT, Olin, Smith and UMass), I study how gender schemas and self-conceptions influence students' major selection and their career decisions 18 months after graduation. This project theorizes a phenomenon I call "the self-expressive edge of sex segregation," the reproduction of occupational sex segregation through the individualistic, self-reflective, yet culturally-informed decisions of social actors. This dissertation shows, first of all, that gender schemas and self-conceptions are indeed co-constructed: our most individualistic beliefs—who we think we are as people—are informed by our adherence to cultural beliefs about gender. These culturally-informed self-conceptions not only help direct the distribution of men and women into already-segregated college majors and career fields, they help to reproduce the cultural sex-typing of such fields as "masculine" and "feminine" domains. As I show with a case study of engineering students, these individual-level beliefs can also interact with professional cultures in such a way that segregation is reproduced in the very process of learning to be a professional. In these mechanisms of sex segregation, cultural gender beliefs *act through* self-conceptions to influence career decisions. This cloaking of gendered career decision-making in individualistic self-expression may be particularly resistant to social change, as undermining individuals' self-expressive freedoms would be a culturally unacceptable method to reduce gender inequality.

The Self-Expressive Edge of Sex-Segregation: The Role of Gender Schemas and Self-Conceptions in College Major Selection and Career Launch

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Chapter 1—Introduction

"For every woman who worked as a doctor between 1998 and 2000,…83 women held clerical jobs, 15 operated factory machines, 14 were sales clerks, 10 were nurses' aides, and 6 served food." (Padavic & Reskin 2001, p. 74).

The bifurcation of individuals in society by gender is striking—and stunningly enduring. The United States has made great strides in advancing the position of women over the last century. Women can now vote, control their fertility, and are legally allowed to enter any educational and most occupational fields they desire. Social attitudes about women's roles have also changed: most Americans now believe that women should work outside the home if they wish to, even if they are mothers to young or school-aged children (Charles & Cech 2010; Kane 2000). Once the women's movement and second-wave feminism of the 1960s and 70s was in full swing and gender discrimination in employment and education became formally illegal, many women moved into previously male-dominated arenas. Between 1950 and 1985, women became doctors, lawyers and scientists in record numbers (England 2010). The general assumption was that gender inequality in all forms was slowly but surely on its way out (Johnson 1998).

But, by the end of the 1980s, this desegregation had lost its momentum. Women's entrance into previously male-dominated fields slowed through the 1990s, and the gender wage gap stopped narrowing in the 1990s (Cotter et al. 2011, England 2010). In order to attain gender parity in all occupations, 52% of men or women would have to change jobs (Cotter et al. 2006). This segregation is the most consequential factor in economic gender inequality more generally and disadvantages women in prestige, pay, and power (Jarell & Stanley 2004). The puzzle that motivates this project is, *decades after legal mandates for equality of opportunity and outcome, and cultural shifts that encourage gender equity, why is occupational sex segregation in the United States so resilient?*

Today, most of the legal restrictions to men's and women's participation in all corners of the labor market have been removed, and broadly-held cultural attitudes favor them doing so. I argue that the endurance of occupational sex segregation—one of the hallmarks of the stalled revolution—is reproduced most effectively through social processes that are neither coercive nor discriminatory. Rather, occupational sex segregation is reproduced in large part by the *voluntary,* self-expressive decisions of men and women. This self-expression is not as agentic as ideologies of individualism might lead us to believe, however—it is inextricably tangled up in the fabric of the gender structure.

As I explain in this chapter, scholars understand many of the institutional and interactional level processes that reproduce inequality through discrimination, exclusion, and stereotyping, but we know much less about the role of individual decision-making in occupational sex segregation, and how that decision-making is informed by cultural gender ideologies. Although self-expression is culturally exalted as the ideal motivator for career decisions in many post-industrial countries like the U.S. (Inglehart 1997), we lack a theoretical language for talking about these gendered self-expressive career decisions. The purpose of this dissertation is to develop such a theory and test it by first showing that self-understandings are co-constructed with gender beliefs, and then demonstrating how the expression of those gendered self-understandings reproduces sex segregation through inter- and intra-occupational mechanisms.

I examine self-expressive career decisions as an example of the cultural reproduction of inequality at the individual level—how people's internalization of cultural structures informs how they interpret and shape their own lives. The beliefs that people hold and the cultural processes they engage in affect how they treat others and how structures and institutions are organized. Cultural beliefs also influence how people come to understand themselves, and how they organize their lives around those self-understandings. This project explores how cultural beliefs interact with social-psychological career decision-making processes to reproduce occupational sex segregation.

The overarching mechanism I study is what I call the *self-expressive edge of sex segregation:* the reproduction of occupational sex segregation through deeply personal, self-reflective—yet culturally-informed—decisions of social actors. This dissertation investigates the co-construction of cultural gender beliefs and self-conceptions among a longitudinal panel of young men and women, and how these culturally-informed self-conceptions, in turn, inform their decisions about college majors and career launch. This stage in the life course is ideal for studying these processes because it is a time when self-expressive career decision-making is both most expected and most possible. Higher education is culturally understood as a vehicle for self-realization and expression, and the highly diversified college curricula in the U.S. was designed to maximize such self-expression (Charles 2011a, 2011b). This structural flexibility for self-expressive decision-making is unmatched in the labor force. However, I am also interested in the extent to which self-expression influences career decisions at career launch, once respondents have the structural constraints of a college degree certification.

I use a 5-year panel of over 700 students from four U.S. institutions: the Massachusetts Institute of Technology (MIT), the Franklin W. Olin College of Engineering (Olin), Smith College (Smith), and the University of Massachusetts, Amherst (UMass). I follow students from their freshman year in college through their graduation and 18 months into their career launch. These data are part of a National Science Foundation-funded project called "FuturePaths" (PIs: Carroll Seron and Susan Silbey). [1]

This chapter situates my approach in the context of existing explanations of occupational sex segregation at the institutional, interactional, and individual levels, and then introduces my theoretical framework. I then theorize the self-expressive edge of sex segregation and discuss my sample. I end by laying out my empirical approach to investigating this process, reviewing my findings, and foreshadowing their theoretical and policy implications.

1.1 Occupational Sex Segregation[2]

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[1] "FuturePaths: Developing Diverse Leadership for Engineering" was funded by the National Science Foundation under Grants No. 0240817, 0241337, 0609628, and 0503351 (PI's: Carroll Seron and Susan Silbey). Work for this project was supported by a National Science Foundation Dissertation Improvement Grant (#1029668). Pre-dissertation work, especially on issues of professional socialization, was funded by a UC Labor and Employment Research Fund Pre-Dissertation Grant (reference # 07-T-LERF-06-0086). Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author and do not necessarily reflect the views of the National Science Foundation or the UC Labor and Employment Research Fund. I thank Carroll Seron and Susan Silbey for allowing me to use these data for my project.

[2] In the book manuscript, I will likely extract this literature review from chapter 1 and make it a stand-alone chapter. This will make the introduction flow more smoothly, introduce my project more quickly, and be more reader-friendly to a more general audience. See Appendix 3 for the proposed chapters of what will be my book manuscript.

Occupational sex segregation refers to the differential distribution of men and women across occupations, places of work, and jobs (Padavic & Reskin 2002). This segregation has consequences: men end up in jobs that are, on average, better-paying, more powerful, and more prestigious than the jobs that women enter. Sex segregation exists across occupations (women and men work in different fields), across firms or establishments (women and men work in different sectors or types of organizations), and across jobs (women and men perform different work activities within the same firm). Although job and firm-level segregation is substantial (see Peterson & Morgan 1995; Tomaskovic-Devey 2003), and within-occupation segregation is important but comparatively less well understood (Cech 2011; Leahey 2007, Leahey et al. 2009), the most consequential segregation for prestige, salary and power is the distribution of men and women into different occupations (Kim & Sakamoto 2008; Mouw & Kalleberg 2010). These dimensions of segregation are more clearly represented as a distinction between *vertical* or *horizontal* sex segregation. Vertical segregation is where men are concentrated in higher-status and/or better-paid positions within each field or task; *horizontal segregation* is where men and women complete different types of tasks or roles (Charles & Bradley 2002). While vertical sex segregation had decreased slightly since the introduction of legislation such as Title IX and the Civil Rights Act, horizontal segregation remains strong in the U.S. (Charles & Grusky 2004; Padavic & Reskin 2002). There is, of course, a vertical component to occupational sex segregation between higher and lower status occupations, and female-dominated occupations are disproportionately represented among those with lower-status. While the factors I investigate could influence all levels of segregation, my primary interest and empirical focus is on horizontal segregation, how men and women end up in substantively different occupations.

An important contributor to occupational sex segregation is men's and women's segregation into male- and female-dominated college majors (Charles & Bradley 2002). As with segregation in the workforce, the desegregation of college majors slowed after the 1980s. The dissimilarity index of college majors has hovered around 19% since the mid-1990s (Gerber & Cheung 2008). College major and occupational sex segregation are reproduced by many of the same mechanisms (Jacobs 1989). While much of the sex segregation literature focuses on occupations, I note literature that addresses sex segregation in higher education in particular where appropriate. I review the literature on sex segregation in college majors in more depth in the beginning of chapter 3.

I am primarily concerned with sex segregation as it is manifested in high-skilled professional occupations and the educational preparation for those occupations. Low-skilled and manual work is highly sex-segregated and did not experience the levels of desegregation that high-skilled occupations enjoyed in the 1960s and 1970s. Paula England (2010) argues that this is because women who had the potential to increase their earnings also might have had the opportunity to enter into higher-status, female-dominated occupations. As such, fewer women became plumbers and mechanics in the 1970s and 1980s as those who became lawyers and doctors (England 2010). I largely agree with this structural argument and I recognize that workers in low-skilled jobs face tremendous constraints in their choice of employment. But, I do expect that, to the extent that they have any degrees of freedom in their employment decisions, there may be a self-expressive component to employment choices even among the working class. This study, however, focuses on men and women who are expected to enter—or remain firmly embedded in—the middle class.

Is it Biology?

Perhaps the most widespread explanation for occupational sex segregation in U.S. popular consciousness is that such segregation is our innate biological destiny. Gender is seen as synonymous with "sex," the anatomical distinction between "male" and "female" bodies, and anatomical differences are thought to be indicative of many other biological and neurological differences between women and men. These differences are believed to translate into discrepancies in men's and women's "innate" abilities and intuition. This gender=sex paradigm posits the explanation for gender inequality in intrinsic, unchanging, biological differences between men and women (Epstein 2007).[3]

As psychologist Cordeilia Fine puts it, "the sheer complexity of the brain lends itself beautifully to over-interpretation and precipitous conclusions" (2010, p. xxviii). Brain researchers have searched for biological sex differences in the lateralization of the brain, the sizes of men's and women's left and right hemispheres, and in the ways that men and women use different parts of their brains (Hurst 2003; Kimmel 2008). Such research assumes that small observed brain differences explain the divergence in men's and women's career outcome. Neurologist Simon Baron-Cohen, for example, concluded that the differences he identified in boy's and girl's manipulation of geometric shapes and

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[3] Shulamith Firestone (1970), for instance, theorized that all social inequality stems from an inherently unequal power distribution in men's and women's bodies. On average, male bodies are larger and stronger than female bodies. Females throughout history have been "at the mercy" of their biology as they get saddled with childbearing/childrearing responsibilities and depend on males for their physical survival. Whether or not Firestone's theory is an adequate representation of the earliest development of a gendered division of labor, she draws a clean causal connection between prehistoric living conditions and modern division of labor.

their interactions with toys signaled important cognitive differences that translate into different occupational abilities and preferences (2003).

Essentialist explanations of occupational sex segregation have long been criticized.[4] Yu Xie and Kimberlee Shauman (2003) for example argue that the following two premises must hold true for occupational sex segregation to be primarily biological: (1) the neurological sex differences must exist net of social differences, and (2) such differences must actually matter for people's abilities to be successful in occupations. Regarding the first, the difficulty comes in disentangling any actually-existing biological differences from gendered socialization and life experiences. As with all societies, anatomical categorization is accompanied by differences in treatment: men and women have been treated differently their entire lives, so they are likely to have developed slightly different brain structures over time (Fine 2010).[5] In order to be able to test whether neurological differences exist *net* of experiences in the social world, scientists would have to study pre-socialized infants. But, the socialization of children begins the moment the baby's sex is known—often times en utero (Valian 1999).

Furthermore, it is not at all clear that such differences would have any effects on men's and women's success as nurses, pharmacists, or accountants. Success in an occupation requires a complex and diverse set of abilities learned over the course of years of education and training (Xie & Shauman 2003).

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[4] "A 2006 report from the National Academy of Sciences found that after an exhaustive review of the scientific literature, including studies of brain structure and function, it could find no evidence of any significant biological factors causing the underrepresentation of women in science and mathematics" (Epstein 2007, pp. 8-9).

[5] Fine states: "We can't understand the gender differences in male and female minds—the minds that are the source of our thoughts, feelings, abilities, motivations, and behavior—without understanding how psychologically permeable is the skull that separates the mind from the sociocultural context in which it operates" (Fine 2010, p. xxiv).

Despite the controversy surrounding the "brain" question, the fact that many people *believe* gender differences to be biological is enough to help sustain these differences. The very cultural perpetuation of these biological explanations reinforces sex segregation—and the inequalities that accompany it—by casting segregation as a "natural" and "ageless" occurrence. Those who benefit from keeping the gender hierarchy intact can invoke these biological explanations as "proof" of the legitimacy and intractability of that hierarchy—a move made prominently by Harvard University president Larry Summers in 2005.[6] As Cynthia Epstein (2007) put it, "there would not be a firm basis for the subordinate condition of females were there not a widespread belief, rooted in folk culture, in their essential difference from males in ability and emotion" (p. 17)… "no society or subgroup leaves social sorting to natural processes" (p. 4).

Social Science Theories of Occupational Sex Segregation

Social science research, in contrast, addresses the myriad ways that occupational sex segregation is reproduced by the entrenched and enduring social and cultural distinctions between men and women. Broadly, these factors can be grouped into three categories: institutional-level factors, interactional-level factors, and individual-level factors (see Table 1.1). I borrow this categorization from Barbara Risman's conceptualization of the gender structure (2004). I prefer this categorization over the more popular "supply-side" versus "demand-side" distinction because of the latter's connection to classical economics and its implicit assumption that the two sides are mutually exclusive. These factors are all interconnected and continually reinforce one

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[6] Summers said, "so, my best guess, to provoke you, of what's behind all of this [discrepancy in the retention patterns of women and men in high-end engineering and science fields] is that…in the special case of science and engineering, these are issues of intrinsic aptitude, and particularly of the variability of aptitude." (http://www.president.harvard.edu/speeches/summers_2005/nber.php, retrieved 9/13/2010).

another. Cognitive biases, for example, buttress organizational-level practices and structures. This project, along with other research, demonstrates that workers' career choices and the biases, discrimination, and cultural beliefs that exist in the environments in which workers make these decisions, are inextricably linked. Although I discuss them separately and focus on the interaction between one particular institutional-level factor (i.e. cultural structures) and on individual-level factor (i.e. self-expression), I recognize these as parts of a larger, interconnected gender structure.

Institutional –level factors

Institutional-level factors of occupational sex segregation are those that reproduce sex segregation throughout the labor market. The most widespread institutional-level factors are the legal regulations and policies that promote or undermine sex segregation. The legal advancements of women in the twentieth century were accompanied by marked increases in education, literacy, employment, and rights to property ownership. The women's movement of the 1960s and early 1970s spurred several important legal advancements: the 1963 Equal Pay Act required employers pay to equitable wages for the same work, regardless of sex; Title VII of the Civil Rights Act (1964) prohibited employer discrimination; the 1968 Executive Order 11246 established affirmative action plans for hiring women and minorities; and Title IX in 1972 prohibited sex discrimination in all aspects of educational programs funded by the government (Bartlett et al., 2002; Epstein, 1988; Lorber, 2001). Women flooded into higher education and the professions after Title IX (McAfee, 1984). In 1970, 43% of women worked, 29% worked full time; in 2001, 74% of women worked and 42% of women worked full time (Hurst, 2003). This legislation makes gender bias formally illegal, but it works from the premise that gender inequality is solely derived from the malicious intent of corporate, governmental, or educational decision-makers. As decades of gender scholarship has shown, gender inequality is reproduced in more ways than through direct discriminatory treatment.

This legislation formally allowed women to enter any occupational or educational field they wished, and protected them from overt “first generation” discrimination (Prokos & Padavic 2005; Sturm 2001). Legislative precedence are only now beginning to be set for how to deal with “second-generation” discrimination, such as those against employed women who choose to become mothers (Williams 2000).

But just because women and men *could* pursue any degree or occupation they wished does not mean that cultural beliefs dictated that they *should*. Cultural beliefs about the appropriateness of women’s and men’s entrance into other-sex-typed college majors or jobs have become less entrenched in recent decades (Kane 2000), but such beliefs still feature prominently in the cultural mechanisms of segregation within professions, organizations, interactions, and, as I will show in this dissertation, in individual, self-expressive choices.

Of particular importance is the cultural ideology of “separate but equal” outcomes for men and women (Charles & Bradley 2002, 2009). Cultural ideologies of essentialism discussed above portray men and women as fundamentally different and differently capable at different tasks and therefore “naturally” suited for different types of academic degrees and jobs (Fenstermaker & West 2002; Ridgeway 2006). Similarly, the “egalitarian essentialism” frame combines the feminist rhetoric of equality of choice and opportunity with support for intensive mothering (Cotter et al. 2011).[7] These prominent cultural frames require the legal protections of women's rights of opportunity to all educational and occupational pathways, but exalt men's and women's rights to freely choose their career paths and to make their own decisions about whether to remain in the workforce after having children. These separate but equal beliefs, furthermore, do not challenge the deeply-held cultural stereotyping of male-typed and female-typed occupations, nor do they challenge the devaluation of female-typed domains.

The third institutional-level factor in occupational sex segregation are labor-market processes. Scholars have argued that, overall, men fight for or are assigned to the best, most prestigious jobs, leaving the rest for women (particularly women of color). This theory of queuing (Reskin & Roos 1990) attempts to explain the sorting of women and men across the labor market. While sorting based on pay and prestige may account for some sex segregation, and men and women are over- and under-represented, respectively, in the most prestigious and highly-paid occupations, there is only a weak correlation between the socioeconomic status of each occupation and the representation of women therein. Sex segregation, in other words, is not entirely based on socioeconomic occupational rankings (Charles & Grusky 2004).

Furthermore, the very movement of women (and occasionally men) into heavily male- or female-dominated fields can tilt the gender balance of these fields. *Feminization* is the process by which some academic fields or occupations move from being male-dominated or gender-neutral to female-dominated. In this process, the relative prestige and pay of the occupation declines. There are many examples of feminization, especially

[7] Messner (2009) calls this "soft essentialism."

in the service sector (e.g. telephone operators and bank tellers) where women crowded when the doors of the labor market were open to them in the 1960s and 1970s, but a scarce few have masculinized. One example is computer programming: "Women were hired as computer programmers in the 1940s because the work seemed to resemble simple clerical tasks. In fact, however, programming demanded complex skills in abstract logic, mathematics, electrical circuitry, and machinery…Once programming was recognized as "intellectually demanding," it became attractive to men. (Baca Zinn 2000, pg. 17)."

Once fields have feminized (or masculinized), they become culturally typed female or male, and attract entrants accordingly. This transformation is relatively rare, however (Charles & Grusky 2004). More often, majors and occupations underwent a slight up-tick in the representation of women in the 1960s through the 1980s (England 2010) and then stabilized. Similarly, some previously male-dominated academic majors such as business and biology became gender-neutral but have not completely feminized (Jacobs 1995).

Organizations, as gendered spaces, also help to reproduce occupational sex segregation. Joan Acker describes work organizations as "inequality regimes:" interlocking practices and processes that reproduce inequality in the workplace (Acker 2006). These inequality regimes mean differential power and control over organizational resources and unequal opportunities for employment, promotion, remuneration, respect and interesting work. Charles Tilly provides some insights into how inequality (through "categorical distinctions") becomes institutionalized in organizations. His argument can be summarized as follows: when critical agents are faced with paired and unequal categories of people at “crucial organizational boundaries,” exclusion and opportunity hoarding arises. These practices are reinforced through processes of isomorphism. As people work in, pass through, or are “processed” by these organizations, they receive different and unequal preparation for performance in new organizations (Tilly 1998).

Organizational practices of hiring can reproduce sex segregation when opaque or closed recruitment processes are used, as organizations that use such practices are less likely to reach diverse audiences of potential employees (Reskin 2000). Discriminatory organizational practices of promotion, furthermore, can create “glass ceilings,” preventing women from reaching leadership positions (Cotter et al. 2001). Informal networks and “boys clubs” can also limit women’s advancement opportunities (Blair-Loy 2001; Podolny & Baron 1997, Roth 2006).

Furthermore, the arrangement of time and lack of flexibility within organizations can make it more challenging for women—who are often burdened with a “second shift” at home (Hochschild 1997)—to remain in their current workplaces or to advance (Bianchi & Milkie 2010). Similarly, organizational-level cultural structures can disadvantage women. For example, the work devotion schema—the cultural mandate that employees show ultimate dedication to their careers and organization—can conflict with other cultural mandates women experience (e.g. the family devotion schema) and force women to make a choice between their families and their careers (Blair-Loy 2003). Such schemas can also be the basis of discrimination against women (especially mothers) who are believed to lack such dedication. Cultural ideologies of the “ideal worker” as having stereotypically masculine characteristics further disadvantage women (Barnett 2004).

While these organizational cultures and practices most directly reproduce vertical sex segregation, they can also affect horizontal segregation, to the extent that women and men are pushed out of or leave certain organizational circumstances, or seek organizational arrangements that are part of other occupations.

Beyond organizations, professional and occupational-level factors can reproduce sex segregation. In particular, professional cultures can influence what subfields and work activities men and women end up in within the professions' boundaries. Due to their nurturance and perpetuation by intra-professional processes of jurisdiction, closure, professional socialization, professional cultures provide the meaning systems and valuation hierarchies about professional work (Abbott 1998; Becker et al. 1961).[8] Professional cultures are important to the reproduction of occupational sex segregation because these cultures are not benign. The belief systems that give meaning to the tasks and expertise within a profession's boarders can have built within them biases about who is best suited to carry out those tasks and expertise. Elsewhere, I call these *professional competence schemas*, the seemingly-objective cultural models about professional competence held by profession members (Cech 2011). These schemas can influence teachers', employers' and co-workers' judgments of women's competence, and they can also affect men's and women's assessments of their own abilities in ways that reproduce gender inequality within these professions. Exclusionary ideologies can also be embedded in the cultural myths, humor and tales of origin of a profession, such as lore

[8] Non-professional occupations (e.g. truck drivers and hairdressers) may have cultures that help to reproduce segregation, but this is a site for further research.

about “founding fathers,” or within a profession’s norms of social interaction, such as the bravado typical of a surgical theater.

These professional cultures can influence not only who is considered appropriate for particular subfields and work activities—which is the basis for hiring and promotion biases—but also what subfields and work activities men and women see themselves as skills at and appropriate for (Cech 2011). Chapter 5 provides a more detailed discussion of the role or professional culture in educational and occupational sex segregation.

Interactional-level factors

At the interactional level, teachers, employers, classmates, and co-workers treat men and women differently and reward them unequally, which can lead to biased hiring, promotion, and allocation of work tasks. *Cognitive biases* can affect how young men and women are treated in their educational experiences, and by their peers, colleagues, and potential and actual employers. Cognitive biases are sub-conscious or pre-conscious processes whereby people immediately categorize individuals as “women” or “men,” and as result, make different assumptions about them, associate them with different realms of the social world, interact with them differently, and expect different things from them (Ridgeway 2006). The assumptions, explanations, etc. that accompany this categorization are connected to broadly-held cultural beliefs about gender, such as the distinguishing characteristics of masculinity and femininity or norms of behavior for men and women (Ridgeway & Correll 2004). Individuals carry these biases with them into every social context (Ridgeway et al. 2009).

The cognitive differentiation between women and men is the foundation for differential treatment and expectations of men and women (and boys and girls) from their earliest educational experiences to their day-to-day workplace encounters. This is demonstrated by a popular riddle: A father and son are in a car together and have an accident. The father is killed and the son is rushed to the hospital. A surgeon is called in to perform an operation. After looking at the boy's face, the surgeon exclaimed, "I can't operate on this boy, he's my son!" Who is the surgeon? (Padavic & Reskin 2002). The story is a riddle (perhaps less so today than in the 1970s when it was popular) precisely because of the expectation that most surgeons are men. The expectations that the practitioners of male-dominated fields are men and those of female-dominated fields are women biases both people's expectations of who will fill those roles and what occupations individual men and women are likely to enter. Thus, cognitive bias can inform how men and women are treated in their educational experiences and in the workplace. Men and women also recognize that they are held accountable to these established cultural scripts about men's and women's appropriateness for certain academic majors and occupations (Fenstermaker & West 2002; West & Zimmerman 1987). They may thus choose gender-typical educational or occupational paths in the expectation that doing otherwise would lead to social sanctions (Charles 2011a).

These cognitive biases have particular sway in organizations. The first way this can happen is through statistical discrimination (Bielby & Baron 1986), where a woman is discriminated against because, for example, her potential employer believes she is likely to have a child and leave the workforce, and thus would be a poor investment of company training time. Additionally, biases about women's and men's abilities to balance family and work responsibilities can lead to motherhood penalties (and fatherhood bonuses) (Budig & England 2001; Correll et al. 2007). Although these penalties and bonuses have been shown primary for wages, they also likely affect promotions and assignments to leadership positions.

Processes of othering and marginalization are also common. Extra-work social events such as “after work drinks” have important consequences for women’s inclusion in the work negotiations that happen in non-work social events (Blair-Loy 2001). This marginalization can also occur in higher education, where women in male-dominated fields experience “chilly climates,” being left out of classroom discussions, lab groups, etc. (Allison et al. 1982; Epstein 1993; National Academy of Science 2007).

Interactional-level factors help determine what college majors and occupations men and women are expected to enter, what kinds of jobs they are encouraged into or turned away from, and how they are treated once there. These interactional-level differences are important in determining whether or not people experience discrimination, and they are interwoven with the institutional factors described above and the individual-level factors described below.

Individual-level factors

Individual-level factors of sex segregation encompass the processes that affect men’s and women’s decision-making about their own college degrees and careers. One of the most popular individual-level explanations for occupational sex segregation is human capital theory. Economist Gary Becker (1993) argued that women obtain different levels of occupational success than men because they choose to invest less in “human capital:” formal education, long work hours, geographical moves, postponement of gratification, networking, etc. Human capital theory argues that women occupy different sectors of the labor market than men because they choose to invest less in the capital necessary for success in male-dominated fields. Factors that they assume to influence women's choices are their presumed desires to have and raise children, their desires for less stressful occupations, and their desire to put their families ahead of their careers. Motivated by their future roles as childrearers, so the theory goes, women prefer occupations with lower costs to labor market withdrawal so their salaries don't "atrophy" (Mincer & Polachek 1974; Okamoto & England 1999). Thus, any occupational sex segregation is due to the net effect of individual women's choices (Becker 1993; Bielby 1991). Relating to higher education specifically, Polachek (1981) and other argue that women prefer college majors that are connected to occupations with higher earnings right out of college and have flatter earnings profiles over time.

Human capital theory and other rational actor theories of sex segregation have come under attack from both sociologists (c.f. Blau & Ferber 1986; England 1982, 1984; Okamoto & England 1999; Reskin, 2000, 2003) and economists (D'Amico, 1987), but its cost-benefit framework still holds tremendous sway in the business world (Polachek & Siebert, 1994). These approaches are flawed on several accounts. First, they assume that men and women make fully-informed decisions about their education and employment in an effort to maximize their lifetime earnings. But men and women never have perfect information about their career decisions, and even if they did, most people's goals are much more complex than simply earning the most amount of money possible in their lifetime (England 1984). Additionally, married women are not more likely to work in female-dominated fields than single women (England, Chassie & McCormek 1982) and female-dominated fields are not more flexible than male-dominated fields (Glass 1990). In other words, it is unlikely that educational and occupational sex segregation is driven by men and women making such calculated decisions for the sole purpose of maximizing their long-term income.

Other social science research argues that men and women choose occupational paths depending on whether they believe those paths will be consistent with their existing or expected roles (Eccles 1987). It is consistent with the "egalitarian essentialism" frame that still expects intensive motherhood (Cotter et al. 2011). While this explanation has its roots in the same neoclassical economic theory that gave rise to human capital theory, this role expectation explanations emphasizes the culture foundations of these roles, rather than the rational calculation of long-term benefits and costs. For example, the family plans explanation suggests that women who value their future roles as mothers and spouses are likely to resolve existing or expected work-family conflicts in favor of those family plans Thus, women choose less male-dominated college majors and occupations (Eccles 1987, Eccles et al. 1984; Frome et al. 2006). Such role expectations may influence whether women and men decide to remain in certain occupational fields, but they are unlikely to explain why women do not enter male-dominated majors or occupations in the first place: my colleagues and I found that women's family plans were not related to their persistence in an engineering degree or their plans to enter the engineering workforce (Cech et al. 2011). Much less is known about how men's anticipated and actual roles influence their selection of occupations (Glass 1990). Our research found that men with strong family plans were actually less likely to intend to persist in engineering than women with similar family plans.

These role expectancy theories are based on the same flawed assumption that male-dominated fields are somehow less flexible than female-dominated fields.

However, college major and career decision-making is prefaced on far more than men's and women's family plans, and not everyone knows their family plans with any certainty, or knows which fields will be flexible when they are making crucial career decisions.

The first literature to really address the issue of gendered choices outside of women's expected family responsibilities is the socialization literature. These scholars study the socialization of boys and girls into different tastes and interests, which are supposed to lead them to be interested in different tasks and occupations in adulthood (Chodorow 1978, 1995; Risman 1998). The assumption is that a boy is socialized to play with trucks and so becomes a car mechanic; a girl is socialized to play with dolls and so becomes a nursery school teacher (Barone 2011). Although this socialization literature is important in explaining gendered preferences in activities at a young age, there is not necessarily a direct causal connection between childhood interests or aspirations and adult careers (Jacobs 1989). This socialization can inform what boys and girls think they like and are good at, but it is likely most important for fostering men's and women's desires to fit into socially-acceptable roles rather than planting in boys and girls the seeds of their future career aspirations.[9]

Of more immediate importance to men's and women's career decisions is the gendered notions men and women have of their skills and abilities. Recent social psychological literature on gendered self-assessments has shown the results of internalizing the cognitive biases discussed above. Shelley Correll (2001, 2004) shows

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[9] Like essentialist explanations, socialization rhetoric seems to have a certain cultural prominence in popular explanations for career decisions. I may find that men and women in this sample tell self-expressive stories about their college major and career launch decisions that include reference to having certain interests in their childhood. Many engineering students I interviewed in a past project (Cech 2007) explained that, even as kids, they "liked to take things apart."

that young women and men internalize the cognitive biases that men are better at math than women. Young women, net of math skills and performance, are less confident in their math abilities than men. Correll finds that women and men make decisions about their college majors based upon gendered notions of what they think they are good at.

The socialization literature attempts to explain men's and women's career decisions by tracing their interests far back to their process of learning what it means to be a gendered member of society. Certainly a few of these interests endure, but they are not enough to explain the vastly different choices men and women make in college major selection, for example. The research on gendered self-assessment, on the other hand, is important to the extent that men and women pursue majors and occupations they think they would be good at, but perceived skill is by no means a sufficient condition for career decision-making.

Perhaps because sociologists and social psychologists fear "blaming the victim" for occupational sex segregation or developing too agentic a theory of occupational sex segregation, we have little understanding of the effects of men's and women's own self-beliefs and preferences on the decisions they make about their careers. Although they are upheld as deeply individualistic and agentic, these decisions are fundamentally social because they are embedded within the same cultural beliefs and assumptions that influence how people treat others. We lack a language and theory to talk about how men and women actually make individualistic career decisions—how gender is constructed with what women and men *consciously* take into account when they are deciding on occupational paths, not just what may creep in through their subconscious.

While the institutional and interactional-level processes above mean that people are never fully free to make career decision on their own, fully-agentic career decisions are upheld as the ideal. No one wants to be told what to do and what to be when they grow up (Bellah et al. 1985). Individual career decisions are, however, never made outside the influence of social forces.

A central tenet of career decision-making in twenty-first century U.S. is *self-expression:* the selection of career paths based on self-reflective decisions about who individuals "think they are" and how they can best realize such expression. Because selves are gendered (Ridgeway 2006), existing gender theory would vaguely expect the outcomes of such self-expression to be gendered as well, but we as of yet do not have a theory to explain the specific mechanisms by which gendered self-expression leads to sex segregated career outcomes. The purpose of this dissertation is to develop such a theory and test it by first showing that self-understandings are gendered and then demonstrating how expression of those gendered self-understandings reproduces sex segregation.

I will make several caveats before introducing my theory of self-expressive career decisions. The first is that, by focusing on "choices," I do not mean to say that these choices are somehow outside the realm of the gender structure, or are not heavily constrained. On the contrary, I will show that they are deeply embedded within that structure. Second, I am not intending to disregard institutional and interactional-level mechanisms of the reproduction of occupational sex segregation: men and women face tremendous constraints on their occupational paths and discrimination is very much a reality in the modern labor force. However, to the extent that men and women have any degrees of freedom in their decisions about how to earn a living, (freedom exemplified in the long list of academic majors available at most universities) self-expression should matter. Obviously, the freedom for middle-class, college-going men and women to make self-expressive career decisions is greater than for men and women who are constrained to low-paid, low-skilled work. I study here the career choices of that former group. While I make no claims to the generalizability of these findings to the employment decisions of low-income, working class men and women, the tremendous cultural value put on self-expression may mean that even working class workers may use self-expression as a metric for decision-making within those constraints. I hope that this may be explored among a less privileged sample of men and women to test whether external constraints completely overwhelm any ability for self-expressive decision-making, or whether there are instances when, given the choice between two equally low-paid and low-skilled jobs, men and women make choices about which work “fits” them best, and thus reproduces occupational sex segregation.

Finally, there remains tremendous vertical segregation—and some horizontal segregation—by race/ethnicity (Tomaskovic-Devey 1993a). African-American, Native American, and Hispanic men and women are less likely to occupy the top rungs of organizational hierarchies, and they also tend to be under-represented in traditionally male-dominated fields such as science and engineering (Maume 1999; Tomaskovic-Devey 1993b). I control for the race/ethnicity of respondents in all of my models and comment on important differences I find, but my sample does not allow for systematic analysis of racial or ethnic differences in the role of gendered self-expression in the reproduction of horizontal segregation. I provide discussions when I find racial/ethnic differences in these gender patterns and provide a brief overview of these trends in the conclusion.

1.2 The Self-Expressive Edge of Sex Segregation

The answer to the question, “what do you want to be when you grow up” is increasingly expected to be met with a self-expressive answer. To the extent possible, the expression of individuality is a central factor in career decision-making (Cotter et al. 2011). The increased existential security of post-industrial societies allows diversion from strictly economic motivations for employment, at least for a privileged minority (Inglehart 1997, Inglehart & Welzel 2005). The increased importance of career counseling and occupational assessment tests all suggest the cultural value of careers that not only support individuals financially, but fulfill them and fit with their values. This self-expression is not simply desired—it is expected (Charles & Bradley 2009).

Recent literature has begun to argue that the resilience of occupational sex segregation is due in part to self-expressive processes. Maria Charles and Karen Bradley (2009) argue that many men and women make career decisions along still-popular essentialist notions of gendered tasks. Men and women may “indulge” their gendered selves in their career choices, seeking self-fulfillment and to be part of occupations that are extensions of themselves (Charles & Bradley 2009). They argue that, because selves are gendered, and because young people feel pressure from cultural expectations that men and women are suited for different social positions, that this self-expression helps reproduce sex segregation. Certain economic and cultural contexts, furthermore, provide more latitude for the “indulgence” of one’s gender in one’s decision-making than others. Advanced industrialized nations like the U.S. that have strong ideologies of self-expression have more latitude for such indulgence, which helps explain the greater occupational sex segregation in those nations. This important work suggests that the indulgence of gendered self-beliefs reproduces sex segregation and identifies the economic and cultural contexts under which such a process is most likely to operate. However, because Charles and Bradley analyze differences by nation, they cannot show this "indulgence" in action at the individual-level, nor do they empirically connect such self-expression to cultural gender beliefs.

My project takes off from this foundation to empirically establish the co-construction of cultural gender beliefs and the self-understandings on which self-expression is based, and specify inter- and intra-occupational mechanisms by which self-expressive decisions reproduce occupational sex segregation. Using over-time, multidimensional measures of self-conceptions, gender beliefs, and college major and career launch outcomes, I am able to study the variation among men and women as well as between them, and watch these mechanisms unfold over time.

Central to my theoretical framework is that self-expression encompasses actions that are thought to express one's self-concept.[10] The object of self-expression is rarely one's group identity (Lthough that sometimes happens), since the "cult of the individual" has long superseded group membership as Americans' defining identity feature (Durkheim [1983] 1994). Rather, the individual has become the pinnacle element of social life, and self-expression is expression of that individualism. A person's notion of his or her individualism is what social psychologists call *self-conceptions,* the beliefs we

[10] This summer, I will analyze the qualitative FuturePaths data to understand how respondents actually make self-expressive decisions—what they actually reflect on and take into account. This analysis will give me a much more refined notion of what this self-expression looks like from the perspective of the individual.

hold about ourselves as experiencing, functioning, unique individuals within a deeply individualistic culture (S. Epstein 1973, Gecas 1982).

Such self-conceptions are, of course, deeply gendered. Gendered self-conceptions arise out of initial socialization and are constantly re-created and reinforced through daily enactment and sanctions (West & Zimmerman 1987). As I argue in the next chapter, these self-conceptions do not necessarily *appear* gendered, however. They just appear *individualistic*. To point out the gendering of someone's self-conceptions would be seen as a violation of the entitlement to his or her "own bit of space" in which to be an individual (Bellah et al. 1985), 76). Thus, the gendering of self-conceptions gets cloaked by the very notion of what it means to define men's and women's own individualism that is guarded by a fortress of cultural beliefs that are at the heart of what it means to be an American (Bellah et al. 1985).

In order to more fully understand the reproduction of occupational sex segregation, we need to account for how people think they are making career decisions. It is not enough to show that these career decisions are self-expressive. We must also understand whether and how the self-conceptions that are the foundations of this self-expression are gendered—not only whether they are different between men and women, but how they are influenced by cultural gender beliefs. Understanding how self-conceptions respond to –and are crafted out of—cultural gender beliefs breaks us free from the need to connect these conceptions to childhood socialization experiences and allows us to watch how self-conceptions change over the lifecourse and how, in turn, affect career decisions over time.

I argue here that this gendered self-expression becomes a driving factor in the gendering of career decisions—especially among young college-educated men and women. Frank and Meyer (2001) argue that "specialized identity claims" (such as "man" or "woman") have tended to become absorbed into general notions of individuality. In other words, gender becomes in many ways a *fulfillment* of individualism (Meyer & Jepperson, 2000). "It becomes increasingly hard for a person with the identity of 'woman' to say she plays the role of 'housewife' because that's 'what women do.' Invoking the woman-mother identity-role matrix is illegitimate. The preferred accounting depicts the woman as a sovereign individual person with a taste for domesticity: 'That's what I choose to do'" (Frank & Meyer, 2001, p. 91).

The cloaking of gendered decision-making in individualistic self-expression has serious consequences for the reproduction of gender inequality in general—and for the reproduction of sex segregation in higher education specifically. If it is no longer legitimate to claim that "I am choosing this major because I am a man," and instead it is legitimate to claim "I choose this major because it suits me," then an enormous amount of gendered decision-making becomes encoded as individualistic self-expression. There is little indication that the sex-typing which produces these gendered aspirations have declined (Lueptow, Garovich-Szabo, & Lueptow, 2001), just that they have recently become encoded as personal indulgences of self-conceptions.

There is another trick to this encoding process: it is one thing to argue against gender-essentialist notions of majors "women do" or "men do." It is quite another to challenge someone's individualistic claim that a certain major is "what suits" him or her: "We believe in the dignity, indeed the sacredness, of the individual. Anything that would violate our right to think for ourselves, make our own decisions, live our lives as we see fit, is not only morally wrong, it is sacrilegious." (Bellah et al. 1985, p. 142). Thus, it becomes illegitimate to challenge one's self-conceptions because of the "sacredness" of the individual. Although it is a site that has tremendous influence in the reproduction of sex segregation, the indulgence of self-conceptions is effectively culturally off-limits as a site for addressing and reducing gender inequality.

Therefore, I argue that a key mechanism by which sex segregation is reproduced is that gendered self-beliefs become encoded in individualistic self-conceptions, legitimated, and are resultantly off-limits to policy regulation and feminist social action. However, this mechanism in the reproduction of sex segregation is particularly resistant to change. It is culturally illegitimate to either challenge people's beliefs about themselves or to reduce their self-expressive freedoms. I call this the self-expressive edge of sex-segregation.

This approach also sheds light on a broader theoretical question in the gender literature—how is the gendered self and the gendered structure co-constructed? This project joins the turn in inequality literature of theorizing gender as enacted on an everyday basis, with the possibility of alteration at every application (Fenstermaker & West 2002; West & Zimmerman 1987). Gender scholars explain the intractability of the gender structure in spite of this continual re-enactment by arguing that gender is structuring not just at the macro level but also organizes social practices at the interactional level and "selves" at the individual level (Ridgeway & Correll 2004; Ridgeway et al. 2009). Seeing gender as structured enactment is, in essence, a particular case of the relationship between agency and structure (Blair-Loy 2003; Risman 1998). A key aspect to understanding the power of gender as a social structure, then, is understanding the co-construction of the gender structure and the gendered individual—an aspect that is thus far under-theorized and under-researched.[11]

But how is the gender structure inculcated into the gendered individual, such that the gendered individual reproduces the gender structure through his or her everyday actions? I follow other cultural sociologists (e.g. Alexander & Smith 2003; Bourdieu 1984; Hays 1994; Lamont 2000) in arguing that macro, meso, and micro-level mechanisms of culture instill ideologies of superiority, inferiority, and difference into patterned behaviors and cognition. I theorize and test mechanisms through which beliefs about the gender structure can influence perceptions of oneself (*prescription, extrapolation* and *biological fatalism*) and processes by which self-conceptions may influence one's gender schemas (*reinforcement* and *subversion*).

With this co-construction identified, I then examine how these cultural structures, ingrained at the individual level, reproduce unequal structures. I use several self-conceptions—I am "feminine" (vs. "masculine), "unsystematic" (vs. "systematic") and "people-oriented" (vs. "things-oriented")—to predict whether respondents choose male- or female-dominated majors. I capture sex segregation with a measure of respondents' *sex segregation scores,* the percent women in respondents' degree field.

College majors are an important determinant of sex-segregation, but the relative freedom of movement across majors means it is much less costly for men and women to change fields for self-expressive reasons than once they are in the workforce. The case of

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[11] This approach might be a way to think about a "gender habitus," the ways that preferences and tastes of men and women reproduce inequities between them. I may develop this argument in the book manuscript.

greater consequence to the reproduction of occupational sex-segregation is whether self-conceptions actually influence men's and women's choice of male-dominated or female-dominated fields at career launch. I thus examine how self-conceptions predict men's and women's career launch decisions net of their college degrees.

Beyond these processes, *intra-field* cultural factors may also influence the ways in which gendered self-conceptions lead to persistence in or attrition from individual fields. As a case study of the intra-field cultural processes of sex-segregation, I focus on a subsample of engineering students. I examine the ways in which gender schemas and self-conceptions filter their development of gendered professional identities, and how those gendered professional identities, in turn, lead to differential persistence in the field of engineering. I next describe the data I use in detail and preview my results in the chapters that follow.

This dissertation tells a story about *mechanisms*—the processes by which self-conceptions are co-constructed with gender schemas and how these gendered self-conceptions, in turn, reproduce or undermine sex segregation in college majors and occupations. To illuminate these mechanisms, I examine the effects of several self-conceptions: "I am feminine," "unsystematic," and "people-oriented." These serve as useful exemplars of self-conceptions and if my data allowed, I could have substituted many other self-conceptions (e.g. "I am nurturing" or "I am aggressive") in this analysis. While each of these self-conceptions is substantively important in its own right, I am more interested in the ability of these self-conception measures to illustrate the mechanisms I am hypothesizing.

1.3 Sample

Data

This project relies on longitudinal panel data collected from four US institutions of higher education: the Massachusetts Institute of Technology (MIT), The Franklin W. Olin College of Engineering (Olin), Smith College (Smith), and the University of Massachusetts, Amherst (UMass). These schools are described in detail below. These data are part of an NSF-funded project called "FuturePaths," which surveyed a cohort of students at each institution once a year for five years, tracking them whether they remained in school, changed majors, or left college altogether.

Longitudinal panel data are best suited for identification of intra-individual change, and inter-individual similarities or differences in that change (whether individuals change in similar or different ways), for analysis of interrelationships between behavioral change (whether certain changes are correlated with each other), and for analysis of causes or determinants of intra-individual change (why individuals change from one period to another) (Baltes and Nesselroade 1979). These data are thus well-suited for documenting intra-individual changes in self-conceptions and gender schemas over time, the inter-individual differences in those changes, and examining the structural and cultural effects of self-conceptions and gender schemas on occupational sex segregation.

The survey data contain many different dimensions of my individual-level measures of interest (self-conceptions, gender schemas, and provisional identity measures) and detailed majors and career-launch data. The longitudinal nature of this study makes it ideal to examine changes in self-conceptions and gender schemas, career plans, and professional identity over time. Although the selection of schools is not random (and likely unrepresentative of the population of colleges in the US), I will use the contexts of these schools to my advantage.

The majority of my analysis will use yearly survey data collected through online surveys administered to the students via e-mail (The students received between $25-50 for completion of each survey). Significant attempts were made to sustain the response rate. The incentives were structured to taper off after intervals of 24 hours, 72 hours, and one week. Non-responders were sent no fewer than four e-mail reminders over a six-week period. Regardless of the previous years' response status, the entire cohort was invited to participate in each year's survey round. See Table 1.1 below for survey retention rates.

Description of Institutions Included in Sample

MIT:

Founded in 1865 in Cambridge, Massachusetts, MIT is among the most elite programs in undergraduate education. As of 2008, it had 4,156 undergraduate students[12] (30% women). The majority of students are located in engineering (60%) and science (27%) and the institution defines its curriculum in terms of its excellence in science and research. For most of the twentieth century, MIT's undergraduate student body, although not formally restricted, was nonetheless predominantly male. Since 1970, the institute has made a concerted effort to diversify its student population by gender and race. "The mission of MIT

[12] Detailed enrollment data: http://web.mit.edu/facts/enrollment.html

is to advance knowledge and educate students in science, technology, and other areas of scholarship that will best serve the nation and the world in the 21st century."[13]

University of Massachusetts, Amherst:

Founded in 1863 in the town of Amherst, the University of Massachusetts is representative of the public (usually land grant) universities that graduate the majority of college students in the United States.[14] Housed at the flagship campus for the state, the UMass offers both graduate and undergraduate degree programs in the standard varieties of science, engineering, liberal arts and social sciences curricula. UMass house an overall undergraduate student body of 20,540 (52% female)[15] and offers 90 areas of undergraduate study. Like MIT, UMass has developed programs to respond to the under-representation of women in male-dominated majors. It has developed various internship opportunities, mentoring programs, awards, and other forms of outreach to ensure the retention and graduation of a more diverse student body.

Smith College:

Smith, founded in 1871 near Springfield, Massachusetts, has historically had success at producing women leaders with a commitment to social service. It also has a strong record in promoting women in male-dominated fields. Smith has an undergraduate enrollment of 2,600 students.[16] As the first all-women engineering program, Smith's Picker Engineering Program seeks to enhance the presence of women in engineering by its focus on engineering as "a liberal art and as a profession in service to humanity." The Picker program integrates engineering education into Smith's liberal arts curriculum to produce what the college

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[13] Retrieved from MIT's website: http://web.mit.edu/aboutmit/
[14] Retrieved from UMass' website: http://www.umass.edu/umhome/about/
[15] Detailed enrollment data: http://umass.edu/oapa/publications/factsheets/
[16] Detailed enrollment data: http://www.smith.edu/about_justthefacts.php

believes will be an innovative program of socially responsible leaders for the engineering profession.

Franklin Olin School of Engineering:

Founded just outside of Boston in 2002 as the first stand-alone, independent engineering college in nearly a half century, Olin College of Engineering is attempting to revolutionize engineering by addressing one of its most persistent problems: the unattractive and disabling image of engineers (Astin 1997). Through a model of hands-on, project-oriented, collaborative education, Olin hopes to produce a new generation of leaders who have learned to harmonize engineering with entrepreneurship. All of its 300 undergraduate students (40% women) take courses in a variety of engineering specialties as well as generic engineering, design, various sciences and humanities. Every student receives a four-year, full-tuition scholarship. Mission statement: "Olin College prepares students to become exemplary engineering innovators who recognize needs, design solutions, and engage in creative enterprises for the good of the world."[17]

While these schools provide an illuminating cross-section of the types of institutions in the US (private research university, single-sex liberal arts, public land-grant, small elite engineering college), as a group they are not necessarily representative of the US college population as a whole. Others, (e.g. Jacobs) have conducted excellent analyses of national trends in sex segregation using representative samples. In contrast, this project attempts to identify mechanisms by which gendered beliefs influence major selection and choice of occupation using detailed attitudinal measures and longitudinal

[17] Retrieved from Olin's website: http://www.olin.edu/about_olin/overview.asp

panel data, with the hope that the mechanisms identified here can be investigated in later research using national samples.

All four schools are located in Massachusetts, which helps to provide regional homogeneity. Despite the schools' geographic proximity, there are several ways the student body in each school might differ. I expect the students at MIT and Smith (private schools) to come from wealthier socio-economic backgrounds than those at UMass. Olin students received full tuition, so the SES of their students is likely determined by social capital, not purely economic, considerations. Smith students, as attendees of a single-sex college known for its social activism and gender egalitarian ideals, are likely more politically liberal than students at the other schools. Olin students, as part of an engineering-only school, are likely more politically conservative (as engineering students are generally more politically conservative than students in other majors [Astin 1993]). While this variation presents many challenges for my empirical analysis, it also allows me to investigate how these processes operate within different organizational contexts.

Table 1.1 presents the response and retention rates for the sample. The entire freshman classes at MIT, Olin, and Smith, along with 332 randomly-selected UMass freshman, were invited to participate in the study, with an overall response rate of 35.8%.[18] The size of the response rates indicates that there may be systematic bias in initial response rate. Following Blair-Loy and Wharton (2002) and others, I conducted a systematic analysis of my sample to determine the likelihood of non-response bias (Winship & Mare, 1992). Response bias analyses run between the sample and the 2003

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[18] Students entered the panel in a two-step process: first, students were invited to participate, and then the survey was distributed. Students who took the first survey were included in the panel.

population data at each school show that the sample marginally over-represents Asian students at MIT (p=.08) and marginally under-represents African-American students at UMass (p=.09). No other gender or race/ethnicity differences were found.

1.4 Overview of Approach and Findings

The central purpose of this project is to identify individual-level, self-expressive mechanisms that reproduce occupational sex segregation. Broadly, I argue that the expression of gendered self-conceptions reproduces sex segregation by influencing men's and women's career decisions. Chapter 2 begins by theorizing self-conceptions in a more sociological way and how they are co-constructed with gender schemas. I conceptualize gender schemas and self-conceptions in the context of social-psychological literature and theorize and empirically investigates the relationships between these two individual-level beliefs. Specifically, I analyze the relationships between perceptions of oneself as "feminine" or "masculine" and several dimensions of gender schemas: gender role beliefs (e.g. "a wife should take her husband's name at marriage"), conceptions of their gender category (e.g. "other members of my same sex are emotional"), and essentialist beliefs (e.g. "some jobs are better suited for men than women"). Using structural equation modeling (SEM) with latent variables, I determine whether respondents' gender schemas in year 2 predict their perceptions of themselves as feminine in year 5. I find that gender schemas influence respondents' self-conceptions through processes of prescription, extrapolation and biological fatalism, and self-conceptions influence gender schemas through reinforcement and subversion. These results indicate that the gendered individual and individual-level beliefs about the gender structure are indeed co-constructed: respondents' beliefs about themselves are informed by their cultural beliefs about gender, and their understandings of the gender structure are also influenced by their self-perceptions.

In chapters 3 and 4, I ask whether these culturally-informed self-conceptions actually influence career decisions-making in ways that reproduce occupational sex segregation. Using three measures of self-conceptions (I am “feminine,” “unsystematic,” and “people-oriented”), I find that self-conceptions predict whether respondents make decisions that reinforce their fields of study as masculine and feminine domains. Furthermore, self-conceptions influence whether respondents change into more male- or female-dominated majors, and are also related to the likelihood of choosing some degrees over others.

In chapter 4, I analyze how these three self-conceptions are related to the percent women in respondents’ career launch field 18 months after they have graduated. I also run models controlling for the extent of sex-segregation in respondents’ degrees to determine whether these beliefs have an effect over and above respondents’ previous career decisions. I find that self-conceptions predict the sex-segregation of respondents’ career launch fields, even net of the structural constraints imposed by their degree credentials. These culturally-informed self-conceptions not only lead respondents to reproduce the *demographic* sex-segregation of their career launch fields, but also help reproduce the *cultural sex-typing* of male- and female-dominated fields as “masculine” and “feminine” domains.

Chapters 3 and 4 paint a broad picture of the effects of self-conceptions on the individual-level reproduction of occupational sex-segregation. In chapter 5, I argue that self-conceptions reproduce sex segregation by filtering professional identities. Among a subsample of engineers, I measure professional identity development by tracking two sets of measures over time: what they personally find important (e.g. "creating or managing technology") and what they value in their concept of a successful career (e.g. "understanding how people use machines"). I find that women's self-conceptions influence their development of less traditional engineering identities than men, and these gendered professional identities lead women to be less likely than men to continue in an engineering degree or to remain in this male-dominated field after graduation.

Chapter 6 reviews these findings and suggests their implications for sociological theory and policy. This project shows how our most individualistic beliefs—who we think we are as people—is informed by our adherence to cultural beliefs about gender. These culturally-informed self-conceptions help direct the distribution of men and women into already-segregated college majors and career fields, and help to reproduce the cultural sex-typing of such fields as "masculine" and "feminine." As shown with a case study of engineering students, these individual-level beliefs can also interact with professional cultures in such a way that segregation is reproduced in the very process of learning to be a professional. In these mechanisms of sex segregation, cultural gender beliefs *act through* self-conceptions to influence career decisions. This cloaking of gendered career decisions-making in individualistic self-expression may be particularly resistant to social change, as undermining individuals' self-expressive freedoms would be a culturally unacceptable method to reduce gender inequality. Importantly, however, my findings suggest that we are not fully determined by our cultural beliefs: my research suggests that the cultural gender beliefs we adhere to, and those we choose to reject, is shaped by how we understand ourselves. I discuss the implications of these findings for policy initiatives and social action. The chapter closes by suggesting how this focus on individual-level determinants could be extended to understanding the self-expressive edge of inequality more generally.

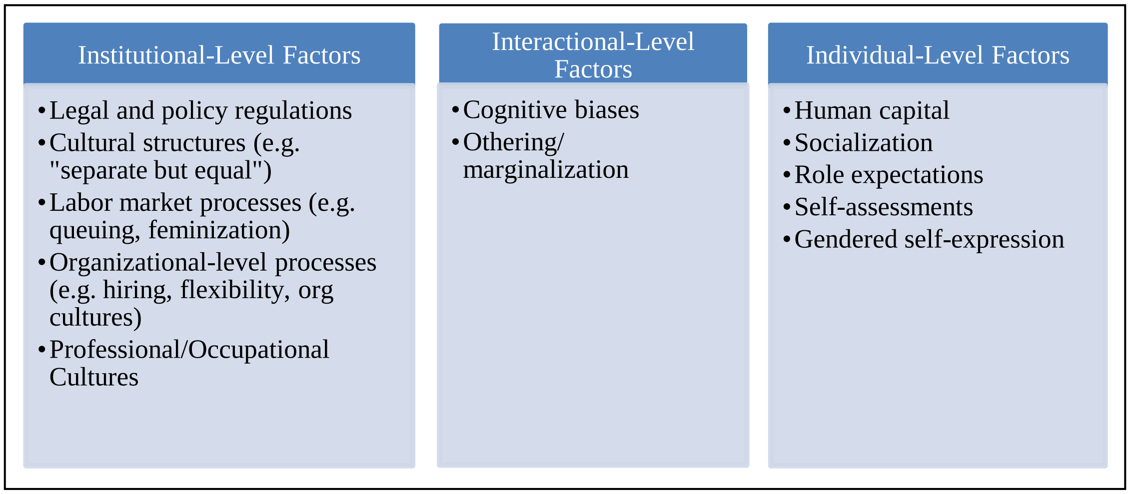

Figure 1.1: Institutional, Interactional, and Individual-Level Factors of Occupational Sex Segregation

Table 1.1: Respondent Response and Retention Rates

	Population Size		Initial Panel Size	Initial Response Rate
Original Sample	2063		739	35.8%
MIT	1020		298	29.2%
Olin	75		55	73.3%
Smith	636		252	39.6%
UMass	332		133	40.1%
	Year of Survey	Response Frequency	Yearly Retention Rate (from Y1 panel)	Yearly Response Rate (from original population)
Took Year 1	2004	739	---	35.8%
Took Year 2	2005	465	62.9%	22.5%
Took Year 3	2006	517	70.0%	25.6%
Took Year 4	2007	559	75.6%	27.1%
Took Year 5	2008	487	65.9%	23.6%

The Self-Expressive Edge of Sex-Segregation: The Role of Gender Schemas and Self-Conceptions in College Major Selection and Career Launch

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Chapter 2—The Co-Construction of Gender Schemas and Self-Conceptions

What are self-conceptions and gender schemas, and how are they constructed together over time? This chapter conceptualizes these beliefs in the context of social-psychological literature and investigates the empirical relationships between them. In part one of this chapter, I provide definitions and theoretical foundations for self-conceptions and gender schemas, and describe the general trends on these measures. I also track how respondents' gender schemas and self-conceptions change over time—an important indication of the stability or flexibility of these beliefs. In part two, I theorize several processes of co-construction between self-conceptions and gender schemas. Specifically, I argue that gender schemas can influence self-conceptions through processes of *prescription*, *extrapolation,* and *biological fatalism*. Self-conceptions may, in turn, affect gender schemas through processes of *generalization* and *reinforcement*/*subversion*. Using structural equation modeling, I analyze the relationships between perceptions of oneself as masculine or feminine (the central axis of cultural distinction between males and females) and several dimensions of gender schemas: gender role beliefs, gender category beliefs, and gender essentialist beliefs.

I find in part one that there are large differences in the ways men and women in my sample view members of their gender categories, understand gender roles, and perceive women's and men's "essential natures." Men's and women's self-conceptions are gendered in expected ways, but are less polarized than their perceptions of their gender categories. This polarization of gender category beliefs, relative to self-beliefs, helps sustain the illusion of strong differences in the characteristics of men and women. I also find that respondents' self-conceptions and gender schemas are fairly stable over time, which helps to perpetuate the gender structure.

The purpose of part two is to theorize and demonstrate mechanisms by which self-conceptions and gender schemas are co-constructed—the mechanisms by which men and women internalize the gender structure and, in turn, how their self-beliefs support or undermine their adherence to that structure. I find that respondents' self-conceptions are informed by cultural beliefs about gender, and their understandings of the gender structure are influenced by their self-conceptions. I discuss how the particular ways these mechanisms play out—especially the notable absence of a generalization effect—helps reproduce the gender hierarchy. [19] I end by discussing the implications of these results and lay the groundwork for the empirical analyses of chapters to come.

PART ONE: THEORY AND DESCRIPTIVES OF GENDER SCHEMAS AND SELF-CONCEPTIONS

How do cultural beliefs reinforce the gender structure? Beliefs about the characteristics of and relationships between members of this fundamental social dichotomy get embedded within institutions and organizations and reproduce this structure at the macro and meso levels (c.f. Acker 2006, Blair-Loy 2003). But cultural beliefs also influence how individuals understand themselves and make decisions about their lives. A central argument of this project is that the beliefs that individuals hold about gender and about themselves—beliefs which are culturally informed and institutionally shaped—guide individuals to find their place within the gendered

[19] In the future, I plan to develop this theoretical contribution as a separate article that I will submit to a journal before the book is complete. In that article, I would remove the empirical section in part one of this chapter and possibly parallel the analysis in part two using unsystematic and people-oriented self-conceptions in addition to feminine self-conceptions.

structure. In order for me to illustrate how this happens, I must first describe how gender schemas and self-conceptions inform one another over time. I begin by defining and contextualizing these two sets of beliefs and presenting the means and standard deviations of the variables I use to measure gender schemas and self-conceptions. Part two of this chapter theorizes and empirically investigates the co-construction of these beliefs over time.

2.1 Gender Schemas

Gender schemas are, broadly, beliefs about the people who make up the social categories of “men” and “women,” and the proper power and status relations between them. Scholars in sociology and psychology have used this term in divergent ways, so I define these two approaches before presenting my conceptualization of gender schemas.

Psychologists have used the term “gender schemas” for several decades. Psychoanalytical, social learning, and cognitive development theorists argue that one’s “core gender identity” is created early in life and does not change over the life course. One becomes a “man” or a “woman” as a part of this process and the traits culturally associated with “men” and “women” are assumed to be attached to this identity. According to this literature, gendered perceptions are accurate because men and women *are* different, do different tasks, and like different things (Bem, 1984; Stoller, 1968).

Other psychologists reject these essentialist developmental theories of gendered thinking and argue instead that we learn “gender-schematic processing” from our childhood socialization experiences that guides our *perceptions* of a polarized gendered world (Bem, 1984, 1993). Here, “gender schemas” are cognitive structures and networks of association that organize individual perceptions. People use gender schemas to evaluate their own and others' adequacy, and men and women develop interests and preferences in accordance with these schemas. Alber and Hasher (1983) extend the notion of gender schemas to include the processes by which the cognitive structures of gender schemas select and actively modify personal experiences in order to fit within a coherent representation of gender (Renn & Calvert, 1993). More recently, Valian (1999) argued that gender schemas lead to the formation of "hypotheses" about men and women which bias the treatment and expectations of others in gender-confirming ways.

These psychological conceptualizations focus almost exclusively on the cognitive, gender-schematic thinking of individual actors. Sociological perspectives on gender schemas, in contrast, start with the social structures that psychological theories of individual gender beliefs simply presuppose. William Sewell (1992) argues that schemas are procedures that are generally applied to the enactment and reproduction of social life. Schemas are "virtual" (as opposed to actual) and operate at different depths; they are shared by many people and are rooted in culture. The power of schemas—and also their potential for alteration—comes from their transposibility into new social situations. Sewell firmly embeds his definition of schemas in social structures (schemas are, along with resources, inextricable from structures), but he provides little account for how these schemas are deployed by individuals.

Cecelia Ridgeway, Shelley Correll and colleagues describe how such individual gendered thought processes can emerge from broader cultural beliefs about gender and how these thought processes, in turn, bias peoples' evaluations of themselves and others (Ridgeway 2006; Ridgeway & Correll 2004; Ridgeway et al. 2009). Cultural beliefs "define the distinguishing characteristics for men and women and how they are expected to behave" and are "rules for enacting the social structure of difference" (Ridgeway & Correll, 2004, pg 511). These cultural beliefs result in deeply-held cognitive binaries that people carry with them into every social-situational context and engage when evaluating their own and others performances and behaviors (2006).

Other scholars move beyond cognitive conceptions of gender schemas by emphasizing the emotional and moral dimensions along which schemas operate. Drawing from Sewell's work, Mary Blair-Loy (2003) argues that cultural schemas are "ordered, socially-constructed and taken-for-granted frameworks for understanding our world" (pg 220). These schemas shape both the structure of society through their "salience in institutions, interactions, and culture," and shape life trajectories by "ordering cognitive processes, evoking emotional responses, and acting as moral universes" (pg. 176). Gender schemas are powerful not only because they organize our thinking and our interpretations of our life events, but also because they evoke emotional responses and provide us with moral prescriptions for actions and decisions.

Building from Blair-Loy's conceptualization, I define gender schemas as shared cultural models that, once internalized and taken for granted, inform individual life trajectories by organizing cognition, emotions, and morality. These shared cultural models on which gender schemas are based can vary widely in progressiveness or traditionalism, in how widespread they are (nationally-held ideologies or specific to a particular subculture), and in how explicitly in conflict they are with other cultural models. Dominant cultural ideologies about gender exist in the U.S. that act as widespread cultural models. As Connell argues about hegemonic masculinity (2005), the cultural model of proper behavior for men and women is widespread and known by both dominant and non-dominant groups, and by both men and women. These cultural models, furthermore, are built into educational, legal, and other institutions (Blair-Loy, 2003). Although subcultures or countercultures may have their own set of beliefs about gender, I am interested here in dominant, widely-held cultural models of gender.

Broadly, gender schemas can include several different dimensions of beliefs about the gender structure. I investigate three of these dimensions: the proper relational dynamics between men and women (*gender role beliefs)*, beliefs about the shared characteristics of the individuals that make up those categories (*gender category beliefs*), and the extent to which such characteristics are believed to be inscribed in physiological or natural differences (*gender essentialist beliefs*). [20]

Gender Role Beliefs. First, shared cultural models about gender often include beliefs about the proper division of paid work and family responsibilities among men and women. The most traditional beliefs in the U.S. advance a separate spheres ideology where men and women are perceived to be responsible for separate and non-overlapping realms of society (i.e. work and family). More progressive beliefs assume that men and women should have at least some responsibilities in each realm (Davis & Greenstein, 2009).

Gender role beliefs, because they specify power dynamics in those roles, are the most explicit cultural representation of the gender hierarchy out of the three dimensions of gender schemas I study. As I illustrate, other gender schema beliefs sit more

[20] Another dimension, which I plan to write a separate article on in the future, is beliefs about the legitimacy of the unequal gender structure itself: whether respondents recognize and disprove of the power relations between men and women.

comfortably along the "separate but equal" ideology discussed in chapter 1 (Charles & Bradley 2009).

Gender Category Beliefs. The second dimension of gender schemas I investigate are beliefs people hold about the characteristics that define members of their gender category. Gender category beliefs help maintain the perception of difference between men and women. In order for the gender structure to be perpetuated (and legitimated), men and women must be portrayed as different, with different characteristics. Mimi Schippers (2007) puts these socially-constructed differences at the center of the maintenance of the gender hierarchy. She argues that stereotypical gender qualities (e.g. "masculine," "emotional," "cooperative") are clustered into configurations that become the idealized notions of hegemonic masculinity and femininity. It is the *complementary* and *hierarchical* relationships between the characteristics of hegemonic masculinity and femininity that help reproduce male dominance. Along these lines, Schippers defines hegemonic masculinity as "the qualities defined as manly that establish and legitimate a hierarchical and complementary relationship to femininity." Hegemonic femininity, then, is "the characteristics defined as womanly that establish and legitimate a hierarchical and complementary relationship to hegemonic masculinity" (Schippers 2007, p. 94).[21] Thus, men's and women's perceptions of the characteristics that define their own gender category—and of the other gender category (which I cannot measure with these data)—are important to the maintenance of the gender structure. These gender category beliefs

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[21] For Schippers, the complementary and hierarchical relationship between hegemonic masculinity and femininity are central to the maintenance of gender hegemony. She thus disagrees with Connell (2005) that there is no hegemonic femininity; she argues instead that hegemonic femininity is that which provides the contrast that grounds the complementarity and hierarchy is based. Hegemonic femininity, in other words, is the femininity against which hegemonic masculinity is contrasted.

indicate men's and women's adherence to the complementary and hierarchical relations between men and women.

Despite the importance of the cultural distinction between men and women, in general, men and women are much more alike than they are different. Cultural distinctions between men and women that exist in nearly every society (Epstein 1999; Rubin 1975).[22] This distinction-making is key to upholding the gender structure. I capture the extent of gender-stereotypicality in respondents' gender category beliefs by using questions about the characteristics men think are held in common by other men, and what characteristics women think are held in common by other women.

Gender Essentialist Beliefs. The gender structure is maintained not only because people believe men and women to be different and should perform different roles, but also because of the perpetuation of compelling explanations of why these differences exist. "Biological explanation is the master narrative holding that men and women are naturally different and have different intelligences, physical abilities, and emotional traits" (Epstein 2007, p. 7). Beliefs that men and women are "inherently" different, and that such differences define men's and women's talents, behaviors, and affect, are called "essentialist" beliefs.[23]

As noted in chapter 1, this gender=sex paradigm anchors the explanations of gender differences in intrinsic, unchanging, biological differences between males and

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[22] Epstein (1999) argues that this persistent emphasis on gender differences is caused by a public inattention to the evidence put forward by social scientists, incomplete or inappropriate models for understanding gender, ideological agendas, confusion between cause and effect, and a focus on sex as a primary cause of behavior.

[23] In the stand-alone article that I will develop based on this chapter, I may examine how gender essentialist beliefs predict gender category beliefs. My preliminary research (not shown) demonstrates that essentialist beliefs strongly predict men's perceptions of other men as masculine and women's perceptions of other women as feminine. Gender essentialist beliefs may be the explanation people use for their stereotypical views of their gender category.

females. The salience of biological essentialism as a *cultural* explanation for gender differences itself can reproduce inequality. The perpetuation of these biological explanations reinforces gender differences as a "natural" and ageless occurrence and are sometimes invoked as "proof" of the gender system's legitimacy.[24]

I examine the extent to which men and women adhere to "more traditional" or "stereotypical" beliefs along each of these three dimensions. Traditional beliefs about gender roles depict the proper division of work and family responsibilities as men holding the breadwinner role and dominating the work and public spheres (Davis & Greenstein, 2009), while women's responsibilities are primarily in the domestic sphere. Women's interests and power are assumed to be subordinate to men's, particularly in the realm of marriage (Kane, 1998). I am also interested in the extent to which men and women view members of their gender categories in ways consistent with hegemonic masculinity and femininity.

Second, traditional cultural models of gender also often promote essentialist beliefs about men's and women's talents, and portray members of each gender category in gender-stereotypic terms. Non-essentialist cultural models of gender, on the other hand, recognize the socio-cultural basis of gender inequality, rather than a biological foundation.

Interestingly, Charles and Bradley (2009) suggest that progressive gender role beliefs can sit comfortably alongside essentialist beliefs about men and women. The "separate but equal" notions of justice pervasive in the United States facilitates the

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[24] These beliefs do not necessarily have to be grounded in scientific findings, although they often are. Essentialist gender beliefs can stem from religious beliefs about, for example, the ways "God made" men and women.

simultaneous belief that women and men should have equal roles in the workplace and in the family, but that they are still different by nature. The most progressive gender beliefs reject essentialist notions of men and women, and understand these differences to be socially constructed, not rooted in the body or brain.

Traditional gender role beliefs have been slowly eroding in the last five decades, and are more often held by older generations in the U.S. than younger generations (Bolzendahl & Myers, 2004; Davis & Greenstein, 2009; Kane, 1998). But that does not mean that all young people's gender schemas are based on progressive cultural models about gender. Consistent with the "separate but equality" ideology, I expect men and women to have gender category beliefs that align with hegemonic masculinity and femininity, respectively, and to be likely to believe in gender essentialism.

I do expect some gender differences in gender schemas. Their gender category beliefs should be bifurcated in ways consistent with hegemonic masculinity and femininity. Furthermore, because of men's and women's very place in the gender structure, they likely have different perspectives on that structure. I expect women to have slightly less traditional gender role beliefs (Baxter & Kane, 1995; Kane, 2000). I also expect them to be slightly less likely to hold essentialist beliefs than men, since such beliefs are often used as justifications for women's disadvantaged place in the labor market and their extra home and family responsibilities (Messner & Bozada-Deas, 2009).

Gender schemas are beliefs held by individuals that can be informed by many different cultural models. It is outside the scope of this chapter to document the origins of these cultural models, or where they diverge or overlap. Gender schemas are also likely influenced by institutional factors such as opportunity structures, which I cannot analyze here. In this chapter, I am interested in whether men and women hold "traditional" or "progressive" beliefs along the three dimensions I discussed.

Changes in Gender Schemas over Time: How might gender schemas change over time? In contrast to psychological notions of gender schemas as fixed from a young age (Bem, 1993; Valian, 1999), and overly-deterministic sociological notions of gender that leave little room for alteration or resistance (e.g. Bourdieu, 1984; Bourdieu, 2001),[25] some scholars have argue that, as a result their very transposibility, schemas face the threat of challenge or modification at every application (Hays, 1994; Sewell, 1992). Furthermore, if people encounter different schemas, or come upon different resources, schemas can change. Specifically, schemas can change in the face of one or more of the following circumstances: (1) "the relationship or situation on which the schema relies is dissolved, or the individual seeks a new relationship," (2) "sufficient resources or alternative schemas are available," or (3) "There is widespread, macro-level social or cultural change" (Blair-Loy, 2003, pg 141).

Given my sample, I expect that such changes are most likely under the second condition. College students encounter new people and new challenges (Astin, 1993). Students are no longer living with parents who may enforce traditional gender beliefs, they enter new life situations for the first time (e.g. independence), and may have new sexual or romantic experiences (Hamilton 2007, Hamilton & Armstrong 2009, Ray & Rosow 2010). Second, students are likely to encounter either sufficient resources or alternative schemas which challenge the gender schemas they had when they entered

[25] Bourdieu argued that because women's thoughts and actions are "structured in accordance with the very structures of the relation of domination that is imposed on them," their actions—and even their very cognition—are acts of submission to this domination (Bourdieu, 2001, p. 21).

college (Hamilton & Armstrong 2009).[26] This is especially true for women and men in non-traditional majors whose very success challenge essentialist beliefs about gendered abilities, or those in majors that explicitly challenge students' gender schemas as part of their curricula (e.g. women's studies and sociology). I take up the relationship between college majors and changes in self-conceptions and gender schemas in chapter 3.

2.2 Self-Conceptions

Self-conceptions are individualistic perceptions of the self: the "theories" or self-reflexive beliefs we hold about ourselves as experiencing, functioning, unique individuals within a deeply individualistic culture (S. Epstein, 1973; Gecas, 1982). A "self-concept" is most often understood as an "organization of various identities, attributes, and their evaluations, developed out of the individual self-reflexive, social, and symbolic activities" (Gecas, 1982, p. 4). Self-conceptions are derived from reflections on past social experiences and function as "systems of generalization" about the self (Markus & Wurf, 1987).

Most social-psychological literature has largely ignored the extent to which self-conceptions are structural and cultural entities with effects that go far beyond the individual level. Sociologists since Durkheim ([1893] 1984) and Mead ([1934]1962) have revealed the deeply social nature of conceptions of the self. Mead (1962) argued that the self is a social structure that arises in social experiences. However, "the common social origin and constitution of individual selves and their structures does not preclude

[26] Men and women from middle or upper-class backgrounds, which are over-represented among college students, are likely to have resources available to them that are not available to working-class students.

wide individual differences and variations among them" (p. 201). Perhaps because these wide differences are sustained that self-conceptions fail to appear *social* in origin.

I draw on sociological literature that takes a firmly structural and cultural stance on self-conceptions, as such literature provides the best starting point to understand how self-conceptions reproduce inequality. The self, as an individual entity with qualities separate from collective groupings, is a pinnacle element of social life in postmodern societies. This "cult of the individual" (Durkheim, [1893] 1984)[27] has intensified in the last century: "Post-WWII advanced the individual as the legitimate actor, the main element of reality, and thus the primary repository of legitimate roles and identities" (Frank & Meyer, 2001, p. 87). This expansion of the individual self as the master human identity buttresses an "enormous cultural expansion in the legitimate range of free personal tastes and preferences" (pg. 90). The *indulgence* of these personal tastes and preferences is the result of a "search for the true self" (Bellah, Madsen, Sullivan, Swidler, & Tipton, 1985, p. 55); "one's idiosyncratic preferences are their own justifications, because they define the true self" (pg. 75). It is from these sociological foundations that I approach self-conceptions.

The way men and women perceive themselves is one of the central factors in career decision-making. Partly because the increased existential security in post-industrial societies allows diversion from strictly economic motivations for employment (at least for a privileged minority) (Inglehart, 1997; Inglehart & Welzel, 2005) and partly because of "normative mandates for self-expression and the associated celebration of individual

[27] The cult of the individual is the intense focus on the rights and dignities of the individual, over and above that of the group, nation, relation, etc. Durkheim argued that is the sole surviving form of mechanical solidarity in modern societies (Marske, 1987).

choice" (Charles & Bradley, 2009, p. 929), the expression of individuality is central to individual's career decision-making. Following these trends of self-expression, I expect the self-concepts of the men and women in my sample to play an important role in how they move in and out of college majors, their status post-college, and how a subsample of engineering students develop professional identities.

These self-conceptions are, of course, deeply gendered. From childhood socialization about identities, preferences, and values, to the internalization of expectations and sanctions of broader gender ideologies, to responses to the experiences with gendered institutions, our sense of self reflect the gendered society we live in (Markus & Kitayama, 2003). "Because gender remains a central axis of human identity, self-expressive values systems tend to encourage the development and enactment of culturally masculine or feminine affinities" (Charles & Bradley, 2009, p. 926).

However, to the holders of these gendered self-conceptions, and to others around them, these self conceptions may not *appear* gendered, they may just appear individualistic. In theory, everyone, regardless of gender, race, ethnicity, or values system, is entitled to the right to their "own bit of space" in which to be an individual, and is "utterly free within its boundaries" (Bellah et al., 1985, p. 76). As discussed in the previous chapter, Frank and Meyer (2001) argue that "specialized identity claims" (such as "man" or "woman") have tended to become absorbed into general notions of individuality. In other words, gender becomes in many ways a *fulfillment* of individualism (Meyer & Jepperson, 2000). There is little indication that the sex-typing which produces these gendered aspirations has declined (Lueptow, Garovich-Szabo, &

Lueptow 2001), just that it is encoded as personal “indulgences” of self-conceptions (Charles & Bradley 2009).

Self-conceptions are different from gender schemas in that they are not based on shared cultural models in the same way. There are, of course, cultural ideologies about how one *ought* to perceive oneself (as strong-willed and independent; as cooperative and helpful; as moral, etc.) and shared beliefs about the sorts of self-conceptions that are valuable or problematic, but there are not similar cultural models about how each of us individually should see ourselves. Individuals have a “generalized other” that informs how they construct their identities (Mead, [1934]1962), but generalized others are usually not shared among people. The very notion of individuality is that no two people *can* or *will* be the same person, or conceive of themselves in the same way.

Like gender schemas, self-conceptions show aspects of stability (as core aspects of the self) and malleability (they change when new self-conceptions are added to the self) (Markus & Kitayama, 2003; Markus & Wurf, 1987). I expect self-conceptions to change, if only slightly, as respondents proceed through college and ponder what they would like to do –and who they would like to be—in the future.

Because individuals hold a multitude of beliefs about themselves, research using self-conceptions usually does not attempt to capture individuals’ entire perceptions of themselves (see e.g. Nagy et al. 2009). Similarly, my research focuses only on career-relevant self-conceptions that correspond to stereotypes of gendered components of the typical professions that employ college graduates (considering oneself “systematic” or preferring to work with people rather than things, for example).

I expect women and men to perceive themselves differently, with different defining characteristics. Gender is constructed as a psychological, social, and/or physical binary by most major social institutions and in virtually every social interaction (Ridgeway, 2006). As I discussed above, complementary and hierarchical characteristics are central to the maintenance of the gender hierarchy (Schippers 2007). Not only do men and women perceive members of their gender category to have gender-stereotypical characteristics, I also expect men and women to see themselves embodying different, gender-stereotypical characteristics.

Before moving on to theorize the co-construction of gender schemas and self-conceptions, I present univariate and bivariate descriptives of the variables I use to operationalize these beliefs and briefly discuss the stability of these measures over time. (See chapter 1 for a detailed description of my sample.)

2.3 General Trends in Gender Schemas and Self-Conceptions

Measuring Gender Schemas and Self-Conceptions

I use three sets of variables to measure gender schemas that correspond to the three dimensions of gender schemas—gender role beliefs, gender category beliefs, and gender essentialist beliefs—described above. Questions that tap respondents' gender role beliefs are modeled after those used in the General Social Survey and the World Values Survey, (e.g. "a wife should take her husband's name at marriage," 1=strongly disagree to 5=strongly agree; see Table 2.1 for question wording, response values, and the years in which the questions were asked). Secondly, I use a set of attribute spectrum scales (used by Burke & Tully, 1977; Lee, 1998) that capture respondents' gender category beliefs (e.g. "usually, others of my same sex are very logical"=1 to "very illogical"=7). These are useful in measuring the extent to which respondents adhere to gender stereotypic views of their own gender category (Lee, 1998).

Questions that capture the extent to which respondents adhere to gender essentialist beliefs ask this in four ways: whether they expect men and women to act differently from one another at work; whether they adhere to separate but equal notions of justice; whether they explain occupational sex segregation as the result of men's and women's natural talents; and whether they believe that some jobs and professions are more suitable for men than for women (1=strongly disagree to 5=strongly agree).

Following social-psychological researchers, I use higher-order abstraction measures of self-conceptions that tap the respondents' perceptions of their "actual" self, rather than those that represent their "ideal" self or the "ought" self (Markus & Wurf, 1987; Nagy et al., 2008). Respondents were asked to locate themselves along the following attitude spectrum scales developed by Lee (1998): "Usually I am very masculine"=1 to "very feminine"=7; "very individualistic" to "very cooperative;" "very unemotional" to "very emotional;" "very asocial" to "very social;" "very unfriendly" to "very friendly;" "very logical" to "very illogical;" "very systematic" to "very unsystematic;" and "like to work with things" to "like to work with people." The fact that these are attitudinal spectrum scales helps capture the theoretical notion that the characteristics that define hegemonic masculinity and femininity are complementary and hierarchical: for example, women are assumed to like to work with people, which is complimentary to, yet less valued than, men's assumed preference to work with things. These self-beliefs are also career-relevant and correspond well with stereotypes of ideal incumbents of gender-typed fields, yet they are not overly-specific (Eccles, 1994; Gecas, 1982). Thus, these self-beliefs are likely consequential for academic major choices, occupational choices at career launch, and the development of gendered professional identities. In the second part of this chapter, and in later chapters, I combine these individual variables within multi-dimensional indicators of theoretically interesting types of self-conceptions (e.g. “I am feminine” or “I am unsystematic”).

Trends in Gender Schemas and Self-Conceptions Measures

Table 2.2 presents the means and standard deviations for self-conceptions and gender schemas variables for men and women. The last two columns present the significance of the differences between men’s and women’s averages in Year 2 and Year 5. I briefly describe the general trends on these variables and how they differ by gender and other key demographic variables before discussing how they change over time.

The men and women in my sample generally consider themselves to be fairly cooperative and social, systematic and logical, and fairly even-keeled emotionally. They like to work with people more than they like to work with things. Only a few of the self-conception variables are significantly different for men and women: men perceive themselves to be more logical, less emotional, and more masculine than women perceive themselves to be. Given the popular cultural assumption that men and women are fundamentally different (Epstein 2007), it may seem surprising that men and women see themselves significantly differently on only half of the self-conception measures.

In stark relief to their self-conceptions, men’s and women’s gender category beliefs are significantly different on every measure. Women see other women as significantly more feminine, cooperative, social, illogical, unsystematic, moral, emotional and wanting to work with people more than men see other men. Men’s and women’s gender category beliefs are also more gender polarized—more stereotypically masculine and feminine, respectively—than their self-conceptions. These results are consistent with Epstein's sociology of gender differences (C. F. Epstein, 1988, 1999), which asserts that the maintenance of gender differences requires the *perception* that men and women are different.

Respondents hold relatively progressive gender role beliefs but are generally in agreement with gender essentialist beliefs--particularly the notion that men and women are naturally talented at different things. Women have more progressive gender role beliefs and are more likely to reject gender essentialist notions. This is consistent with gender perceptions literature that shows that women are more likely to hold progressive gender beliefs (Davis & Greenstein, 2009) because disadvantaged individuals are often more likely to recognize this disadvantage than those who are advantaged (Cech & Blair-Loy, 2010; Davis & Greenstein, 2009). Both men's and women's gender role beliefs become more progressive over time.

Appendix A presents a series of OLS regression models using gender to predict these gender schemas and self-conception measures, plus respondents' race/ethnicity, nativity, their parents' income, their political conservatism, how religious they perceive themselves to be in relation to their peers, and their sexual identity. I find in these models that the significant gender differences identified in the bivariate analysis hold net of other demographic variables, except that gender is not a significant predictor of gender essentialist views.

I find several differences on the basis of other key demographic axes. Politically conservative students have more stereotypical perceptions of their gender categories and more traditional and essentialist beliefs about gender. Highly religious students have more traditional beliefs about gender roles than less religious students. Sexual identity also predicts students' self-conceptions and beliefs about gender: men and women who identify as lesbian, gay or bisexual have less stereotypically masculine or feminine self-conceptions, respectively; they have more progressive gender role beliefs; are less likely to hold gender essentialist beliefs; and are more apt to recognize gender inequality. There were comparatively few significant differences by racial and ethnic group, by nativity, and by family income. [28]

Finally, there are several differences between students who attended the three private schools (MIT, Olin, and Smith) compared to those who attended University of Massachusetts Amherst (UMass). In general, men and women at MIT, Olin, and Smith hold more progressive gender role beliefs than UMass students and consider themselves and their gender category to be less gender-stereotypic. With the exception of the more progressive gender role beliefs held by Smith graduates in year 5, these school differences were generally strongest in year 2 and became less pronounced by year 5.

There are two overarching trends in these demographic results. First, demographic characteristics other than gender are much stronger predictors of gender schemas then they are of self-conceptions. Although self-conceptions are certainly gendered, and are also informed by other demographic circumstances, respondents still seem to hold individualistic self-definitions. Gender schemas, on the other hand, are

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[28] Appendix A provides the full set of OLS regressions using these demographic factors to predict gender schemas and self-conceptions, and a more thorough discussion of the findings. I simply summarize the trends here.

more dependent on characteristics such as political conservatism, religiosity, sexual identity, and race/ethnicity.

Secondly, gender schemas act as a coherent set of beliefs. Gender schemas are much more cohesive than self-conceptions. In regression analyses using individual gender schemas and self-conception measures to predict each other (not shown), I found substantial coherence in gender category, gender essentialist and gender role beliefs behave over time.[29] The gender category, gender essentialist, and gender role beliefs *act like schemas*: they are very strong predictors of one another and hold together as a cohesive set of beliefs.

2.4 Stability and Flexibility of Gender Schemas and Self-Conceptions Over Time

Although excellent ethnomethodological work has captured gender being enacted in micro-level behaviors and interactions (Berk 1985; West & Fenstermaker 1995), and historical trend analyses have tracked aggregate changes in gender ideologies over time (Bielby & Bielby 1984; Davis & Greenstein 2009; Mason & Lu 1988; Okamoto & England 1999), little is known about the intra-individual stability of gender schemas over time. This flexibility has theoretical implications: stable individual gender schemas would reinforce the stability of the gender structure over time; flexible gender schemas would mean that the gender structure is reproduced *in spite of* this flexibility.

Figure 2.1 illustrates the stability scores of men and women on each of the self-conception, gender category, and gender role and essentialist beliefs.[30] Appendix 1 provides graphs of the change scores in year 2 and 5. Stability scores capture something

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[29] Only one of these essentialism questions was asked in year 2 (some jobs and professions are better suited for men than for women); the others were asked in year 5 only.

[30] Stability score= 1- (abs[(Year 5 value - Year 2 value)/(number of variable values -1)])

different than the mean change scores: the latter indicate *trends* in the changes of beliefs over time; stability scores capture instability in these measures, no matter the direction of change. A stability score of 100% means that a person's response on that item remained constant between year 2 and year 5. A stability score of zero means a person's response went from the very bottom of the variable value distribution to the very top of the value distribution (or vice-versa). The horizontal dotted line in each Figure 2.1 chart is a visual benchmark representing 80% stability. For self-conceptions, this represents about a 1.5 point move up or down each of the seven-point attitude spectrum scales; for gender schemas, this is a one-point change in agreement or disagreement with each of the gender schema measures.

Both men and women have stability scores above 80% for all but the "I am cooperative" and "people-oriented" self-conceptions. For the stability scores of gender category beliefs, men's perceptions of other men exhibit slightly larger changes over time than women's perception of other women.

College is a formative time of personal growth where both beliefs about oneself and beliefs about the gender structure seem likely to change (Astin 1993). However, students' self-conceptions and gender schemas are fairly stable over time. The stability of these beliefs contributes to the stability of the gender structure: even across these life experiences, respondents' perceptions of gender and their perceptions of themselves do not change drastically. For example, students who came in with very traditional gender beliefs and very stereotypical perceptions of their gender category would likely have had 80% or better stability in these beliefs.

These beliefs are not stagnant, however. The average stability score for each belief is around 75-80%, suggesting that gender schemas and self-conceptions are not immovable and, given the right circumstances, these beliefs do change.

PART TWO: CO-CONSTRUCTION THEORY AND ANALYSIS

The first part of this chapter conceptualized my use of self-conceptions and gender schemas, briefly illustrated how these beliefs are predicted by gender and other key demographic variables, and discussed their stability over time. I showed that there are large differences between the ways men and women in my sample view members of their gender categories and understand gender roles. Men's and women's self-conceptions are gendered in expected ways, but are not as polarized as their perceptions of members of their gender category.

Before I can show how self-conceptions affect the reproduction of sex-segregation of college majors and occupations in the chapters that follow, I need to investigate how self-conceptions are co-constructed with gender schemas over time. Thus far, relatively little is known about the processes of this co-construction, and even whether it is primarily uni-directional or bi-directional. Little research, especially quantitative research, has systematically captured the influence of gender schemas on individual action over time or the extent to which these beliefs influence perceptions of self, partly because such inquiries are challenging without longitudinal panel data (Davis & Greenstein 2009). We know even less about how perceptions of self might influence the extent to which men and women hold traditional or progressive gender schemas. Such knowledge is important to explaining the resilience of gender inequality in the modern era (Charles 2009).

I begin by theorizing mechanisms by which this co-construction might occur. I then present an empirical analysis of one particular case of co-construction: how feminine self-conceptions influence—and are influenced by—gender role, gender category, and gender essentialist beliefs.

2.5 Processes of Co-Construction: How Gender Schemas influence Self-Conceptions

How do gender schemas influence people's perceptions of themselves? Although it is outside the scope of this project to discuss how men and women first develop these beliefs, it is important to understand how gender schemas, once in place, influence individuals' self-conceptions. Past research has shown that cultural ideologies reproduce inequality by shaping micro-level interactions and judgments of selves and others (Ridgeway 2006; Ridgeway & Correll 2004), but how do these cultural ideologies affect people's perceptions of themselves?

Different dimensions of gender schemas may differently affect self-conceptions. The three dimensions I introduced earlier play different roles in the maintenance of the gender structure. Traditional gender role beliefs specify the roles of men and women and the proper power relations between them; gender category beliefs uphold the complementary and hierarchical characteristics of men and women; and essentialism provides a cultural explanation and legitimate for the existing gender order. As a result, I expect that they will be internalized by men and women through different mechanisms. Specifically, I describe processes of *prescription*, *extrapolation* and *biological fatalism*.

First, individuals' gender role beliefs may *prescribe* perceptions of self. Cultural beliefs about gender to which individuals adhere provide rough guides for what individuals ought to do and ought to be like (Davis & Greenstein 2009; Ridgeway 2006).

Having traditional beliefs about the roles of power differentials between men and women should lead individuals to see themselves in ways consistent with those roles. Blair-Loy (2003), for instance, demonstrates women executives' adherence to the "family devotion schema," a shared cultural model that depicts a woman's primary moral responsibility to be her role as wife and mother (p. 2). This cultural model is consistent with (and inclusive of) other cultural models, such as the expectation of "intensive motherhood" (Hays, 1996) that reinforce women's responsibilities in the home. Some of the women executives in Blair-Loy's study were compelled by their adherence to this schema to leave their high-status careers and devote themselves full-time to childrearing; it prescribed for them the primacy of "mother" within their self-conceptions.

Secondly, gender category beliefs may be *extrapolated* into individuals' beliefs about themselves. This is distinct from a prescriptive process because it relies on beliefs about what men and women are, rather than beliefs about what one thinks men and women should be like. Individuals hold beliefs about the common characteristics of their gender category—beliefs that may align with or undermine commonly-held assumptions about the characteristics that encompass hegemonic masculinity and femininity (Connell 2005, Schippers 2007). Men and women who subscribe to these hegemonic beliefs about their gender category are likely to see themselves as embodying those characteristics as well. People who reject hegemonic perceptions of their gender category, on the other hand, are more free to see themselves less stereotypically.

Research on gendered self-assessment of math abilities provides an example of this extrapolation process. Women who believe that members of their gender are, in general, poor at math may come to have little confidence in their own math abilities, regardless of their actual skills (Correll 2001, 2004; Hyde et al. 1990; Steele 1997).[31] Correll (2004) argues that if women perceive other women to have weaker abilities in math than men, this can affect how they perceive themselves. Similarly, men who perceive other men to be systematic may extrapolate this characteristic onto themselves as members of that gender category. In other words, men's and women's membership in their gender category may be accompanied by sets of characteristics that they also apply to themselves.[32]

Finally, men and women who subscribe to gender essentialism believe that men and women have different characteristics, skills, and abilities by nature. Beyond providing a ready explanation and justification of the gender structure, men and women may find meanings about *themselves* in these essentialist beliefs. I call this process *biological fatalism*. Those who believe that men and women are naturally, fundamentally different may apply this to themselves—that they, as men or women, are "naturally" one way or another. "I am a woman, women are naturally emotional, therefore I am emotional." For example, part of the appeal of the "men are from Mars"/ "women are from Venus" cottage industry of books, which are based on the assumption that gender differences are driven by biology, is that people read them not only to understand their

[31] There are, of course, ways that cultural models that men and women do not personally hold can influence how they perceive themselves—for example, Correll stated that her argument about gender-stereotyped self-beliefs about one's math abilities could come from individuals' perceptions that other hold these gendered beliefs. Stereotype threat (Spencer, Steele, & Quinn, 1999; Steele, 1997) is another example. Women and men who believe they may be held accountable to cultural norms about the proper self-conceptions for men and women may hold such self-conceptions while privately endorsing progressive gender beliefs. However, I am primarily interested in the relationship between respondents' perceptions of self and the gender schemas they endorse.

[32] Perceptions of one's gender category do not necessarily have to be informed by gender essentialist beliefs (although gender essentialism provides pre-packaged and coherent sets of beliefs about the characteristics of men and women). Perceptions of one's gender category can be completely based on social-constructionist logic and still uphold a stark differentiation between men and women.

friends, partners, and children, but also to better understand themselves. Biological fatalism may be a way that men and women explain themselves and their self-understandings.

My analysis can help determine if gender schemas influence self-conceptions through processes of prescription, extrapolation, and biological fatalism, and whether these processes are similarly important for men and women. Figure 2.2 provides a schematic summary of these mechanisms.

2.6 Processes of Co-Construction: How Self-Conceptions influence Gender Schemas

The effect of cultural beliefs on perceptions of self is important to scholars interested in the power of culture to influence behavior and self-beliefs. The reverse causal process—how perceptions of self influence individually-held beliefs about gender—is equally important, but less well-understood. As with the reverse causal direction, I expect that self-conceptions will influence the dimensions of gender schemas differently. I argue that self-conceptions could influence gender category beliefs through a process of *generalization*, while they could affect gender role beliefs and gender essentialist beliefs through a *reinforcement/subversion* process.

First, self-conceptions may affect gender category beliefs through a process of *generalization.* This is the inverse of the extrapolation process discussed above. In this process, men and women generalize their self-perceptions to their entire gender category. For example, a woman who believes she is feminine may generalize this characteristic to other women. However, self-conceptions that go against stereotypical perceptions of men and women may challenge stereotypical notions of one's gender category and cause one to see his/her gender category more neutrally. For example, a man's perception of himself as neutral or feminine may undermine his perception of his gender category as hegemonically masculine. The basis of this mechanism is that one might reconcile perceived differences between one's self-conceptions and the characteristics of one's gender category by broadening (neutralizing) the latter to be able to incorporate the former. Through generalizability of astereotypical self-conceptions, notions of hegemonic masculinity and femininity could be undermined and alternate femininities and masculinities developed (Schippers 2007)

Secondly, self-conceptions may influence both gender role beliefs and gender essentialist beliefs through *reinforcement* or *subversion.* To the extent that perceiving the validity of traditional divisions of work and family responsibilities and traditional relations between men and women depends on gender-stereotypic self-beliefs, seeing oneself as having stereotypic characteristics may reinforce the validity of these beliefs. The inverse relationship is also likely to drive a significant result between self-conceptions and gender role beliefs: non-gender-stereotypic perceptions of oneself may undermine the legitimacy of traditional gender role beliefs (which assume stereotypic perceptions of oneself) and lead one to have more progressive gender role beliefs. Similarly, self-conceptions that are consistent with gender essentialist beliefs may be more "proof" to individuals that essentialism is a legitimate explanation of gender differences. On the other hand, self-conceptions that contradict such essentialist notions may subvert the validity of that explanation for those individuals.

I next explain the importance of the co-construction processes and discuss the particular measures I am using to examine them. Then, I investigate these relationships empirically using structural equation modeling with multi-indicator measures of gender schemas and self-conceptions. Finally, I discuss how the results inform our understanding of the co-construction of these individual-level beliefs and why they are important for understanding the reproduction of inequality.

The Importance of Co-Construction

Here, co-construction refers to the ways gender schemas influence how people perceive themselves over time, and how perceptions of self, in turn, influence the extent to which people adhere to gender schemas. This co-construction is theoretically interesting and may be vital to the individual-level reproduction of inequality. It is an example of how individuals come to internalize the gender structure and how, in turn, their self-beliefs reproduce or undermine their adherence to that structure.

Gender schemas likely influence changes in perceptions of self through prescription, extrapolation, and biological fatalism. If these self-beliefs predict career decisions that reproduce sex-segregation, this is a site where cultural gender role beliefs *act through* self-conceptions to reproduce sex segregation. This “self-expressive edge of sex segregation” may be particularly resistant to social change, as this encoding process is culturally unavailable as a site for addressing gender inequality. Thus, I hypothesize that a key mechanism by which sex segregation is reproduced on the individual level is that gender schemas become encoded in individualist self-conceptions, legitimated, and are resultantly culturally off-limits to policy regulation and social action.

Secondly, perceptions of self—particularly if they contradict gender essentialist beliefs (e.g. women who perceive themselves as particularly systematic or men who perceive themselves as particularly emotional)— may influence individuals’ adherence to traditional gender role beliefs. This is a potential site for the subversion of traditional gender beliefs and has tremendous policy implications: If young men and women can be encouraged to develop conceptions of themselves that are counter to essentialist beliefs, those individuals may begin to reconsider essentialist beliefs about members of their gender category or begin to question traditional gender role beliefs. Conversely, more gender-stereotypic beliefs about the self may retrench individuals' essentialist gender beliefs.

For my purposes, I do not need to show that individuals' gender schemas have the potential to affect the entirety of their self-conceptions. Rather, it will suffice to display evidence for my arguments here to show that *some* elements of self-conceptions influence *some* dimensions of self-conceptions to demonstrate that these processes of co-construction do operate.

I examine the relationships between the three dimensions of gender schemas—gender role beliefs, gender category beliefs, and gender essentialist beliefs—and one multi-faceted self-conception: how "masculine" or "feminine" men and women perceive themselves to be. Here, I am referring to hegemonic notions of masculinity and femininity, rather than alternative or subordinate femininities and masculinities (Connell 2005, Pyke & Johnson 2003, Schippers 2007). This self-conception is an ideal case for examining co-construction with gender schemas because hegemonic masculinity and femininity is the central axis along which the gender distinction is drawn and maintained (Esptein 1999). As noted above, the perceived complementarity and hierarchy of masculinity and femininity are central to the gender structure.

Masculinity and femininity are heavily laden with cultural meanings for both men and women. For men, considering oneself to be "feminine" is devalued in relation to hegemonic masculinity, and it is, by definition, the opposite of being masculine (Schippers 2007). Men face considerable social pressures to perceive themselves as (and enact) hegemonic masculinity (Connell, 2005). Men who consider themselves less masculine than other men have to overcome a host of pressures and potential sanctions.

For women, considering oneself to be feminine is both culturally expected and devalued (Schippers 2007). Being feminine is culturally prescribed for women, and women face tremendous pressure to enact femininity (Wolf, 2002). However, masculinity is more highly valued than femininity in may realms of importance to women, especially in most professional workplace settings (see, e.g. Dinovitzer 2009, Gorman 2005). I am interested in how gender schemas influence respondents' perceptions of themselves as masculine or feminine: what gender schemas lead men and women to hold more stereotypical perceptions of themselves, and what gender schemas lead men and women to conceive of themselves in a less stereotypical manner.[33]

2.7 Hypotheses

Broadly, I expect to see evidence of co-constitutive beliefs about gender and the self, whereby there are strong and consistent patterns where gender schemas predict men's and women's self-conceptions. To the extent possible, I take advantage of my longitudinal data and examine the effects of gender schema beliefs on perceptions of self over time, and vice versa.

[33] Because the notions of femininity and masculinity are themselves complex, I do not claim that respondents all share the same definition of these concepts. "Masculinity" and "femininity" are socially-constructed traits whose boundaries are historically contingent and ever-shifting (Connell, 2005). However, the salience of these concepts in the U.S. means that there exists shared definitions of this concept that are likely quite consistent and stable across individuals (Lueptow et al., 2001).

I expect that the three dimensions of gender schemas—gender role beliefs, gender category beliefs, and essentialist beliefs—will significantly affect how feminine men and women perceive themselves to be. In particular, traditional gender role beliefs should be positively related to women's feminine self-conceptions to men's masculine self-conceptions. This is an example of the prescription process theorized above: women's and men's adherence to traditional gender role beliefs prescribes for them gender-typical self-conceptions. Gender category and gender essentialist beliefs should also have an effect on men and women through a process of extrapolation and biological fatalism, respectively. Both men and women who perceive their gender category to be relatively masculine or feminine, respectively, will be more likely to see themselves as masculine or feminine. Because of the overarching assumption in essentialist beliefs about gender that men are "naturally" masculine and women are "naturally" feminine, I expect that women who adhere to essentialist gender beliefs will be more likely to have feminine self-conceptions and men who hold essentialist beliefs will be more likely than other men to see themselves as masculine.

Secondly, I expect that perceptions of oneself will have a significant effect on respondents' gender schemas. Specifically, stereotypic perceptions of themselves (i.e. women with feminine self-conceptions and men with masculine self-conceptions) will hold more traditional gender role beliefs, as such beliefs fit easily alongside these stereotypic perceptions of self and do not directly contradict them. This is an example of reinforcement. Stereotypic self-conceptions are also likely to reinforce men's and women's gender essentialist beliefs: It is a strong confirmation of essentialism if men see themselves as having the essentialist characteristics of "masculinity" or women see themselves as having the essentialist characteristic of "femininity." In contrast, perceptions of oneself as anti-stereotypic (women who perceive themselves to be masculine and men who perceive themselves to be feminine) may challenge the legitimacy of traditional gender role beliefs and the validity of essentialist notions of gender. Thus, these men and women likely have more progressive gender role beliefs and less essentialist beliefs about gender than women with more feminine self-conceptions and men more masculine self-conceptions. I also expect that those with gender-stereotypic self-conceptions will see their gender category as more feminine (for women) and more masculine (for men) in a process of generalization.

2.8 Latent Variables

I use structural equation modeling (SEM) for my co-construction analysis, a statistical technique useful for testing and estimating causal relationships (Byrne, 2010). It is also well-suited for theory testing. SEM allows for the construction of latent measures which were not themselves included in the survey but, rather, estimate several manifest (measured) variables which "tap into" the concept represented by the latent variable. In this way, the researcher is not required to measure every variable that might be part of a latent concept; several measures that each capture some facet of that latent concept are put together to make a stronger measure. The more tightly the variables hang together as a latent factor, the more coherent the concept is presumed to be.

Structural equation models consist of two components: a measurement model and a structural (or construct) model. The validity of both are measured with standard fit statistics. I present four for each model: the χ^2 and degrees of freedom (df), the comparative fit index (CFI) which compares the fit of the hypothesized model with that of an independent model, and the root mean square error of approximation (RMSEA), which accounts for both fit and model parsimony. A good CFI is larger than .900 and an acceptable fit is larger than .800. An RMSEA below .06 indicates a great fit and an RMSEA below .08 is acceptable (Byrne 2010).[34] I also include the squared multiple correlation, or the R^2 of the dependent variable, in each model. I first present the confirmatory factor analysis (CFA) for each of the latent variable constructs I use in this chapter, then the structural components of causal models that use those latent variables. To ensure discriminant validity between the four latent measures I use in this chapter, I compared the χ^2 and degrees of freedom between two models: one where the manifest measures predict their separate latent measures as usual and the four separate latent measures are correlated with one another, and a second model where all the manifest measures predicted a single latent measure. The significance of the difference in the χ^2 and degrees of freedom between the two models gives an indication of discriminant validity. I found discriminant validity significant at the .000 level in year 2 and year 5, for men and for women.[35]

A note on timing of measurement: some of the most substantively important measures that make up the essentialist beliefs and gender category beliefs measures are only available in year 5. For these constructs, I run the models with both the year 2 and year 5 operationalizations.

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[34] RMSEA is a more accurate fit statistic with medium-size samples than CFI because the CFI may be deflated with sample sizes less than 300 or 400 (SEMs can be reliably interpreted with samples of 100 or more) (Chen, Curran, Bollen, Kirby, & Paxton, 2008).
[35] I also ensured that none of the manifest measures were more highly correlated with a measure outside of its latent group than it was correlated with the measures inside of its latent group.

Self-Conceptions: I am Feminine

I constructed the "I am feminine" self-conception latent variable from five attribute spectrum scales: "Usually I am very masculine" to "very feminine," "Usually I am very unemotional" to "very emotional," "Usually I am very unfriendly" to "very friendly, "Usually I am very asocial" to "very social," and "Usually I am very individualistic" to "very cooperative." See Panel A in figure 2.3 for the CFA for the year 2 latent construct of feminine self-conception, and Panel B for the year 5 CFA. Of these five measures, "I am friendly" and "I am social" are conceptually much more similar to one another than any other pair of variables in this latent measure. Empirically, the correlation between these two measures (.633 for men, .538 for men) is also much higher than between other pairs of variables. I expect that, due to this conceptual and empirical overlap, the measurement errors on these two variables are likely also correlated. Thus, I include a correlated error term between the friendly and social measures in the latent measure for feminine self-conceptions for both men and women, and in both years 2 and 5. (This correlated error term is significant in year 2 and 5 for men, and in year 5 for women.)

Interestingly, I find that the "I am cooperative" measure becomes less salient in women's feminine self-conceptions between year 2 and year 5.[36] This may point to a decoupling of cooperativeness or independence from notions of femininity and

[36] I established the significance of this change by comparing the χ^2 and degrees of freedom difference between a model where the year 2 and year 5 latent measures of feminine self-conceptions were correlated and the coefficient estimates on the "I am cooperative" measure constrained to equal one another, and a second model where these coefficient estimates were allowed to vary freely. The significance of the χ^2 and degrees of freedom change between the two models was significant at the .001 level for women, but was not significant for men.

masculinity as men and women proceed through an education process that tends to emphasize individual work.

Gender Schema Beliefs: Traditional Gender Role Beliefs, Gender Category Beliefs, and Gender Essentialist Beliefs

The following measures make up the traditional gender role beliefs latent variable: "A wife should willingly take her husband's name at marriage" (1=strongly disagree to 5=strongly agree), "a woman should not let bearing children stand in the way of a career if she wants one," (recoded so that 1=strongly agree to 5=strongly disagree), "women can have a full and happy life without marrying" (recoded so that 1=strongly agree to 5=strongly disagree), and "I consider myself feminist" (recoded so that 1=strongly agree to 5=strongly disagree).[37] Year 2 construction and CFA for the traditional gender role belief latent variable is shown in Figure 3.4 Panel A, and the Year 5 CFA is shown in Panel B.

The year 2 and 5 constructs of feminine gender category beliefs includes: "Usually, others of my same sex are very unfriendly"=1 to "very friendly"=7; "very individualistic"=1 to "very cooperative"=7, "very unemotional"=1 to "very emotional"=7, "very asocial"=1 to "very social"=7 (see Panel A and B of Figure 2.5).

My time-lagged examination of the effect of gender essentialist beliefs on self-conception is restricted by the presence of only one of the four essentialism questions in year 2: "There are some jobs and professions that are more suitable for men than for women" (1=strongly disagree to 5=strongly agree). I include this as a single-measure

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[37] "I consider myself a feminist" is a gender role belief measure and not a self-conception measure because being a feminist signals adherence to a coherent set of beliefs about the social roles about men and women. It is more of an indication of the kinds of beliefs men and women have about the gender structure than a simple self-conception.

representation of gender essentialist beliefs in year 2. Year 5 repeats this variable and adds three other measures that tap gender essentialist beliefs: "I expect members of the opposite sex to act differently than me at work" (1=strongly disagree to 5=strongly agree), "The trend of occupational sex segregation in the U.S. exists because men and women are naturally talented at different things" (1=strongly disagree to 5=strongly agree), and "Men and women should have equal rights, but they are different by nature" (1=strongly disagree to 5=strongly agree). See Panels A and B of Figure 2.6 for the year 2 and 5 constructs and CFAs.

Controls: All SEMs include controls for whether the respondent attended Smith (yes=1), Olin (yes=1), MIT (yes=1) or UMass (yes=1, the comparison category), and whether they identify as African-American (yes=1), Asian-American (yes=1), Hispanic or Latino (yes=1) or white (yes=1, comparison category).

The next sections present the results of this co-construction analysis. I then discuss these results and how they can inform our understanding of gender inequality more generally. All reported significance is calculated using two-tailed tests and I use maximum likelihood techniques for dealing with missing data.

2.9 Gender Schema Beliefs Predicting Feminine Self-Conceptions

Table 2.3 provides the SEMs predicting men's and women's year 5 feminine self-conceptions with their year 2 traditional gender role beliefs. (All models also include controls for school and race/ethnicity, the results of which I discuss below.) For women, I find no significant effect of gender role beliefs on perceptions of self as feminine. For men, traditional gender role beliefs are significant and positive predictors of masculine self-conceptions: men who hold traditional gender role beliefs in year 2 are more likely to see themselves as masculine in year 5 (prescription). In contrast, men with more progressive gender role beliefs are less likely to see themselves as masculine than other men.

Table 2.4 and 2.5 use feminine gender category beliefs to predict perceptions of self as feminine (extrapolation). Table 2.4 uses the year 2 measures of feminine gender category, a less accurate operationalization of this concept than the year 5 measure (Table 2.5), which includes the "usually others of my same sex are very masculine" to "very feminine" measure. The effect of gender category beliefs is stronger for women than it is for men: women's feminine gender category beliefs in both year 2 and year 5 predict the extent to which they perceive themselves as feminine in year 5. For men, in contrast, there is no significant relationship between how masculine they perceive other men to be and their own masculine self-conceptions using the year 2 operationalization of gender category beliefs, but the year 5 operationalization positively predicts men's masculine self-conceptions. The extrapolation process discussed above appears to be in operation: men and women who perceive their gender category to be feminine are more likely to see themselves as feminine as well.

The next two tables (2.6 and 2.7) present models predicting feminine self-conceptions with gender essentialist beliefs (biological fatalism). As noted above, due to available variables, year 2 conceptualization of gender essentialism includes only the "some jobs and professions are better suited for men" question. Women who hold this belief in year 2 are marginally more likely to see themselves as feminine than women who reject this notion of essentialism. The year 5 multi-indicator measure of essentialist views is a fully significant predictor of year 5 feminine gender schemas for women. This relationship is strong for men using both year 2 and year 5 measures of essentialism: men who endorse essentialist beliefs about the proper jobs for men and women are significantly more likely to see themselves as masculine. The reverse of this is that men who reject essentialist beliefs are *less* likely than other men to see themselves as masculine, and women who reject these beliefs are *less* likely than other women to see themselves as feminine.

Are these gender schemas measures related to the change in feminine self-conceptions over time? Tables 2.8 through 2.10 predict year 5 feminine self-conceptions with the three types of gender schemas beliefs, controlling for year 2 feminine self-conceptions measures. Including year 2 self-conceptions in the SEM means that the year 5 measure effectively indexes the change in feminine self-conceptions over time. Positive coefficients indicate a measure that is related to a shift to more feminine self-conceptions over time. A negative coefficient indicates a factor that is related to a shift to more masculine self-conceptions over time.

I find that traditional gender role beliefs are marginally significantly related to men's increasingly masculine self-conceptions over time (prescription; Table 2.8). These same traditional beliefs do not predict a change in women's feminine self-conceptions over time. Gender category beliefs are not related to change in self-conceptions for men or women (Table 2.9). Essentialist beliefs about occupations significantly predict men's increasingly masculine self-conceptions (biological fatalism), but are unrelated to women's feminine self-conceptions (Table 2.10). Figure 2.2 summarizes these findings.

Discussion

Confirming the expectations above, gender schemas are indeed significant predictors of feminine self-conceptions. This is a clear indication of something that has long been assumed: the way individuals see and understand the gendered structure has direct bearing on their gendered perceptions of self. However, there are interesting differences in how gender schemas influence men's and women's feminine self-conceptions.

First, the process of prescription, whereby gender role beliefs influence self-conceptions and are very important for men's, but not for women's feminine self-conceptions. Among men, those with traditional gender role beliefs are more likely to see themselves as masculine. This relationship is consistent with the masculinities literature (e.g. Connell, 2005) that argues that adherence to hegemonic masculinity—fundamentally a belief about men's and women's roles in society—is definitionally and conceptually opposed to the expression of femininity for men. In this process of prescription, men who hold traditional beliefs about gender roles would see themselves as less feminine than men with more progressive beliefs.

The inverse of this relationship is even more interesting: men who hold progressive gender role beliefs are more likely to see themselves as feminine. Because ideologies of hegemonic masculinity exert tremendous pressure on men to enact such masculinity, progressive gender role beliefs may both allow space for and ideologically buttress more feminine self-beliefs among men. The rejection of traditional gender role beliefs may create a more acceptable range of characteristics in which men can define themselves. Progressive gender role beliefs may provide a ready-made legitimation for non-hegemonic self-beliefs.

There is no prescription process of women, at least for this self-conception. This lack of relationship is surprising at first, given the importance traditional gender role beliefs have in upholding the gendered order, particularly in the institutions of marriage and family. However, the relationship between traditional gender role beliefs and pressures to have gender-stereotypical identities are not as clear for women as they are for men. Cultural alternatives are available to women that uphold stereotypically feminine perceptions of self while rejecting traditional gender roles. For example, the "feminine-ism" ideal proclaims that "being a strong, powerful woman doesn't mean you have to be tough, overworked and unattractive" (Salmansohn, 2010). "Feminin-ism" upholds pressure to enact stereotypical femininity even while rejecting traditional gender roles. This seeming empowerment of feminine self-expression still has undercurrents of subordination and submission to dominant power structures, where women need to feel "sexy," and are not allowed to be "controlling" or "bitchy" (Schippers 2007). The existence of such cultural alternatives may be the result of women's structural position, in which they wish to simultaneously hold equal positions and retain legitimacy in a heavily gender-differentiated world. No such cultural alternatives seem to exist for men that allow them to simultaneously uphold traditional gender role beliefs and perceive themselves as feminine. I discuss this more below.

More important to women's feminine self-conceptions is their belief in gender essentialism, a process of biological fatalism. Women who uphold gender essentialist beliefs are more likely to see themselves as feminine than women who reject essentialist beliefs. As a common explanation for gender differences, essentialism may justify women's adherence to hegemonic femininity. Those women who reject essentialism, on the other hand, tend to see themselves as less feminine than other women. The rejection of essentialism takes away its power: those who do not believe that women are "naturally" feminine are more free to define themselves as more neutral or masculine.[38]

Biological fatalism also works for men: men who agree with gender essentialist beliefs are more likely to see themselves as masculine. Again, essentialist beliefs define a (narrow) range of men's "natural" characteristics. Men who reject essentialist beliefs seem to have more room to maneuver their self-conceptions.

An extrapolation process also exists between men's and women's perceptions of their gender category and their self-conceptions. For both men and women, the more masculine or feminine they portray members of their gender category, the more masculine or feminine they see themselves. Respondents' beliefs about the characteristics that define their gender category as different, in other words, also influence their self-conceptions.

Thus, I find that men and women internalize gender schemas through different mechanisms: extrapolation and biological fatalism lead both men and women to have more gender-stereotypic self-conceptions, but prescription matters only for men. Men's masculine self-conceptions are reinforced through three processes: First, traditional gender role beliefs prescribe that they take their place in the power hierarchy, which includes adhering to hegemonic masculinity. Second, the gender category beliefs that accompany hegemonic masculinity are extrapolated into men's self-conceptions: as a

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[38] Although, of course, there are external sanctions for doing so.

member of that gender category, men understand themselves as "masculine" and reject femininity in their self-conceptions. Third, biological fatalism encourages men to see their masculinity as "natural" and innate.

For men to reject masculine self-conceptions and see themselves as more neutral or feminine, they may need to reject the expectations of the traditional power structure, the cultural assumptions about the characteristics that define the category "men," and the belief that masculinity is rooted in their biology.

Women's feminine self-conceptions are also reproduced by processes of extrapolation and biological fatalism, but not by prescription. As noted above, I believe that this results from the cultural alternatives to traditional gender role beliefs that women have available. These alternatives, however, nonetheless uphold women as different from men. In order to see themselves as more neutral or masculine, women may need to reject hegemonic femininity as the defining characteristics of their gender category. They also need to reject gender essentialist beliefs about women's inherent "femininity" in order to see themselves as more neutral or masculine.

I believe this difference in mechanisms is rooted in men's and women's location in the gender structure. Men's portrayal of themselves as hegemonically masculine and their distancing of themselves from hegemonic femininity is central to the reproduction of the gender structure. This structure only exists to the extent that men and women are defined as fundamentally different. Men, because they believe in traditional gender role beliefs and/or because they extrapolate that from their beliefs in the masculinity of their gender category and/or believe their masculinity is biologically-determined, reap the benefits of aligning their self-conceptions with hegemonic masculinity.

Women, on the other hand, can perceive themselves as feminine without believing in traditional gender role beliefs. As noted before, this lack of a prescription process for women aligns with separate but equal notions of gender. Notions of hegemonic femininity that appear to be removed from traditional gender role beliefs may be more palatable to young women in the U.S. However, extrapolation and biological fatalism are very strong influences in women's feminine self-conceptions. They reproduce women's hegemonic femininity without the need for adherence to traditional gender role beliefs. In other words, women's believe in patriarchy is not a requirement for the reproduction of "feminine" selves. This helps us understand why gender differences may continue despite strong cultural mandates for equality. I now move on to the second half of this co-construction: how self-conceptions influence individually-held gender beliefs.

2.10 Predicting Gender Schemas with Feminine Self-Conceptions

Tables 2.11 through 2.16 illustrate the ability of self-conceptions to predict the three dimensions of gender schemas: traditional gender role beliefs, gender category beliefs, and essentialism. Table 2.11 illustrates processes of reinforcement/subversion of gender role beliefs by feminine and masculine self-conceptions. For men, perceptions of themselves as masculine in year 2 predict traditional gender role beliefs in year 5: men's perceptions of themselves as more neutral or feminine than their peers do are more likely to subvert traditional gender role beliefs. Similarly, women's feminine self-conceptions marginally reinforce their traditional gender role beliefs; women's less feminine self-conceptions tend to subvert such beliefs. The process of generalization does not seem to be operating for either men's or women's gender category beliefs: men's and women's feminine self-conceptions are not related to whether they see members of their gender category as masculine or feminine (Table 2.12). I discuss the implications of this null finding below.

Turning to the relationship between self-conceptions and gender essentialist beliefs (which can also be reinforcing or subversive) (Table 2.13), women's feminine self-conceptions reinforce their adherence to essentialist gender beliefs. Women who see themselves as feminine in year 2 are more likely to espouse essentialist beliefs in year 5. Men's masculine self-conceptions also reinforce their gender essentialism; men's less masculine self-conceptions tend to subvert their beliefs in gender essentialism.

Tables 2.14-2.16 examine whether change in gender schemas can be predicted by self-conceptions over this relatively short time horizon. I find that, among men, less masculine self-conceptions marginally significantly predict a decline in traditional gender role beliefs over time (Table 2.14). Given the significance of the time-lagged predictions above, it is likely that the reinforcement/subversion process may unfold over a longer timeframe than the four years captured in this study. As above, self-conceptions do not have a significant generalization effect on men's and women's gender category beliefs over time (Table 2.15). Nor do self-conceptions predict changes in essentialist beliefs over time (Table 2.16).

Discussion

The most significant effect of feminine self-conceptions on gender schemas was reinforcement/subversion of adherence to traditional gender role beliefs and gender essentialism. For women, perception of oneself as feminine reinforces essentialist beliefs and marginally reinforces traditional gender role beliefs. Men's year 2 masculine self-conceptions reinforce their traditional gender role beliefs and gender essentialism and marginally predicts the increasing traditionality of these beliefs over time.

These results also indicate a subversion process. For those women who hold more masculine self-beliefs, and those men who hold more feminine self-beliefs, their adherence to counter-stereotypic self-conceptions subvert the legitimacy of essentialist and traditional gender role beliefs. Thus, it does seem possible that if men and women can learn to see themselves in a more neutral or less stereotypic light, these self-beliefs might actually undermine their adherence to such beliefs. These subversion and reinforcement processes worked similarly for gender essentialist beliefs.

The absence of generalization as a significant mechanism by which feminine or masculine self-conceptions influence feminine or masculine gender category beliefs is important. Men and women appear to be able to maintain hegemonic perceptions of their gender category, even if they are themselves a exception to those rules. Men's and women's self-conceptions are sensitive to their beliefs about the characteristics that define their gender category. However, the causal connection does not run the other way: their perceptions of their gender category do not become less stereotypical, even if they come to see themselves as having neutral or astereotypcial characteristics. Being the exception to one's gender category does not appear to undermine the legitimacy of that characterization itself.

Differences by School and Race/Ethnicity

I included controls for school and race/ethnicity in the previous structural equation models. I find several interesting differences by school. First, among women, those who attend MIT have significantly less feminine self-conceptions than women who attend UMass. In addition to these selection effects, women who attend MIT and Smith are more likely to have even more masculine self-conceptions by the time they graduate than UMass women. I find no significant differences in self-conceptions by school for men. Smith is considered to be a socially liberal school where rigid gender expectations are somewhat relaxed (Horowitz, 1984). MIT is a technical school with largely male-dominated curricula. This finding is consistent with my past research which showed that women in male-dominated fields (e.g. engineering) tend to have more masculine or neutral self-concepts than women in other majors (Cech 2007).

Women at Olin, MIT and Smith also have more progressive gender role beliefs than UMass women. Olin women become increasingly less essentialist over time than those at UMass. Smith students also have less feminine perceptions of other women, less essentialist beliefs, and develop increasingly more progressive and non-essentialist beliefs over time, compared to UMass women. There are no differences in the gender schemas of men at Olin, MIT and UMass.

Consistent with existing literature on racial/ethnic differences in gender beliefs and self-conceptions (e.g. Molloy & Herzberger 1998; Pyke & Johnson 2003, Okazaki 2002, Ray & Rosow 2010), gender schemas and self-conceptions differ significantly by race/ethnicity. African-American women are less likely to perceive themselves as feminine than white women, and both African-American women's and men's self-conceptions become more masculine over time, compared to white men's and women's self-conceptions. African-American women have more progressive gender role beliefs than white women. (See Appendix 1 for a more detailed description of these results by race/ethnicity).

Hispanic and Latino men have marginally more masculine self-conceptions than white men, and their self-conceptions become more masculine over time. Finally, Asian and Asian-American men's self-conceptions are less masculine than white men's self-conceptions and become less masculine over time, compared to the change in white men's self-conceptions. Asian and Asian-American men and women hold significantly more traditional gender role beliefs than white men and women, and Asian women become increasingly essentialist over time, compared to white women.[39]

2.11 Conclusion

The purpose of this chapter was to provide a theoretical and empirical introduction to gender schemas and self-conceptions, and to demonstrate their co-construction over time. I theorized and found evidence for several processes of co-construction: prescription, extrapolation, biological fatalism, reinforcement, and subversion. Notably absent was evidence for the process of generalization. I examined the co-construction of three sets of gender schema beliefs (traditional gender role beliefs, gender essentialist beliefs, and masculine and feminine gender category beliefs), and one component of self-conceptions (men's and women's perceptions of themselves as masculine or feminine), by analyzing the causal relationships between them. I now discuss these results and their importance to understanding gender inequality.

In part one, I found that self-conceptions and gender schemas are gendered in important ways, but that gender category beliefs are more polarized than self-conceptions. This polarization helps maintain the perception of gender differences, even

[39] The book manuscript will include more explanation and interpretation of these intersectional race/gender findings.

as individuals' self-conceptions defy such strong polarization. I also found that gender schemas and self-conceptions are relatively stable over this formative period in respondents' lives—but not completely stagnant. This is consonant with (and contributes to) the aggregate stability of gender beliefs in the United States. However, the movement on these beliefs that did exist suggests the possibility that these individual-level beliefs can change over time.

The second part of this chapter investigated the relationships between self-conceptions and gender schemas and found evidence that these beliefs function as a set of co-constitutive beliefs. Figure 2.2 summarizes these mechanisms and my empirical findings. Self-conceptions and gender schemas do not vary independently of one another, and men and women do not define themselves completely independently of broadly-held gender beliefs. I find strong co-constructive relationships between masculine self-conceptions and traditional gender role beliefs for men. Here, causality is significant in both directions: men with traditional gender role beliefs are more likely to see themselves as masculine (prescription), and men with masculine self-conceptions are more likely to adhere to traditional gender role beliefs (reinforcement). Women's essentialist beliefs and their feminine self-conceptions predict one another as well: women who hold essentialist beliefs are more likely to see themselves as feminine (biological fatalism). Women who see themselves as feminine, in turn, are more likely to believe essentialist accounts of gender (reinforcement). This co-construction is also clear for men, but with the opposite relationships: men who hold essentialist beliefs are less likely to see themselves as feminine, and men who perceive themselves as feminine are less likely to hold essentialist beliefs.

Essentialist gender beliefs create a feedback loop through self-conceptions: people who hold essentialist beliefs are more likely to see themselves along gender-stereotypic lines, and those stereotypic self-conceptions, in turn, reinforce beliefs that men and women are different "by nature."

Not all of the relationships between gender schemas and feminine self-conceptions appear to be co-constitutive, however. First, women's feminine self-conceptions marginally influenced their adherence to traditional gender role beliefs, but not the other way around. I argued above that women have cultural alternatives that allow them to reject traditional gender role beliefs but still hold feminine self-conceptions.

Gender category beliefs have a uni-directional relationship with self-conceptions as well. Specifically, respondents' perceptions of their gender category as feminine significantly predicted how feminine they perceived themselves, but the reverse relationship is insignificant. This lack of relationship helps explain the resilience of ideologies of hegemonic masculinity and femininity, even when people's own self-conceptions are exceptions to those beliefs.

I have only examined one particular element of self-conceptions in this analysis. Other components of self-conceptions may be co-constructed with gender schema beliefs differently than feminine self-conceptions. Predicting attitudes with other attitudes is notoriously difficult to do, compared to predicting attitudes with factors such as gender, age, race/ethnicity, or work status. Predicting the *change in* attitudes over time is even more challenging, as many life factors affect why people's beliefs might change (especially in this population that is experiencing what is likely a formidable time in their lives). However, the connections between gender schemas and self-conceptions are quite clear. The fact that I found significant relationships between them, and, in some cases, was able to predict the change in these beliefs over time, is important.

Finally, these results illustrate the potential power of these co-constitutive beliefs about gender and the self. Gender schemas become internalized into people's perceptions of themselves through processes of prescription, extrapolation, and biological fatalism. For example, adherence to traditional gender role beliefs may cause individuals to develop more gender-stereotypic self-beliefs over time. The next two chapters demonstrate how these gendered self-beliefs predict career decisions that reproduce sex-segregation. Because of their relationships to self-conceptions described here, these gender schema beliefs may *act through* self-conceptions to reproduce sex segregation. This self-expressive edge of sex segregation may be particularly resistant to social change, as this encoding process is culturally unavailable as a site for addressing gender inequality. It is one thing to argue against gender-essentialist notions of majors "women do" or "men do." It is quite another to challenge someone's individualistic claim that a certain major is "what suits" him or her.

On the other hand, this chapter suggests potential sites for the subversion of patriarchal gender beliefs. While altering the cultural models on which gender beliefs are based is an arduous task, my research illustrates that, if young men and women can develop less stereotypic perceptions of themselves, these astereotypic self-beliefs may reduce their adherence to traditional gender role beliefs and gender essentialism. I return to this discussion in chapter 6.

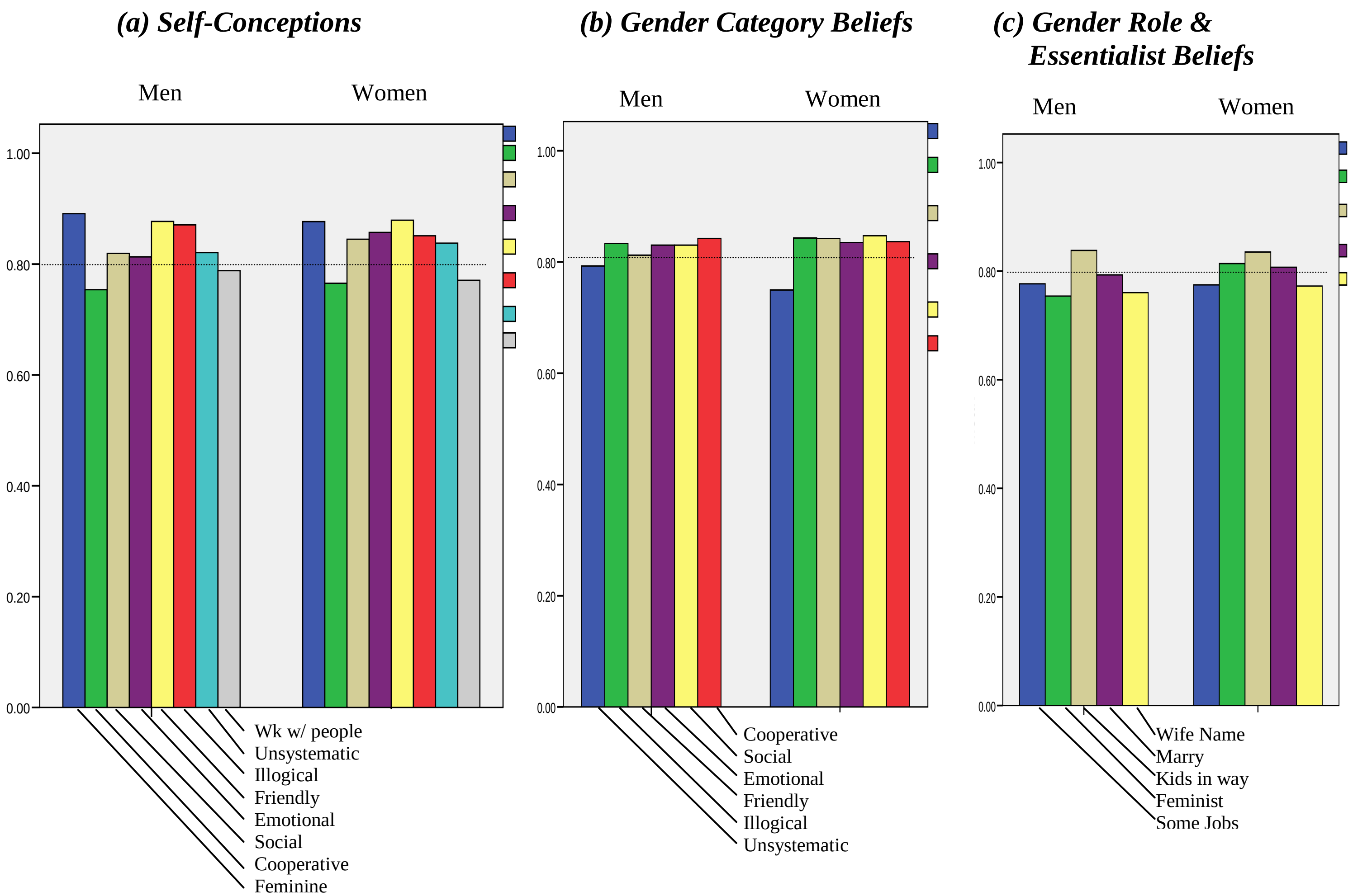

Figure 2.1 Self-Conceptions and Gender Schemas Stability Scores

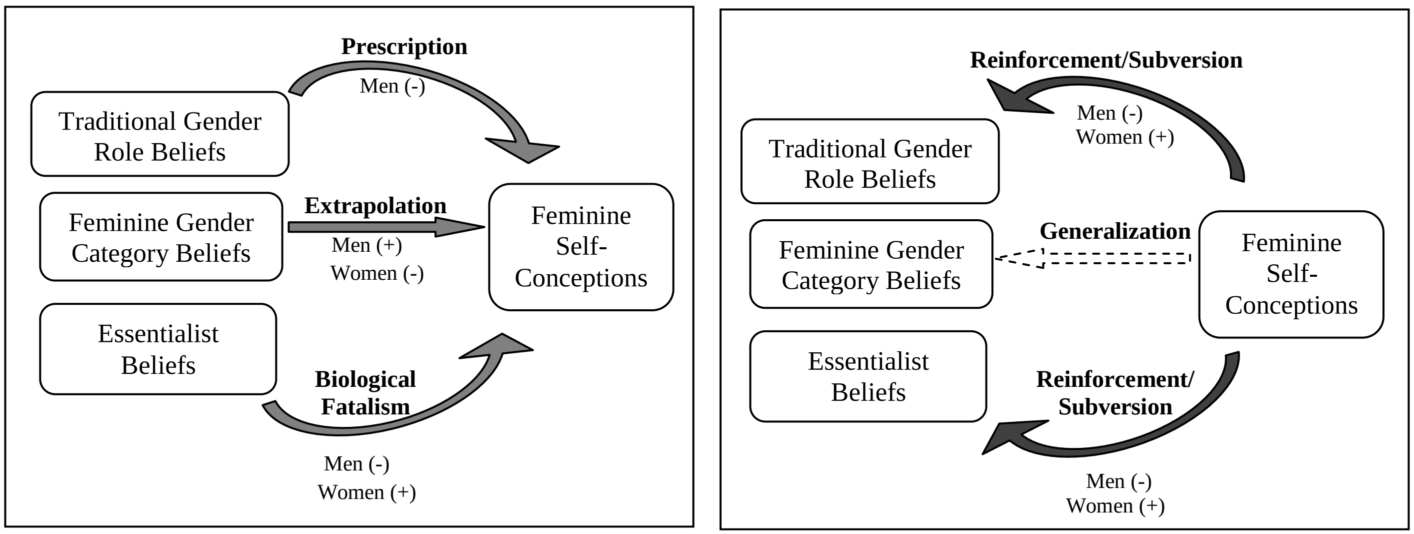

Figure 2.2: Schematic of Co-Construction and Significant Results (and Direction)

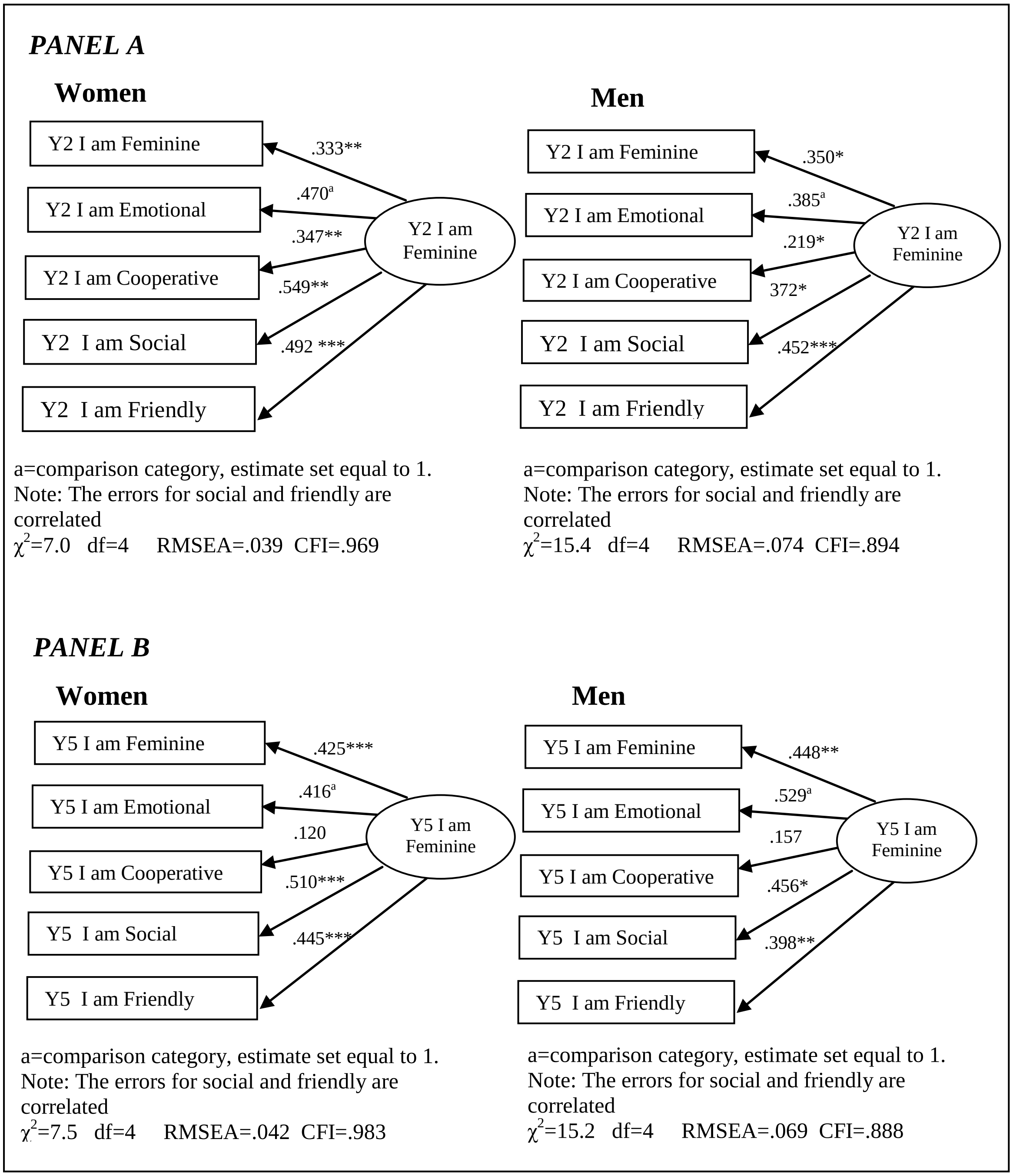

Figure 2.3: Latent Variable Construction and CFA for Feminine Self-Conceptions, Year 2 and 5, Standardized Coefficients

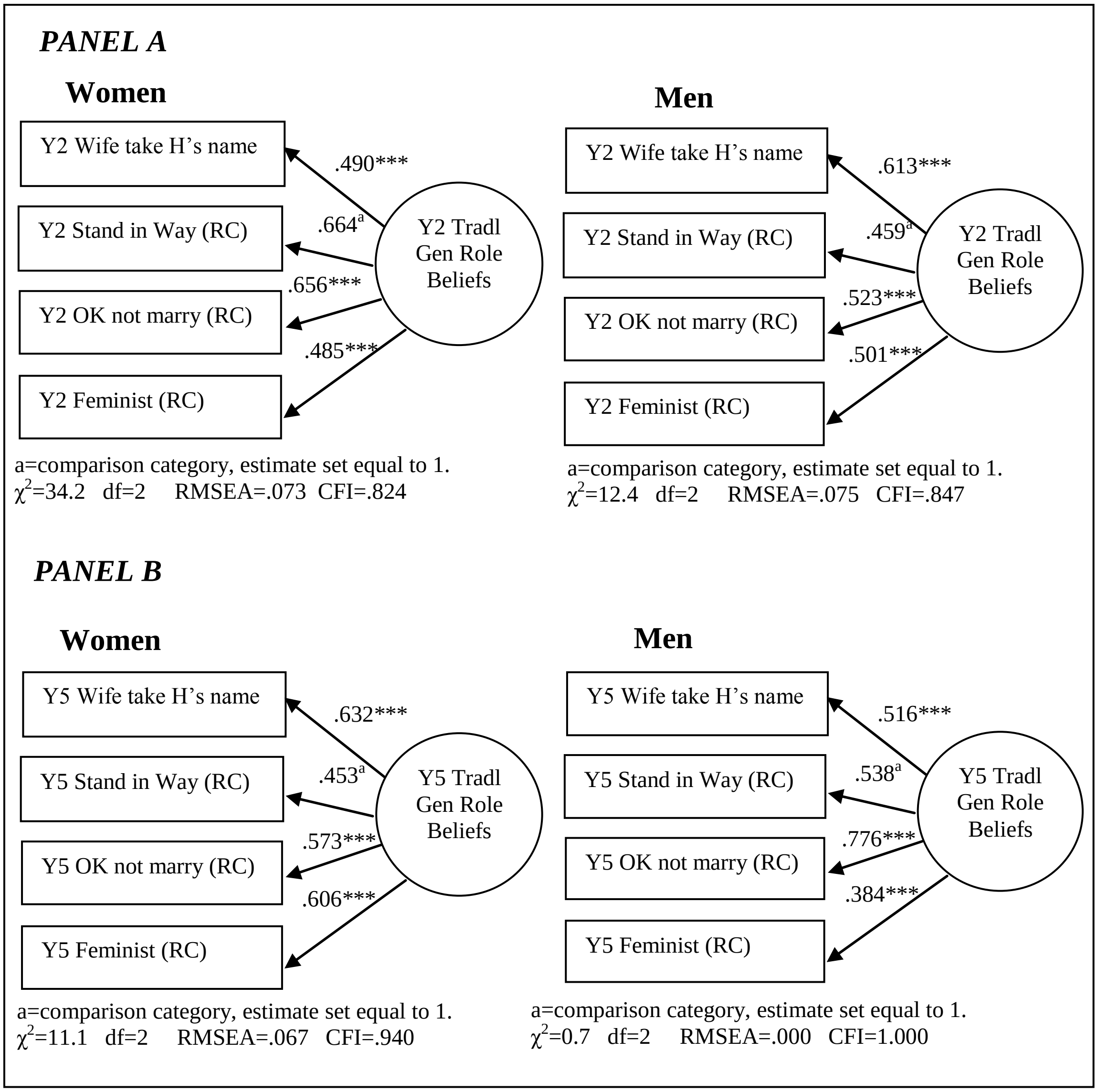

Figure 2.4: Latent Variable Construction and CFA for Traditional Gender Role Beliefs, Year 2 and 5, Standardized Coefficients

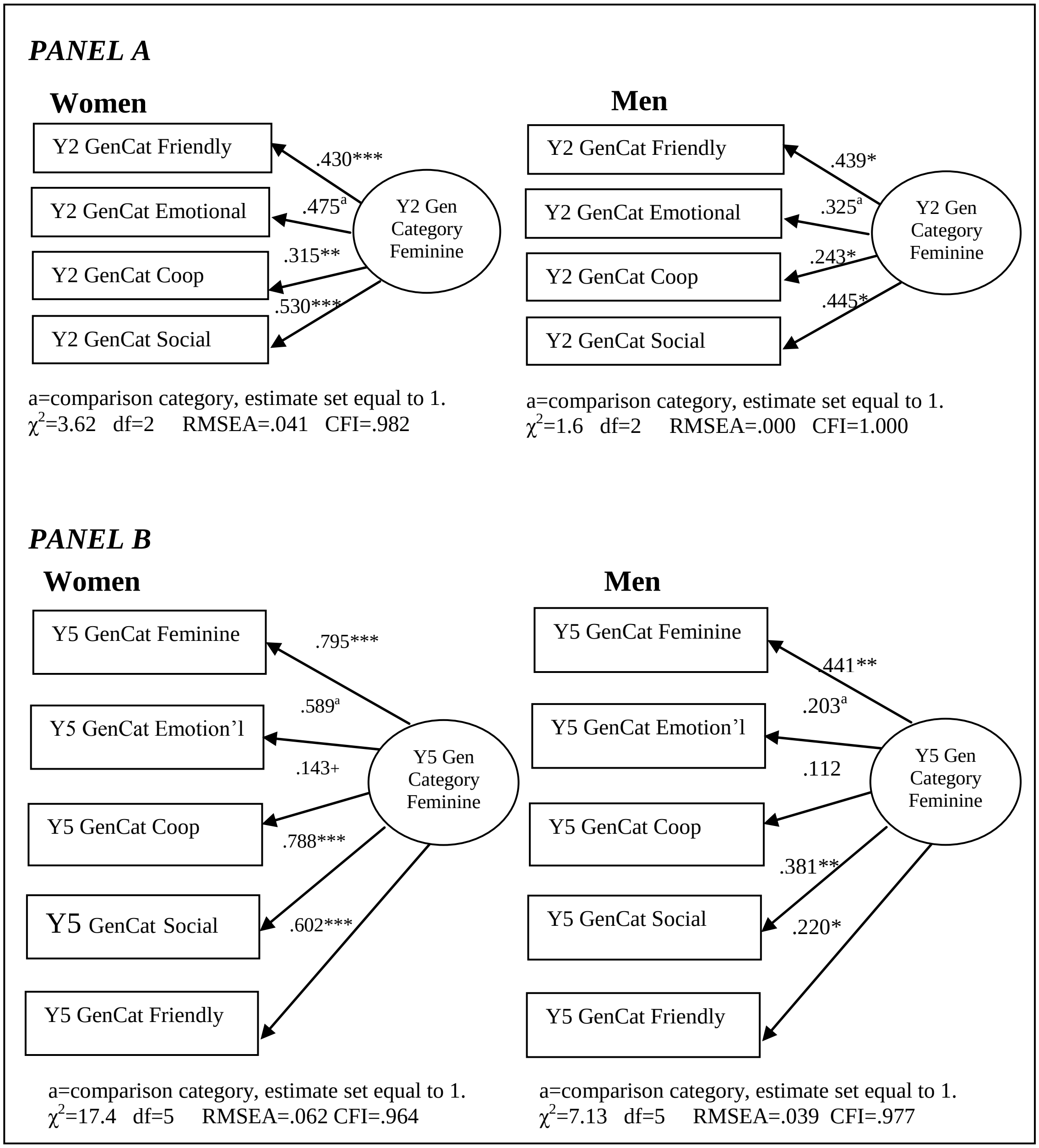

Figure 2.5: Latent Variable Construction and CFA for Feminine Gender Category Beliefs, Year 2 and 5

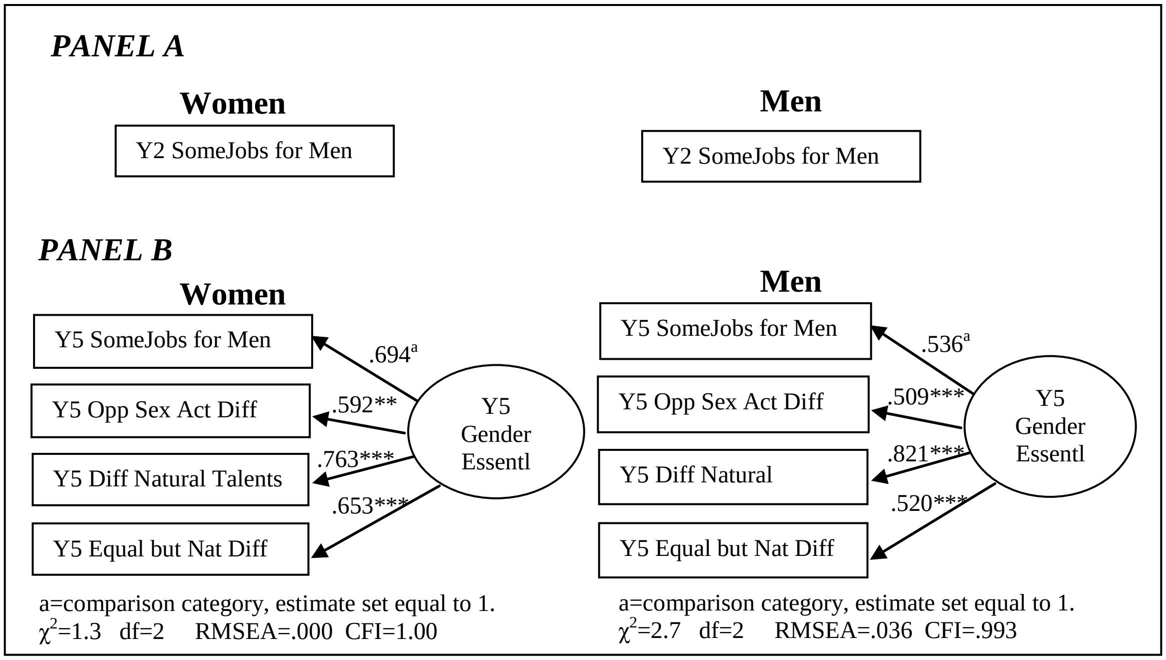

Figure 2.6: Latent Variable Construction and CFA for Gender Essentialist Beliefs, Year 2 and 5 (Standardized Coefficients

Table 2.1: Self-Conception and Gender Schemas Questions

Question	Response Options	Response Values	Years Surveyed
Self-Conception Questions			
Usually I am… Usually I am… Usually I am… Usually I am… Usually I am… Usually I am… Usually I am… Usually I am…	Individualistic ←→ Cooperative Work w/ things ←→ Work w/ people Asocial ←→ Social Logical ←→ Illogical Systematic ←→ Unsystematic Masculine ←→ Feminine Unemotional ←→ Emotional Unfriendly ←→ Friendly	1 to 7	2, 3, 4, 5
Gender Schemas Questions			
Gender Category Beliefs			
Usually, others of my same sex are… Usually, others of my same sex are… Usually, others of my same sex are… Usually, others of my same sex are… Usually, others of my same sex are… Usually, others of my same sex are… Usually, others of my same sex are… Usually, others of my same sex are…	Individualistic ←→ Cooperative Work w/ things ←→ Work w/ people Asocial ←→ Social Logical ←→ Illogical Systematic ←→ Unsystematic Masculine ←→ Feminine Unemotional ←→ Emotional Unfriendly ←→ Friendly	1 to 7	2, 3, 4, 5
Gender Role Beliefs			
Wife should willingly take husband's name at marriage. Women should not let bearing children stand in the way of a career if she wants it (reverse coded) Women can have full and happy life without marrying (reverse coded). I consider myself a feminist (recode).	Strongly Disagree to Strongly Agree	1 to 5	2, 5
Gender Essentialist Beliefs			
There are some jobs and professions that are more suitable for men than for women	Strongly Disagree to Strongly Agree	1 to 5	2, 5
I expect members of the opposite sex to act differently than me at work. The trend of occupational sex segregation in the U.S. exists because men and women are naturally talented at different things. Men and women should have equal rights, but they are different by nature.	Strongly Disagree to Strongly Agree	1 to 5	5
Demographic Information [Years Surveyed]			
Gender [1]	School [1, 2, 3, 4]		
Race/Ethnicity [1]	Religiosity [2]		
Family Income [1]	Political Conservatism [2]		
Parents' Education [1]	Sexual Identity [2, 5]		
Parents' Occupation[1]	Whether born in U.S. or elsewhere [1]		
Religiosity [2]	Detailed Post-Graduation Occupation [5]		
Detailed Academic Major [1, 2, 3, 4]	Detailed Post-Graduation Graduate or Professional School [5]		
Detailed Academic Minor [1, 2, 3, 4]			

Table 2.2: Means and Standard Deviations for Men and Women, Year 2 and Year 5

	WOMEN				MEN				Gender Difference	
	Year 2 (n=298)		**Year 5** (n=167)		**Year 2** (n=304)		**Year 5** (n=176)		**Yr2** ***p***	**Yr5** ***p***
Self-Conception Measures	**Mean**	***Stdev***	**Mean**	***Stdev***	**Mean**	***Stdev***	**Mean**	***Stdev***		
I am Feminine	5.34	*1.01*	5.20	*1.05*	2.66	*1.04*	2.66	*0.89*	***	***
I am Cooperative	3.46	*1.53*	3.15	*1.64*	3.53	*1.59*	3.32	*1.67*		
I am Social	5.00	*1.42*	5.22	*1.26*	4.76	*1.60*	5.04	*1.32*		
I am Unsystematic	2.74	*1.35*	2.52	*1.12*	2.70	*1.31*	2.63	*1.21*		
I am Illogical	2.54	*1.21*	2.43	*1.12*	2.03	*1.00*	1.94	*1.02*	***	***
I am Emotional	4.99	*1.27*	5.01	*1.19*	3.99	*1.56*	4.01	*1.45*	***	***
I am Friendly	5.72	*1.06*	5.85	*0.94*	5.59	*1.12*	5.64	*0.90*		*
I am People-Oriented	4.39	*1.83*	4.97	*1.56*	4.33	*1.69*	4.70	*1.63*		+
Gender Category Beliefs										
Same Sex: Feminine	--	--	5.45	*0.74*	--	--	2.54	*0.71*	--	***
Same Sex: Cooperative	4.18	*1.50*	4.08	*1.39*	3.72	*1.33*	3.24	*1.12*	***	***
Same Sex: Social	5.44	*1.08*	5.58	*0.94*	4.69	*1.32*	4.79	*1.31*	***	***
Same Sex: Illogical	3.79	*1.20*	3.79	*1.14*	3.17	*1.36*	3.29	*1.16*	***	***
Same Sex: Unsystem.	3.68	*1.10*	3.56	*1.05*	3.17	*1.36*	3.43	*1.07*	***	
Same Sex: Emotional	5.67	*1.01*	5.43	*0.92*	3.06	*1.02*	3.42	*0.98*	***	***
Same Sex: Friendly	5.13	*1.08*	5.09	*0.96*	4.59	*1.21*	4.62	*0.97*	***	***
Traditional Gender Role Beliefs *(5=Strongly Agree; 1=Strongly Disagree)*										
Wife should take husband's name	2.59	*1.12*	1.98	*1.11*	3.17	*1.18*	2.73	*1.18*	***	***
Women can live a full/happy lives w/o marrying (rev. coded)	1.83	*0.96*	1.50	*0.86*	2.10	*1.11*	1.81	*1.03*	***	***
Women shouldn't let kids stand in way of career (rev. coded)	1.99	*1.00*	1.71	*0.89*	2.41	*1.16*	2.10	*1.10*	***	***
I consider myself a feminist (rev. coded)	2.79	*1.17*	2.36	*1.12*	3.56	*1.18*	3.40	*1.24*	***	***
Gender Essentialism *(5=Strongly Agree; 1=Strongly Disagree)*										
Some jobs better suited for men	3.33	*1.26*	3.47	*1.32*	2.62	*1.23*	2.70	*1.30*	***	***
I expect members of opposite sex to act differently	--	--	3.51	*1.23*	--	--	3.62	*1.17*	--	
M and W naturally talented at diff. things	--	--	3.80	*1.19*	--	--	3.33	*1.28*	--	***
Have equal rights, but are different by nature.	--	--	2.46	*1.25*	--	--	2.08	*0.99*	--	***

Table 2.3: Unstandardized Coefficient Estimates of SEM Predicting Year 5 Feminine Self-Conceptions with Traditional Gender Role Beliefs and Controls

	WOMEN			MEN		
	Unst. Estimate	S.E.		Unst. Estimate	S.E.	
Traditional Gender Role Beliefs	**.165**	**.122**		**-.218**	**.105**	*
MIT	-.694	.191	***	-.024	.109	
Smith	-.176	.161				
Olin	-.108	.245		-.141	.176	
African-American	-.376	.225	+	.143	.307	
Hispanic or Latino	-.080	.179		-.150	.162	
Asian or Asian-American	.111	.124		.154	.126	
Chi-squared (df)	131.0 (67)			99.0 (60)		
RMSEA	.045			.048		
CFI	.937			.853		
R^2	.200			.146		

Table 2.4: Unstandardized Coefficient Estimates of SEM Predicting Year 5 Feminine Self-Conceptions with Year 2 Feminine Gender Category Beliefs and Controls

	WOMEN			MEN		
	Unst. Estimate	S.E.		Unst. Estimate	S.E.	
Y2 Same Sex is Feminine	**.291**	**.136**	*	**.646**	**.541**	
MIT	-.714	.192	**	-.071	.168	
Smith	-.189	.158				
Olin	-.213	.249		-.134	.253	
African-American	-.432	.231	+	.201	.469	
Hispanic or Latino	-.029	.188		-.389	.255	
Asian or Asian-American	.163	.127		.250	.189	
Chi-squared (df)	119.6 (67)			74.7 (60)		
RMSEA	.040			.029		
CFI	.943			.949		
R^2	.219			.078		

Table 2.5: Unstandardized Coefficient Estimates of SEM Predicting Year 5 Feminine Self-Conceptions with Year 5 Feminine Gender Category Beliefs and Controls

	WOMEN			MEN		
	Unst. Estimate	S.E.		Unst. Estimate	S.E.	
Y5 Same Sex is Feminine	**.233**	**.082**	**	**.277**	**.123**	*
MIT	-.783	.193	***	-.098	.121	
Smith	-.197	.157				
Olin	-.189	.253		-.066	.170	
African-American	-.374	.230		.365	.348	
Hispanic or Latino	-.047	.190		-.252	.185	
Asian or Asian-American	.172	.129		.120	.132	
Chi-squared (df)	142.6 (81)			130.0 (73)		
RMSEA	.040			0.051		
CFI	.948			0.845		
R^2	.238			.154		

Table 2.6: Unstandardized Coefficient Estimates of SEM Predicting Year 5 Feminine Self-Conceptions with Year 2 Gender Essentialist Beliefs and Controls

	WOMEN			MEN		
	Unst. Estimate	S.E.		Unst. Estimate	S.E.	
Y2 Gender Essentialism	**.076**	**.043**	+	**-.239**	**.078**	**
MIT	-.527	.192	**	-.096	.205	
Smith	-.245	.170				
Olin	-.300	.278		-.146	.301	
African-American	.417	.249	+	.410	.575	
Hispanic or Latino	-.047	.208		-.466	.298	
Asian or Asian-American	-.001	.142		.536	.232	
Chi-squared (df)	38.5 (32)			36.5 (28)		
RMSEA	.020			.033		
CFI	.990			.955		
R^2	.112			.151		

Table 2.7: Unstandardized Coefficient Estimates of SEM Predicting Year 5 Feminine Self-Conceptions with Year 5 Gender Essentialist Beliefs and Controls

	WOMEN			MEN		
	Unst. Estimate	S.E.		Unst. Estimate	S.E.	
Y5 Gender Essentialism	**.108**	**.050**	*	**-.315**	**.108**	***
MIT	-.489	.142	***	-.012	.178	
Smith	-.126	.109				
Olin	-.100	.172		-.084	.258	
African-American	-.202	.155		.183	.498	
Hispanic or Latino	-.064	.129		-.302	.259	
Asian or Asian-American	.037	.093		.442	.211	*
Chi-squared (df)	79.7 (67)			103.0 (60)		
RMSEA	.020			.050		
CFI	.988			.869		
R^2	.216			.200		

Table 2.8: Unstandardized Coefficient Estimates of SEM Predicting *Change in* Feminine Self-Conceptions (Year 2 to Year 5) with Year 2 Traditional Gender Role Beliefs

	WOMEN			MEN		
	Unst. Estimate	S.E.		Unst. Estimate	S.E.	
Traditional Gender Role Beliefs	**.101**	**.090**		**-.384**	**.184**	+
Year 2 Feminine Self-Conceptions	.559	.120	***	1.007	.266	***
MIT	-.338	.140	*	-.191	.179	
Smith	.025	.126				
Olin	.024	.191		-.192	.275	
African-American	-.415	.182	*	-2.757	.870	***
Hispanic or Latino	.003	.140		-.551	.259	*
Asian or Asian-American	.103	.098		.577	.213	*
Chi-squared (df)	214.6 (133)			197.7 (122)		
RMSEA	.036			.047		
CFI	.936			.838		
R^2	.788			.840		

Table 2.9: Unstandardized Coefficient Estimates of SEM Predicting *Change in* Feminine Self-Conceptions (Year 2 to Year 5) with Year 2 Feminine Gender Category Beliefs

	WOMEN			MEN		
	Unst. Estimate	**S.E.**		**Unst. Estimate**	**S.E.**	
Y2 Same Sex is Feminine	**-.105**	**.121**		**.040**	**.086**	
Y2 Feminine Self-Conceptions	.606	.135	***	.868	.247	***
MIT	-.367	.142	**	-.191	.160	
Smith	-.045	.121				
Olin	.001	.192		-.065	.233	
African-American	-.360	.181	*	-1.056	1.820	*
Hispanic or Latino	-.027	.145		-.544	.243	*
Asian or Asian-American	.136	.099		.523	.201	**
Chi-squared (df)	216.3 (133)			191.3 (122)		
RMSEA	.036			.045		
CFI	.932			.862		
R^2	.571			.769		

Table 2.10: Unstandardized Coefficient Estimates of SEM Predicting *Change in* Feminine Self-Conceptions (Year 2 to Year 5) with Year 2 Gender Essentialist Belief

	WOMEN			MEN		
	Unst. Estimate	**S.E.**		**Unst. Estimate**	**S.E.**	
Y2 Gender Essentialism	**-.014**	**.018**		**-.177**	**.065**	**
Y2 Feminine Self-Conceptions	.905	.325	**	1.007	.249	***
MIT	-.233	.095	*	-.181	.170	
Smith	-.029	.073				
Olin	-.013	.116		-.133	.247	
African-American	-.237	.116	*	-2.771	.789	***
Hispanic or Latino	-.001	.087		-.704	.256	***
Asian or Asian-American	.093	.063		.701	.211	***
Chi-squared (df)	93.4 (83)			130.6 (75)		
RMSEA	.016			.051		
CFI	.990			.861		
R^2	.548			.813		

Table 2.11: Unstandardized Coefficient Estimates of SEM Predicting Year 5 Traditional Gender Role Beliefs with Year 2 Feminine Self-Conceptions

	WOMEN			MEN		
	Unst. Estimate	**S.E.**		**Unst. Estimate**	**S.E.**	
Y2 SC: Feminine	**.178**	**.107**	+	**-.248**	**.118**	*
MIT	-.300	.141	*	.105	.085	
Smith	-.749	.146	***			
Olin	-.407	.209	+	.132	.197	
African-American	-.500	.191	**	.479	.207	*
Hispanic or Latino	-.006	.155		.005	.170	
Asian or Asian-American	.388	.110	***	.393	.119	*
Chi-squared (df)	109.3 (67)			108.5 (60)		
RMSEA	.036			.033		
CFI	.952			.920		
R^2	.365			.241		

Table 2.12: Unstandardized Coefficient Estimates of SEM Predicting Year 5 Feminine Gender Category Beliefs with Year 2 Feminine Self-Conceptions

	WOMEN			MEN		
	Unst. Estimate	**S.E.**		**Unst. Estimate**	**S.E.**	
Y2 SC: Feminine	**.024**	**.120**		**-.003**	**.015**	
MIT	-.037	.159		.098	.111	
Smith	-.394	.147	**			
Olin	-.099	.237		.058	.158	
African-American	.383	.215	+	-.221	.356	
Hispanic or Latino	-.162	.179		.084	.157	
Asian or Asian-American	-.008	.119		-.046	.118	
Chi-squared (df)	125.7 (81)			130.8 (73)		
RMSEA	.034			.053		
CFI	.957			.798		
R^2	.083			.010		

Table 2.13: Unstandardized Coefficient Estimates of SEM Predicting Year 5 Gender Essentialist Beliefs with Year 2 Feminine Self-Conceptions

	WOMEN			MEN		
	Unst. Estimate	**S.E.**		**Unst. Estimate**	**S.E.**	
Y2 SC: Feminine	**.484**	**.225**	*	**-.869**	**.371**	**
MIT	-.121	.228		.098	.205	
Smith	-.530	.185	**			
Olin	-.345	.300		-.218	.296	
African-American	.293	.267		.087	.571	
Hispanic or Latino	.080	.225		-.046	.296	
Asian or Asian-American	.693	.156	***	.687	.226	*
Chi-squared (df)	79.7 (67)			103.0 (60)		
RMSEA	.020			.050		
CFI	.988			.869		
R^2	.225			.229		

Table 2.14: Unstandardized Coefficient Estimates of SEM Predicting *Change in* Traditional Gender Role Beliefs (Year 2 to Year 5) with Year 2 Feminine Self-Conceptions

	WOMEN			MEN		
	Unst. Estimate	**S.E.**		**Unst. Estimate**	**S.E.**	
Y2 SC: Feminine	**.163**	**.120**		**-.124**	**.016**	+
Y2 Tradtl Gender Role Beliefs	.770	.119	***	1.076	.261	***
MIT	-.184	.169		.046	.112	
Smith	-.484	.166	**			
Olin	-.256	.254		.173	.181	
African-American	.369	.228		.139	.360	
Hispanic or Latino	.009	.187		.175	.159	
Asian or Asian-American	-.239	.131	+	.219	.122	+
Chi-squared (df)	224.6 (117)			184.3 (107)		
RMSEA	.044			.050		
CFI	.918			.836		
R^2	.618			.752		

Table 2.15: Unstandardized Coefficient Estimates of SEM Predicting *Change in* Feminine Gender Category Beliefs (Year 2 to Year 5) with Year 2 Feminine Self-Conceptions

	WOMEN			MEN		
	Unst. Estimate	**S.E.**		**Unst. Estimate**	**S.E.**	
Y2 SC: Feminine	**-.072**	**.113**		**.003**	**.004**	
Y2 Feminine Gender Categ. Beliefs	.255	.133	*	.799	.445	
MIT	-.064	.130		.014	.037	
Smith	-.279	.123	*			
Olin	-.140	.194		-.071	.063	
African-American	.166	.176		-.175	.136	
Hispanic or Latino	-.094	.146		-.043	.057	
Asian or Asian-American	.015	.097		.021	.041	
Chi-squared (df)	184.7 (117)			195.8 (107)		
RMSEA	.034			.054		
CFI	.939			.794		
R^2	.514			.471		

Table 2.16: Unstandardized Coefficient Estimates of SEM Predicting *Change in* Gender Essentialist Beliefs (Year 2 to Year 5) with Year 2 Feminine Self-Conceptions

	WOMEN			MEN		
	Unst. Estimate	**S.E.**		**Unst. Estimate**	**S.E.**	
Y2 SC: Feminine	**.026**	**.153**		**-.067**	**.059**	
Y2 Gender Essentialist Beliefs	.607	.046	***	.618	.063	***
MIT	-.160	.202		.203	.178	
Smith	-.485	.187	**			
Olin	-.645	.300	*	.101	.260	
African-American	.349	.271		-.419	.553	
Hispanic or Latino	.384	.226	+	.227	.254	
Asian or Asian-American	.357	.155	*	.068	.193	
Chi-squared (df)	37.6 (36)			83.6 (32)		
RMSEA	.009			.075		
CFI	.991			.817		
R^2	.654			.378		

The Self-Expressive Edge of Sex-Segregation: The Role of Gender Schemas and Self-Conceptions in College Major Selection and Career Launch

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Chapter 3— Who Chooses Sex-Segregated Degrees? The Role of Individual-Level Beliefs on College Major Selection and Change

The demography of a typical college course in elementary education looks strikingly different than that of a course in physics. While some fields such as business and marketing have roughly equal proportions of men and women, the majority of academic majors are at least 70 percent female or male (Digest of Educational Statistics 2009). This segregation is important to understand in its own right, and sex-segregation in degree credentials also contributes to sex segregation in occupations.

The previous chapter demonstrated that gender schemas and self-conceptions are co-constructed. What, then, is the relationship between these gendered self-conceptions and the academic fields of study that men and women choose? This chapter examines how these culturally informed self-conceptions influence whether respondents graduate with male-dominated or female-dominated degrees.

I begin by briefly reviewing the literature on sex segregation in higher education. I then present my theory and hypotheses for how self-conceptions influence college major selection through the process of self-expression, and how these self-expressive major choices, in turn, reproduce sex segregation in higher education. I show in this chapter that self-conceptions are indeed predictors of college degree selection. Women with self-conceptions that align most closely with stereotypical traits associated with women (i.e. feminine, unsystematic, and people-oriented) are more likely to graduate with degrees in female-dominated subjects. Men who perceive themselves as less systematic are more likely to choose female-dominated degrees, and men who perceive themselves as people-oriented are more likely to move into more female-dominated majors as they progress through college. These results are consistent with my analysis of the likelihood of choosing several individual male-dominated or female-dominated degrees. The chapter ends with a discussion of these findings and what they mean for respondents' career choices after college.

Not only does this chapter demonstrate that self-conceptions predict whether respondents choose male- or female-dominated college majors, it also showed that these effects happen in segregation-reproducing ways: those most likely to choose the most sex-segregated majors are also those most likely to have perceptions of themselves that embody stereotypic traits of men and women. Chapter 4 will analyze how self-conceptions influence sex segregation in career launch activities.

3.1 Horizontal Sex Segregation in Higher Education

Women made impressive inroads into higher education after the passage of Title IX (Charles & Bradley 2002). Women now make up the majority of college students, they earn 58 percent of all bachelor's degrees, and finish their degrees more quickly than men (Buchmann et al. 2008). Similarly, sex segregation in higher education has decreased substantially since the 1950s and 1960s: the dissimilarity index across fields of study fell from 40 percent in 1965 to 19 percent in 1995 (Gerber & Cheung 2008). As with many other dimensions of gender inequality, however, desegregation of college majors stalled in the 1990s (Cotter et al. 2011). There remains substantial segregation across fields of study and men crowd in academic majors that are most likely to translate into high-paying, prestigious occupations (male-dominated) occupations (Gerber & Cheung 2008). I briefly review the existing social science explanations for this enduring segregation and situate my approach within them.

Economic approaches argue that this sex segregation emerges out of men's and women's rational choices to maximize their lifetime earnings. I reviewed these human capital explanations in the introduction for occupational sex segregation in general, but there has been an influential literature on the choice of academic majors in particular. First, Polachek (1981), Becker (1993) and others argue that women, guided by "cost-benefit" calculations, prefer college majors that will be connected to occupations with high earnings right out of college (presumably before women have children), and have flatter earnings profiles that will minimize the cost of interruptions to employment in order to care for children. As discussed in the introduction, these human capital explanations have come under strong criticism (see D'Amico 1987; England 1984, 1982).

Secondly, a "comparative advantage" theory suggests that because women out-perform men in female-dominated majors, women choose such majors to maximize their possibility of having a positive outcome to their investment in higher education (Barone 2011). However, even with middle-range grade point averages, women have more opportunities to attain highly-paid occupations with a male-dominated degree than a female-dominated degree (Gerber & Cheung 2008).

A third assumption is that women do not have the high school preparation in math and science and thus do not choose male-dominated college majors. This may have been the case several decades ago, when women's math scores and preparation lagged men's, but men and women now take equally-demanding math classes in high school, they are more likely to have taken biology and chemistry classes than men, and earn better grades on average in these classes than their male peers (Buchmann et al. 2008). Secondly, while women's math and science preparation may be on par with men's, women assess their own abilities lower than men do. These biased self-assessments, *net of* math ability, preparation, and performance, lead women to be less likely than men to enter college with math and science majors (Correll 2004).

Rejecting rational actor explanations, sociologists and social psychologists have argued that structural and cultural processes lead to the perpetuation of sex segregation in higher education. First, the combination of diversified higher education systems, increasingly more elaborate educational niches, and high female employment rates in recent decades exacerbates sex segregation in higher education (Charles & Bradley 2002). When students are given greater latitude to choose their field, they tend to reproduce this segregation. Others have argued that desegregation happens most often in the most prestigious institutions, meaning that the effects of such desegregation are unlikely to make widespread change (Gerber & Cheung 2008). I see this in the data I use here: women are more highly represented in male-dominated fields at MIT and Olin than at UMass.

From a cultural perspective, boys and girls are encouraged to pursue different interests and develop different skills (Ridgeway & Smith-Lovin 1999): girls tend to read more often than boys, and boys have more practice with formal reasoning than girls. This socialization is believed to influence the types of interests that young men and women develop in high school and the college majors they eventually intend to select (Watt & Eccles 2008). Similarly, the role expectations literature (reviewed in the Introduction) argues that women and men are socialized to expect to take on different roles, and thus make career decisions based on their beliefs about how best to balance those roles. Women who are socialized to expect that they will take on childcare and spousal support roles will choose majors they believe will lead to more flexible or family-friendly occupations. This theory, however, suffers from the same problems as rational choice explanations.

The socialization literature is problematic because the college majors that men and women choose are often far afield from their interests as children. Jacobs (1989) argues that such socialized preferences are only effective to the extent that they are sustained by external discriminatory and sanctioning mechanisms of social control.

Mechanisms that sustain gendered interests and preferences do not necessarily have to be external, however. Sociologists have recently argued that the resilience of sex segregation of college majors is due in part to individual-level cultural processes. Charles and Bradley (2009) argue that many men and women make college major decisions along still-popular essentialist notions of gendered tasks. Men and women may "indulge their gendered selves" in their choice of academic majors, seeking self-fulfillment and to be part of fields that are extensions of themselves (Charles & Bradley 2009). I examine the extent to which perceptions of self influence the individual-level reproduction of sex segregation by attending to respondents' decisions about college majors. In particular, I am interested in how these beliefs predict college sex segregation scores (i.e. the percent women in each respondents' majors) as an outcome variable.

As discussed in chapter 1, there are forceful normative trends of choosing majors for self-expressive reasons. If selves are gendered, self-expressive major selection should be gendered as well. College presents relative freedom to align one's career goals with one's personal interests in ways that are much less costly than when they have entered the labor market. A student can be an aspiring chemist one semester, a musician the next, and end up graduating with a degree in political science. Making such rapid changes in one's career trajectory once in the workforce would be difficult, if not impossible. This flexibility, unparalleled in other parts of the career path, should provide the best conditions for making career decisions along self-expressive lines. This makes it an ideal location to study how gendered self-conceptions influence men's and women's career decisions.

As demonstrated in the last chapter, self-conceptions are deeply interwoven with cultural beliefs about gender. These gendered self-conceptions do not necessarily appear gendered to the individuals who hold them, however; they may simply appear individualistic. The expression of these self-conceptions in academic major selection can reproduce sex segregation in higher education but this self-expression might not seem gendered to those enacting it.

3.2 Self-Conceptions and Self-Expressive Major Selection

Gendered self-conceptions can be translated into gendered self-expressive major selection as men and women match their self-conceptions with stereotypes about male- and female-dominated fields writ large, regardless of the actual content of those fields, or with stereotypes about the specific content or skills required of individual fields.[40] In the first of these self-expressive processes, young men and women match their self-conceptions with broad, stereotypical assumptions associated with fields that are male-

[40] This is roughly how I expect this process to occur. Post-dissertation, I will analyze the qualitative data on respondents talking about their decisions about major selection and career launch for insights into the *process* by which self-conceptions turn into self-expressive career decisions. What are students responding to? The content of the fields? The professional role? The characteristics of the typical practitioners of those fields? I think such a chapter would enrich my discussion of this "self-expressive edge" of sex-segregation by allowing me to give specific details about how this happens at the individual level.

typed and female-typed. These stereotypes exist partially separate from the actual activities that make up these fields and are an incarnation of the stereotypes broadly associated with women and men. Female-typed fields are generally associated with traits stereotypically assigned to women (e.g. feminine, people-oriented, unsystematic), and male-typed fields are associated with traits stereotypically assigned to men—e.g. masculine, systematic, and objects-oriented.   As an act of self-expression, respondents may match their self-conceptions with these stereotypes. It is unlikely that many students explicitly or intentionally base their decisions on the demographic representation of women or men in a certain field. To reiterate the quote from chapter 1, it is no longer culturally legitimate to claim that "I am choosing this major because I am a man," but rather, "I choose this major because it suits me."

The second process is the cumulative effect of gendered stereotypes about the activities and traits that make up the fields along the male-dominated to female-dominated spectrum. The activities and skills that comprise an elementary education degree, for example, are stereotypically associated with women, while the activities and skills that comprise a mechanical engineering degree are stereotypically associated with men. Women and men who match their gendered self-conceptions to the stereotypes of the characteristic tasks of these fields will help to reproduce sex segregation in college majors through these "self-expressive" choices.

The cultural stereotypes assigned to any given field (or the tasks and skills assumed to be needed or valued in that field), however, are not necessarily accurate representations of the kinds of skills that are required to succeed in a field. The beliefs about what it means to be a competent student in a field are sensitive to the demographic representation of men and women within them (England et al. 1996). Thus, the skills and sensibilities assumed to be essential to success in a given field are usually only a selection of the skills actually required of that field—emphases and de-emphases that happen along gendered lines. Nursing requires skills in logic, knowledge and manipulation of machinery, and mental calculations, while engineering requires teamwork and communication skills, but such skills are de-emphasized in these respective fields, perhaps because they are contrary to the gender-typing of these fields.

In this chapter, I examine the effects of gendered self-conceptions on whether students select male-dominated or female-dominated majors, and whether students select individual male-typed or female-typed majors. I expect that women and men with more feminine, unsystematic and more people-oriented self-conceptions will be more likely to graduate with female-dominated degrees than their peers. I also predict that they will be more likely to graduate with degrees in humanities and social sciences (examples of individual female-typed fields) and be less likely to graduate with degrees in physical sciences and engineering (examples of individual male-typed fields). I end with a discussion of these results and lead into the following chapter.

3.3 Hypotheses

To investigate the possibility that expression of gendered self-conceptions leads to gendered decisions about college majors, I examine the effects of several types of self-conceptions on the probability that men and women will choose male-dominated or female-dominated majors. I focus on three particular self-conception spectrums: perception of oneself as feminine (versus masculine), as unsystematic (versus systematic), and as people-oriented (versus things-oriented). I use multiple self-conceptions in an attempt to show that any effects I find are likely not specific to a narrowly-defined type of self-conception. My purpose is to show how self-conceptions, in general, could influence career launch decisions. It should not be assumed that these are the *only* self-conceptions that influence career launch; rather they are useful exemplars of substantive categories of self-beliefs. If I find an effect of self-conceptions here, it is likely there are many other self-conceptions that follow the same pattern.

First, I examine whether respondents' perceptions of themselves as masculine or feminine affect their choice of female-dominated or male-dominated college degree fields. As discussed in chapter 2, the feminine self-conception measure should be a salient factor in self-expressive decision-making related to sex-segregation. I expect self-expressive patterns of career selection to unfold such that students with self-conceptions traditionally stereotyped as more feminine will be more likely to earn female-dominated degrees and be more likely to move into an even more female-dominated majors. As discussed in chapter 2, perceptions of self as masculine or feminine is the central axis of gendered identity differentiation and holds power for both men and women (Eccles 1999). In addition to feminine self-conceptions, I am also interested in how respondents' perceptions of themselves as unsystematic influence their decisions about college majors. Men are stereotypically characterized as more "systematic" than women (Lee, 1998). This measure is particularly important for capturing the self-expressive processes leading people into (or away from) male dominated fields such as science and engineering that are presumed to require strong skills in logical and systematic thinking (Faulkner, 2000; McIlwee & Robinson, 1992).

Third, I examine the relationship between respondents' perceptions of themselves as people-oriented or things-oriented and the sex-segregation of the degree fields they select. College majors that are female-dominated are often stereotyped as ideal for individuals who "like to work with people" (e.g. elementary school teaching and nursing). Many male-dominated fields are stereotyped as "things" or "objects-focused," where the majority of a practitioner's time is engaged in working with objects (e.g. machines, tools) rather than people (Bem, 1993; Coltrane, 1998; Valian, 1999). These distinctions are quite arbitrary in practice, as most occupations require work with both people and things. Even the fields like engineering which are widely-stereotyped as "things-oriented" have extensive social and communicative aspects (Faulkner, 2000). Nonetheless, the cultural distinction between people-focused and things-focused fields are consistent with the sex-typing of fields. I thus expect that people who perceive themselves as people-oriented will be more likely to choose degree fields that are female-dominated, while those who perceive themselves as things-oriented will be more likely to choose male-dominated degree fields.

3.4 Methods

Dependent Variables

The dependent variable of interest is a measure of the percent women in respondents' college degree that ranges from 0-100% women. I call this measure the *degree sex-segregation score.* A positive coefficient predicting this scale means that respondents with that characteristic are more likely to be enrolled in a female-dominated major; negative predictor coefficients would imply characteristics that lead respondents to enroll in male-dominated majors. I identified a college sex-segregation score for each person by matching their detailed college major (identified by year 5 transcript data and year 4 survey questions) with national statistics of the percent women in each of these fields. I referenced the statistics computed by the National Science Foundation's Division of Science Resource Statistics for the percent women in science and engineering-related degrees[41] and the National Center for Education Statistics' Digest of Educational Statistics for the percent women in non-science or engineering degrees.[42] Appendix 2 provides a more detailed description of the coding process and how I dealt with individuals with dual degrees.

I also created a measure of the change in respondents' college sex-segregation scores in descriptive and demographic models. To create this variable, I subtracted the percent female in the majors in which they enrolled in year 1 from the percent female in the fields in which they eventually earned their degrees:

[sex segregation change score in college = (% women in degree field) – (% women in year 1 major)]

For example, individuals with a positive change score moved into more female-dominated degree fields then the ones in which they originally majored. I use this change score in the descriptive analysis; I model change in the causal models by including respondents' entrance major sex-segregation scores in the structural equation models predicting sex-segregation scores in their degrees.

To see whether the trends identified with the sex segregation scores hold across individual male-typed, gender balanced, and female-typed majors, I examine the effects of self-conceptions on the likelihood of choosing individual majors. I run demographic

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[41] NSF detailed majors data: http://www.nsf.gov/statistics/wmpd/pdf/tabc-5.pdf
[42] Digest of Educational Statistics: http://nces.ed.gov/programs/digest/d09/tables/dt09_286.asp

OLS models and structural equation models individually for two female-typed majors (arts and humanities and social sciences), two gender balanced fields (business and biology), and two male-typed majors (engineering and physical sciences).

Independent Variables

I rely on several sets of independent variables to conduct this analysis. First, I use the year 2 latent measure of feminine self-conceptions presented in chapter 2 to predict sex-segregation scores. The year 2 latent measures for feminine self-conceptions are comprised of five attitudinal spectrum scales: "Usually I am very masculine" to "very feminine" (on a 1 to 7 scale), "usually I am very unemotional" to "very emotional" (1 to 7 scale), "usually I am very unfriendly" to "very friendly" (1 to 7 scale), "usually I am very uncooperative" to "very cooperative" (1 to 7 scale), and "usually I am very asocial" to "very social" (1 to 7 scale).[43] I created an additional latent variable to capture respondents' perceptions of themselves as "unsystematic." I use two manifest variables to construct the latent variable for unsystematic self-conceptions: "usually I am very systematic" to "very unsystematic" (1 to 7 scale) and "usually I am very logical" to "very illogical" (1 to 7 scale).[44]

A third self-conception I examine is respondents' belief that they are better suited for working with people rather than things. For this, I use a single indicator, "Usually I like to work with things" to "Usually I like to work with people" (1 to 7). Because there are no other indicators with which I could build a latent variable, I use the "people-

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[43] See chapter 2 for men's and women's CFAs for year 2 feminine self-conceptions.
[44] The systematic/unsystematic measure is the reference indicator in the latent variable; I constrained the variance of the error term on this manifest variable to 1 to allow for model identification. Year 2 CFAs for men and women: χ^2=0, df=0, CFI=1.000, RMSEA=.000. Standardized regression weights for men: .620 for "I am illogical" and .645 for "I am unsystematic." Standardized regression weights for women: .667 for "I am illogical" and ".670 for "I am unsystematic."

oriented" measure as a single manifest variable predicting sex-segregation scores and their change scores. Tests for discriminant validity of these self-conception measures were significant at the .000 level for both men and women.[45]

As discussed in chapter 2, it would be impossible to capture individuals' entire conceptions of themselves in a survey instrument. Instead, I use three career-relevant self-conceptions that are highly gendered and are themes that are likely to be invoked in self-expressive decision-making. I showed that the "feminine" self-conceptions are co-constructed with cultural gender beliefs in the previous chapter. To make the argument that gender schemas act through self-conceptions to reinforce occupational sex segregation, it is enough that I show that *some* culturally-informed self-conceptions influence college major selection.

The demographic models discussed below (and those presented in Appendix 2) measure several demographic characteristics on choice of major, including respondents' gender (women=1)[46], whether respondents were born in the U.S. (yes=1), their family's income (in dollars), whether they identify as gay, lesbian or bisexual (yes=1), their political conservatism (1=very liberal to 7=very conservative), how they rate their religiosity compared to their peers (1=lowest 10% to 5=highest 10%), and their SAT math and verbal scores. The structural equation models control for the following race/ethnicity and school measures: whether respondents identify as African-American (yes=1), Hispanic or Latino (yes=1) or Asian or Asian-American (yes=1), or non-Hispanic white (yes=1; reference category); whether they attended MIT (yes=1), Olin

[45] I also ensured that each manifest variable was not more correlated with a measure outside of its latent variable group than it was correlated with the measures in its latent variable group.
[46] The structural equation models are ran separately for men and women, so they do not include a control for gender.

(yes=1), Smith (yes=1) or UMass (yes=1; reference category), and their SAT math and verbal scores.

Analytic Strategy

Table 3.1 presents the univariate and bivariate statistics for college sex segregation scores at year 1, at college degree (year 4), and the change in sex segregation scores between year 1 and college graduation. I use OLS regression in Table 3.2 to determine the demographic predictors of sex-segregation scores and change in sex-segregation scores over time. Since people-oriented self-conception is not measured with a latent variable, I examine the effects of this self-conception on the dependent variable using OLS regression. The remainder of the analysis in this chapter uses structural equation modeling. I remind the reader that latent variables are meant to represent overarching concepts, the components of which are captured by the manifest variables predicted by the latent measure. The benefit of latent variables is that not all possible measures of this concept must be included as manifest variables for the concept to be adequately represented by the latent variable (Byrne, 2010). Table 3.3-3.5 present the structural models (the relationships between the latent independent variable and the dependent variable) and the controls predicting the degree sex segregation score and change scores. Tables 3.6-3.11 present the SEMs and OLS models predicting whether students select into specific male-dominated, gender balanced, or female-dominated majors. All models presented in this chapter control for school attended, race/ethnicity, and SAT math and verbal scores. (No other demographic factors were significant predictors of sex-segregation scores in the demographic models.)

As noted in chapter 1, this sample of students from MIT, Olin, Smith and UMass is not a representative sample of all institutions of higher education in the United States. It is, however, an advantageous sample for examining the effects of self-conceptions on academic major selection. MIT and Olin are elite private institutions that emphasize training in male-dominated fields. Students at these schools experience greater-than-average pressure to major in the most prestigious (i.e. male-dominated) fields of study at these institutions—it is far less prestigious to be a business major at MIT than a physics major and these prestige rankings are palpable. At more mainstream institutions like UMass, there is not the same pressure for students to choose male-dominated fields over neutral or female-dominated majors. Therefore, it is a harder case to show that self-conceptions would have an effect on major selection and change at these institutions than in a representative sample of US college students.

Smith is a useful case for a different reason. Smith has historically be an a locus of progressive gender beliefs, where women are challenged to think outside of and beyond traditional stereotypes of the types of work that women "can" or "should" do. It should be harder, therefore to find evidence that feminine self-conceptions lead women to choose more female-dominated fields when those very lines of social reasoning are directly challenged by the culture of the institution. I expect that the self-expressive decision-making trends I document here would be even stronger in a more representative sample of college students.

The next section details the demographic trends of respondents' college degrees. The following section presents the models predicting percent women in respondents' college degrees and the changes in sex-segregation scores between their year 1 majors and their eventual degrees. Since self-conceptions were only measured in year 2 and 5, I cannot use self-conceptions to predict the majors students initially enter. I do, however, use self-conceptions (plus controls) to predict whether students enter more male- or female-dominated majors between college entry and graduation.

3.5 College Major Selection and Demographic Predictors of Sex Segregation in Higher Education

Table 3.1 presents the univariate and bivariate statistics for year 1 sex-segregation score, college degree sex-segregation score, and the change in sex segregation score between year 1 and graduation. Here, women's year 1 and degree sex-segregation scores are significantly higher than men's scores: men and women perpetuate sex segregation with their initial academic major selection and the college degrees they eventually earn. The majors that men enter have an average of 26.9% women, compared to 44.6% women in the fields that women enter. By the time they graduate, the average percent women in the degrees earned has shifted only slightly: 43.2% for men and 27.1% for women. Students who attend MIT and Olin enter and graduate from significantly more male-dominated fields than UMass students—an expected outcome due to the educational focus of both MIT and Olin. These school effects hold for men and women. Smith students are more likely to enter and graduate from female-dominated fields than UMass students.

Over 40 percent of men and women change majors over the course of their college careers, but Table 3.1 suggests that these movements do not do much to disturb the sex-segregation originating from students' initial major selection in year 1. The change scores are near zero both men and women. The histograms presented in figure 3.1

and 3.2 illustrate that there is some movement of men and women into more male- or female-dominated majors in college, but these do not appear to be substantial shifts. In fact, there is no significant difference in the sex segregation change score between men and women—men's and women's major switching does not aggravate (or undermine) the significant sex-segregation in their original major selection. There are no school differences in this trend, except that Olin students are more likely than UMass students to switch into more male-dominated fields of study. This school effect is likely driven by the curriculum at Olin, which does not offer any female-dominated majors.

The bivariate results largely hold once other factors are controlled. Table 3.2 presents the OLS regression models predicting sex-segregation scores of students' year 1 majors and degree fields, and the change in sex segregation scores during college. The models include variables for gender, school attended, race/ethnicity, nativity, family income, LGBT status, political conservatism, religiosity, and SAT math and verbal scores. I also ran the models separately by gender. The model predicting sex segregation scores of degree fields include students' cumulative GPA as well. As expected, men enter and graduate from significantly more male-dominated fields than women. The MIT and Olin school effects documented above hold for women once other demographic and performance measures are controlled, but the only school effect that exists for men is that Olin men are more likely than UMass men to enter and graduate from male-dominated college majors. SAT scores, a rough and imperfect measurement of skill, shows that men and women with higher math SAT scores are likely to enter and graduate with more male-dominated majors than students with lower SAT math scores. Verbal SAT scores do not influence women's college major choices, but men with high verbal SAT scores are more likely to graduate with a female-dominated degree than men with lower verbal SAT scores. GPA does not have a significant effect on sex segregation scores.[47]

The third set of models in Table 3.2 predicts the change in college sex segregation scores between year 1 and graduation. By including the sex segregation score of year 1 in a model predicting sex segregation scores of students' degrees, these models effectively index the change in sex segregation scores over the course of their time in college. Consistent with Table 3.1, gender is not a significant predictor of moving into more male or female-dominated majors in college. None of these demographic and performance measures significantly predict women's movement between college majors. Among men, those who are at Olin are more likely to switch into more male-dominated majors than UMass students. Men with high SAT math scores are more likely to switch into more male-dominated majors, and men with high SAT verbal scores are more likely to switch into more female-dominated majors. It is interesting that this performance measure does not matter for women. Other literature (e.g. Correll 2001, 2004) has shown that women's assessments of their skills and competencies in math, net of their abilities and performance are weaker than men's assessments. Thus, men's exit out of male-dominated college majors may have more to do with their actual abilities in those fields than women's movement into and out of majors. Again, GPA is not related to whether men and women move into a more male- or female-dominated major in college.

Overall, these trends suggest that men's and women's selection of college majors reinforces occupational sex segregation in college majors. There is some movement of

[47] Due to trends of grade inflation and wide variability in GPAs across institutions, SAT is a more consistent measurement of skill.

men and women along the spectrum of sex-segregated majors over the course of their time in college, but this movement neither aggravates nor undermines the sex segregation originally established by men's and women's initial selection of college majors.

3.6 Structural Equation and OLS Models with Self-Conception Measures

Tables 3.3 through 3.5 present the structural equation and OLS regression models predicting sex segregation scores of college degrees and the change in sex segregation scores of students' majors between year 1 and graduation. The models in Tables 3.3 include the feminine self-conception latent measure plus controls for school, race/ethnicity, and SAT math and verbal scores. I present the models separately for men and women. In the first set of columns in 3.3, the feminine self-conceptions latent measure is significant and positive for women. This means that every point more feminine women perceive themselves to be corresponds to 6.9% more women in their college degree fields. Thus, women who perceive themselves as more feminine than their peers are more likely to graduate from a female-dominated major, net of school, race/ethnicity, and SAT scores, and those who perceive themselves as more masculine than their peers are more likely to graduate from a male-dominated major.

The second set of models in Table 3.3 predicts the change in sex segregation scores between college entry and graduation. To the first set of models in this table, I add the sex segregation score of students' year 1 majors. This addition effectively means that the dependent variable in the second set of models indexes the change in sex segregation scores between college entry and graduation. Masculine or feminine self-conceptions are not a significant predictor of changing into more female- or male-dominated majors in college for either men or women.

A similar trend holds for unsystematic self-conceptions (Table 3.4). Women who perceive themselves as less systematic then their women peers are more likely to graduate with a female-dominated degree. Men who perceive themselves as less systematic then their peers are also more likely to earn a female-dominated degree. It is important that this result holds net of students' performance on math and verbal tasks: among students with the *same* math SAT score, students who perceive themselves as less systematic than their peers will be more likely to choose female-dominated degrees. Controlling for SAT scores helps illustrate that unsystematic self-conceptions are not tapping into students' actual abilities; but rather their *perception* of their logical skills—perceptions that have been shown by social-psychological literature to be fairly inaccurate at capturing people's objective skills, and, more importantly, such perceptions are highly gendered (Correll 2004, 2001). In this process of self-expression, students appear to be matching their self-perceptions (which may or may not be related to their actual skills) to stereotypes about the fields in which they choose their degrees. Unsystematic self-conceptions are not a significant predictor of changing majors, however.

Table 3.5 includes the people-oriented self-conception measure. Here again, women who perceive themselves as more people-oriented then their peers are more likely to earn female-dominated degrees, and women who perceive themselves as more things-oriented are more likely to earn male-dominate degrees. People-oriented self-conceptions are not a significant predictor of the sex segregation score of men's degree choices. However, men who have people-oriented self-conceptions are more likely to change into a *more* female-dominated major over the course of their college careers.

A few interesting racial/ethnic differences arose once I controlled for gendered self-conceptions. Net of unsystematic self-conceptions (Tables 3.4), African-American men are more likely to enter a male-dominated degree than similar white men. African-American men are also more likely to earn an engineering degree than white men (Table 3.11). Among women, net of gendered self-conceptions, African-American women are more likely than white women to earn a physical sciences degree (Table 3.10) but marginally less likely to earn a biology degree (Table 3.9). These results could be due to the combined result of selection effects of high-achieving African-American students into the schools in my study (Gerber & Cheung 2008) and, perhaps, the existence of support programs for under-represented minority students in male-dominated majors such as science and engineering and a lack of them for female-dominated majors. I also find that, net of unsystematic and people-oriented self-conceptions, Asian and Asian-American men are more likely than white men to earn female-dominated degrees. Asian-American men face countervailing stereotypes as both less hegemonically masculine than white men (Connell 2005), but also as "naturally" talented at math and science-related fields, compared to white men (Eglash 2003). Perhaps the former stereotype is helping to produce this result. I hope that this analysis will be conducted across other U.S. institutions to help determine whether these racial/ethnic differences are the result of a selection process or a trend across higher education in the U.S.

Discussion

These results illustrate that the students in this sample are reproducing occupational sex segregation in their college major choices. Men choose more male-dominated majors and degrees than women and women choose more female-dominated majors and degrees than men. While I found that many men and women changed their majors over the course of their time in college, this switching neither aggravates nor undermines the segregation trends in their initial choice of college majors. Thus, is seems that the early choices students make about their college majors are the most important in reproducing sex segregation throughout college.

I also found that self-conceptions predict whether men and women graduate with male- or female-dominated degrees: women who perceive themselves as feminine or unsystematic and men who perceive themselves as less systematic compared to their peers are more likely to earn a female-dominated degree. Women with people-oriented self-conceptions are more likely to earn a female-dominated degree than women with more things-oriented self-conceptions, and men with people-oriented self-conceptions are more likely switch into more female-dominated majors while in college. Thus, it is not just that women and men help to reproduce the demographic imbalance of their fields of study, but rather those who are most likely to choose the most sex-segregated majors are *also* those who are most likely to hold the most stereotypical perceptions of themselves (women as feminine, unsystematic and people-oriented; men as systematic and things-oriented).

The sex segregation scores help illustrate respondents' individual contributions to reproducing sex segregation, and are a single metric for examining the effect of self-conceptions on where men and women place themselves along this spectrum in response to stereotypes about male- and female-dominated fields. However, it is also useful to understand how self-conceptions predict whether men and women enter individual fields along that spectrum of female-dominated to male-dominated fields. The next section examines the relationship between men's and women's self-conceptions and their likelihood of choosing two culturally female-typed majors (social sciences and humanities), two relatively gender-neutral majors (business and biology), and two culturally male-typed majors (engineering and physical sciences). Looking at these individual fields will help understand whether this is a spectrum-wide phenomenon, largely driven by general stereotypes about male-dominated and female-dominated, or whether the results just presented are largely driven by students' self-expressive responses to the stereotypes of a few specific male-dominated or female-dominated fields.

3.7 Demographic predictors of individual majors

The analysis of the full sample demonstrates that both men and women with more female-typed self-conceptions, relative to their peers, are more likely to graduate with a female-dominated major. It is impossible to tell from this analysis whether these findings are the result of a common theme across the male- to-female-dominated spectrum of college majors, or whether they are being driven by the trends in one or two individual majors. In order to determine the extent to which this is a spectrum-wide trend, I examine the effect of self-conceptions on majoring in two female-dominated fields (humanities and social sciences), two gender-neutral fields (business and biology), and two male-dominated fields (engineering and physics). If students are truly responding to stereotypes about male-dominated and female-dominated fields (whether those stereotypes originate from the types of activities and skills that are assumed to be need and valued in those fields, or from the cultural assumptions deriving from the representation of men and women in those fields), then more feminine, unsystematic, and more people-oriented self-conceptions should lead men and women to be more likely to graduate with degrees in social science and humanities, while masculine, systematic, and things-oriented self-conceptions should lead men and women to graduate from male-dominated fields such as engineering and physics.

Appendix 2 presents the demographic and performance measures that predict graduating with degrees in humanities, social sciences, business, biology, engineering, and physical sciences. [48] Note that Olin is all engineers, and a large portion of the MIT student body are engineers as well, so I have quite a few engineers in the sample. However, I have data on the specific type of engineering students are in, and there is quite a bit of variation in the representation of women across the engineering fields. For example, the percent women biological and chemical engineering is nearly 30%, while the representation in mechanical engineering is only about 8%. I take advantage of this large sample size in chapter 5, when I examine the intra-field cultural forces that lead to the reproduction of sex segregation. Appendix 2 also presents the percent of respondents who occupy each large academic majors category from year 1 through graduation. It also presents the logistic regressions predicting the likelihood of choosing each of these majors with controls for the same demographic characteristics as used in the OLS models for degree sex segregation scores.

It is possible that the trends documented above using the sex segregation scores might be driven by the results of one or two majors. It is important, therefore, to

[48] Each of these degree categories contains many different types of majors, each with varying representation of men and women. However, due to small sample sizes on these individual majors, I opt to combine them into larger categories. A more fined-grained analysis with a larger sample may find differences within these degree categories, but I expect that the results would be consistent with the results I present here.

determine whether the effect of gendered self-conceptions is localized to only a few majors or is spread throughout the spectrum of male-dominated and female-dominated degrees. If this is indeed a trend that exists throughout the spectrum of sex segregated majors, then more feminine, unsystematic, and more people-oriented self-conceptions should be positively related to graduating with a female-dominated degree and should be negatively related to graduating with a male-dominated degree. There should be little pattern for those majors that are fairly gender balanced. Figure 3.3 below illustrates the direction of the relationships between the three focal self-conceptions and the likelihood of choosing these fields. (I discuss which of these relationships are significant below.) The consistency of the pattern is striking: the direction of the feminine, unsystematic, and people-oriented self-conceptions is positive in all but one case among the two female-dominated majors and the direction of the self-conception measures is negative in all cases among the male-dominated majors. The pattern does not hold among the gender-neutral fields. Many of these relationships are not significant, but their direction is important: given a larger sample, it is likely that many more of these relationships would be significant. If it were only the male-dominated or female-dominated majors that were driving the trends documented with the sex segregation scores, then the patterning in the other blocks would be much less clear.

Tables 3.6-3.11 present the structural equation and OLS models predicting respondents' likelihood of choosing individual female-typed degrees with feminine, unsystematic, and people-oriented self-conceptions measures, respectively. The models also control for school, race/ethnicity, and SAT math and verbal scores. Significant coefficients in these models mean that those factors increase the likelihood that a respondent will earn a degree in that field, compared to other fields. The first set of models (Table 3.6) predict the likelihood of earning a degree in the humanities. None of the self-conception measures are significantly related to choosing this major for either men or women. There are several self-conceptions that predict men's and women's choice of a social science degree, however (Table 3.7). Women who perceive themselves as feminine are more likely to choose a social sciences major over other majors, and men and women who are people-oriented are marginally more likely to have this major as well.

Table 3.8 and 3.9 predict the likelihood of choosing two gender-neutral majors: business and biology. These gendered self-conceptions are not strong predictors of choosing either of these majors. Women who perceive themselves as unsystematic are marginally more likely to earn a biology degree than other majors. The self-conception measures are not significantly related to earning a business major.

The gendered self-conceptions I study are important determinants of whether men and women earn a degree in the two male-dominated fields. Women who perceive themselves as systematic and men who perceive themselves as things-oriented are more likely to choose a physical sciences major over other fields (Table 3.10). Similarly, men who perceive themselves as more masculine than their peers are more likely to graduate with engineering degree, and women who perceive themselves as things-oriented are more likely to graduate in engineering (Table 3.11).

Discussion

The trends in how self-conceptions predict whether men and women enter individual majors are consistent with the spectrum-wide trends documented in the first part of the chapter. The direction of the relationships of feminine, unsystematic, and people-oriented self-conceptions to individual male- and female-dominated majors suggests that the earlier-documented trends are not the result of a handful of individual majors that have unusually strong relationships to these self-conception measures. It seems that the stereotypes that accompany fields that are male-dominated and female-dominated are not benign. Men and women appear to use these stereotypes to place themselves along the spectrum of sex-segregated majors.

It is important that these self-conceptions are able to predict selection of certain degrees *net of* students' math and verbal SAT scores. For instance, women's unsystematic self-conceptions significantly decrease the likelihood that they will choose a physical sciences degree (a very math-intensive field of study), even among women with the same math skills. In other words, these self-conceptions are not proxies for students' abilities to actually fulfill the activities within these fields, but rather their perceptions of how well they fit with these beliefs about these fields.

Do Majors Affect Self-Conceptions Over Time?

College is a formative time of personal growth and reflection, influenced by events inside and outside the classroom. As discussed in chapter 5, academic majors have embedded within them professional a socialization process, whereby students learn values, beliefs, and practices of members of the profession most closely related to their academic degree (Becker et al. 1969; Cech et al. 2011; Schleef 206). We might expect, therefore, that college majors would change how students think of themselves over time.

To test the reverse causal order—that academic majors influence self-conceptions—I ran models (not shown) using the six individual college majors noted above (humanities, social sciences, business, biology, engineering, and physical sciences) to predict the changes in respondents' feminine, unsystematic, and people-oriented self-conceptions between year 2 and 5. I found that students' majors do not appear to affect their self-conceptions over time. I also ran models using the sex segregation score and found that the percent female in respondents' initial college majors was not related to the change in their self-conceptions over time. Thus, contrary to the alternative hypothesis, respondents' majors do not have much of an effect on these self-conception measures. The effects of professional socialization may happen on a longer time horizon than I am able to capture here.

3.8 Conclusions

The purpose of this chapter was to document the effects of the culturally-informed self-conceptions described in the previous chapter on men's and women's college major selection and change. Specifically, I was interested in whether, through the process of self-expressive career decision-making, men and women would make college major choices based on their gendered perceptions of self. These self-conceptions, shown to be co-constructed with gender schemas, are indeed important in determining whether students earn male-dominated or female-dominated degrees.

Using students' college sex-segregation scores (the percent women in their college degrees), I examined the trends for men and women. I found that, among this specialized sample, men and women are reproducing sex segregation in college majors by their decision-making: women are more likely to graduate with female-dominated majors and men are more likely to graduate with male-dominated majors. Many students change majors over the course of their college careers, but this switching did not usually entail much change in their sex-segregation scores. Those who switched majors tended to stay within the same range gender representation as the field they initially entered. Additionally, the movement of men and women among college majors neither reinforced nor undermined the sex-segregation of their choices at college entry.

The lack of significant differences between men's and women's change in sex segregation scores between their intended majors and the fields in which they earned their degrees suggests that the movement of men and women between majors does not significantly expand or undermine sex segregation in the aggregate. Thus, while the issue of retention is important to keep people with training in their fields, the movement of men and women to other fields does not constitute a major watershed. On the other hand, students' initial choice of majors *is* consequential to the sex-segregatedness of their later career decisions. Those who change their majors do not usually venture far down the spectrum of sex-segregated fields in these changes. Recruitment into college majors, then, is a critical point of differentiation. Thus, limited resources directed toward encouraging men and women into other-gendered majors at the pre-college levels would be more effective at challenging the current trends of occupational sex segregation than retention efforts or those that encourage students to change majors.

I used structural equation modeling and OLS regression to predict sex segregation scores with self-conceptions measures. I found that women who perceive themselves as more feminine, unsystematic, and people-oriented then their peers are more likely to graduate from a female-dominated major, net of their school and their "skill" (as measured by math and verbal SAT scores). Similarly, men who perceive themselves as unsystematic were more likely to earn a female-dominated college degree, and those with people-oriented self-conceptions are more likely to change into more female-dominated majors over time.

These patterns do not appear to be driven by one or two outlying majors. Running the models predicting the likelihood of choosing two female-dominated, two male-dominated and two gender-balanced majors, I found that self-conceptions matter throughout the spectrum of individual sex-segregated majors. Feminine, unsystematic and people-oriented self-conceptions are positively related to graduating with one of the female-dominated majors and negatively related to graduating with one of the male-dominated majors. No clear pattern emerged among the gender balanced majors.

The findings here point to a *double feedback loop*, whereby the self-expressive career decisions of men and women not only help to reproduce the demographic imbalance of their fields of study, but also the perceptions of male and female-dominated majors as culturally masculine and feminine domains.

The demographic representation of men and women in these fields helps to reproduce the gender typing of these fields—it reinforces the presence of men and women and that presence anchors the cultural stereotypes of men and women to those fields. The students in my sample with gender-typical self-conceptions reproduce the demographic imbalance of these fields, and, indirectly, are contributing to the sex-typing of these fields. But, these results show that they reproduce the cultural sex-typing of these fields in a more direct way: those who hold the most gender-stereotypic traits (women who see themselves as very feminine, unsystematic, and people-oriented, and men who see themselves as very systematic) are more likely to choose the most gender-stereotyped majors. Thus, it is not just that these culturally sex-typed fields attract men and women accordingly, but that female-typed fields attract women *and* men who see themselves with female-stereotyped traits then their peers. Thus, through these self-expressive decision-making processes, the cultural sex-typing of these fields is essentially *embodied* in the types of men and women who select into these fields. This self-expressive edge of sex segregation is multidimensional and, thus, difficult to retract.

What happens after college?

The results presented in this chapter focused on a time of career flexibility unmatched by any experience in the labor market. If self-conceptions affected career decisions at all, we would expect to find it happening in college—where high flexibility meets low penalties for changing one's mind. This delayed decision-making model is relatively unique to the U.S.; other post-industrial countries impose much greater restrictions on men's and women's career decision-making in college, or even in secondary school (Turner 1960). As I discuss in the concluding chapter, the abundance of room for men and women to make self-expressive career decisions helps to reproduce sex segregation. As counter-intuitive to cultural norms of self-expression as it may be, one of the most effective procedures for undermining sex segregation in college majors may be to require students to take a more strictly-enforced set of electives: math, physics, child development, poetry, etc, and take away some of students' room to completely tailor their college courses to their gendered self-conceptions.

The next chapter will examine what happens when men and women leave college and either enter the workforce or enroll in a graduate program. Will their culturally-informed self-conceptions still affect their career decision-making, even once they face the structural constraints of having a specific college degree?

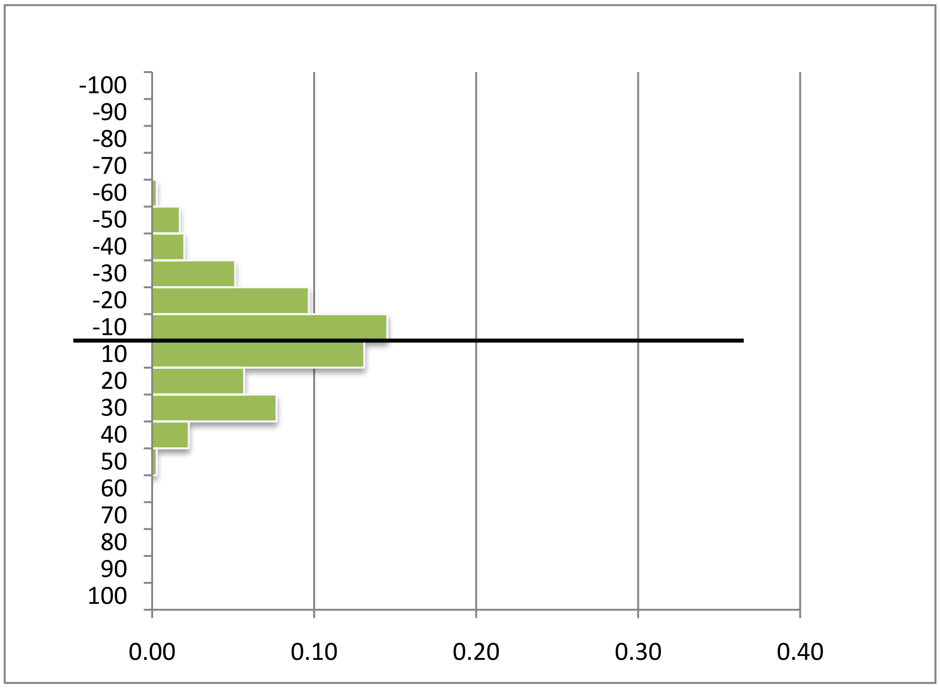

Figure 3.1: Histogram of Women's Sex-Segregation Change Scores Between Year 1 Major and College Degree

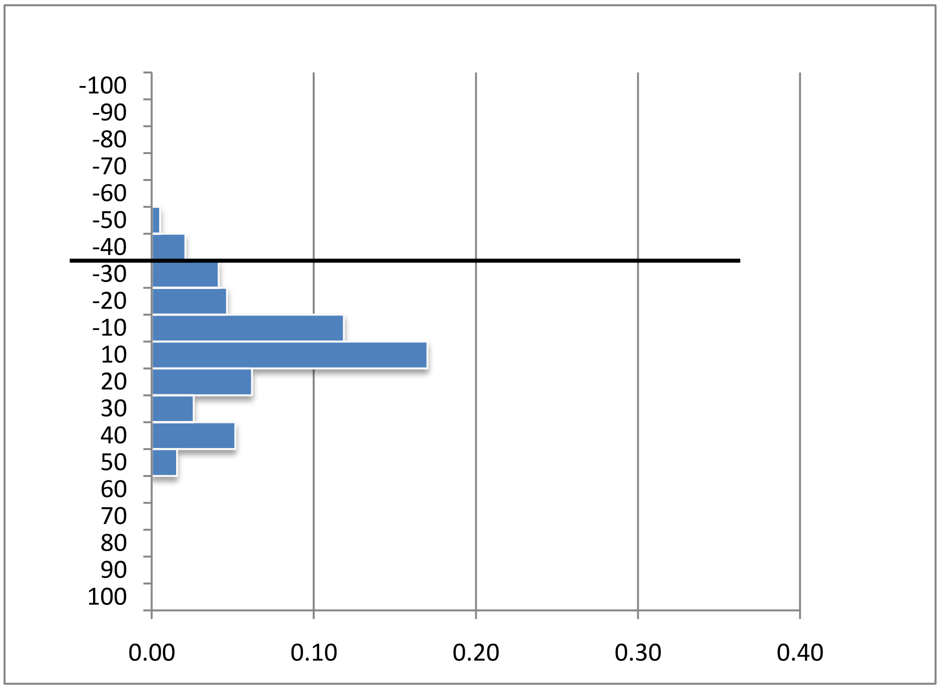

Figure 3.2: Histogram of Men's Sex-Segregation Change Scores Between Year 1 Major and College Degree

		WOMEN			MEN		
		Feminine	**Unsystem**	**People**	**Feminine**	**Unsystem**	**People**
Female Dominated	Humanities	+	+	-	+	+	+
	Social Sci	+	+	+	+	+	+
Gender-Neutral	Business	+	-	+	-	-	+
	Biology	-	+	-	-	-	-
Male-Dominated	Engineering	-	-	-	-	-	-
	Physics	-	-	-	-	-	-

Figure 3.3: Direction of Relationships between Feminine, Unsystematic, and People-Oriented Self-Conception and the Likelihood of Graduating with Certain Degrees

Table 3.1: Univariate and Bivariate Statistics for Degree Sex-Segregation and Change in Sex-Segregation Scores, by Gender and School

	ALL		**WOMEN**		**MEN**		***p***
	Mean	*SD*	Mean	*SD*	Mean	*SD*	
All							
Year 1 Sex-Segregation Score (percent female in Year 1 Major)	0.383	0.212	0.446	0.202	0.269	0.179	***
Degree Sex-Segregation Score (percent female in college degree)	0.372	*0.213*	0.433	*0.214*	0.271	*0.171*	***
Yr 1 to Degree Sex-Segregation Δ Score (change in the percent female between Year 1 Major and college degree earned)	-0.001	*0.146*	-0.009	*0.148*	0.015	*0.141*	
UMass							
Year 1 Sex-Segregation Score	0.417	0.217	0.554	0.158	0.318	0.201	***
Degree Sex-Segregation Score	0.422	*0.202*	0.552	*0.143*	0.347	*0.198*	***
Δ in Sex-Segregation Score (Yr 1 to Deg)	0.051	*0.144*	0.022	*0.125*	0.072	*0.153*	
MIT							
Year 1 Sex-Segregation Score	0.304	0.178	0.344	0.174	0.268	0.174	***
Degree Sex-Segregation Score	0.31	*0.183*	0.348	*0.196*	0.271	*0.162*	**
Δ in Sex-Segregation Score (Yr 1 to Deg)	-0.001	*0.149*	0.001	*0.152*	- 0.002	*0.146*	
Olin							
Year 1 Sex-Segregation Score	0.179	0.067	0.208	0.078	0.158	0.048	**
Degree Sex-Segregation Score	0.15	*0.04*	0.156	*0.049*	0.145	*0.033*	
Δ in Sex-Segregation Score (Yr 1 to Deg)	-0.025	*0.065*	-0.045	*0.081*	- 0.012	*0.009*	+
Smith							
Year 1 Sex-Segregation Score	0.502	0.192					
Degree Sex-Segregation Score	0.508	0.196					
Δ in Sex-Segregation Score (Yr 1 to Deg)	-0.018	0.155					

MIT students have significantly lower sex-seg scores at Year 1 and at graduation than Umass
MIT students are more likely to switch into more male-dominated fields than Umass students
Olin students have significantly lower sex-seg scores at Year 1 and at graduation than Umass
Smith students have significantly higher sex-seg scores at Year 1 and at graduation than Umass
Among Women, MIT have significantly lower sex-seg scores at Yr 1 and at graduation than Umass
Among Women, Olin have significantly lower sex-seg scores at Yr 1 and at graduation than Umass
Among Women, Olin students are more likely to switch into more male-dominated fields than Umass
Among Men, MIT have significantly lower sex-seg scores at Year 1 and at graduation than Umass
Among Men, MIT are more likely to switch into more male-dominated fields than Umass students
Among Men, Olin have significantly lower sex-seg scores at Year 1 and at graduation than Umass
Among Men, Olin are more likely to switch into more male-dominated fields than Umass students

Table 3.2: Descriptive Variables Predicting Sex-Segregation in Year 1 Major, in College Degree Field, and in the Change between Year 1 and Degree.

	SEX-SEGREGATION SCORES in YEAR 1 MAJOR						SEX-SEGREGATION SCORES in DEGREE FIELD						SEX-SEGREGATION CHANGE SCORE (Controlling for Year 1)					
	All Unst. Coeff		WOMEN Unst. Coeff		MEN Unst. Coeff		All Unst. Coeff		WOMEN Unst. Coeff		MEN Unst. Coeff		All Unst. Coeff		WOMEN Unst. Coeff		MEN Unst. Coeff	
Constant	62.267	***	68.8	***	65.000	**	68.611	***	56.200	**	85.100	**	25.670	*	9.600		36.724	
Female	8.199	**					3.762						-1.676					
MIT Student	-4.290		-13.472	*	4.100		-3.523		-9.383	*	-.600		-1.277		-.513		-2.461	
Olin Student	-17.092	***	-27.816	***	-8.000		-21.250	***	-29.148	***	-16.200	*	-9.229	*	-8.585		-10.472	*
Smith Student	8.579	*	1.672				4.207		.122				-1.156		-.285			
Hispanic	-0.336		-1.339		-1.668		-.193		2.503		-5.192		-.398		2.849		-3.454	
Black	-6.167		-4.101		-16.379		-11.082		-8.388		-33.111		-9.361		-8.243		-22.430	
Asian.	2.258		1.497		1.788		.837		-.408		1.122		-1.355		-1.994		-1.510	
Born in the US	-3.191		-2.650		-4.644		-3.642		-.934		-11.206		-.469		.813		-4.697	
Family Income	0.000		.000		.000		.000		.000		.000		.000		.000		.000	
LGB	-1.979		-3.401		.508		1.062		-.996		4.378		2.090		.828		3.933	
Conservatism	0.168		-.623		1.852		.654		1.239		-.315		.366		1.327		-1.644	
Religiosity	0.323		1.438		-2.370		-.026		-.157		.153		-.335		-1.160		1.463	
SAT Verbal	0.021		.018		.028		.030		.021		.080	*	.014		.006		.057	*
SAT Math	-0.060	**	-.046	*	-.064		-.091	***	-.075	**	-.129	**	-.039	*	-.033		-.080	*
GPA							3.633		5.548		2.395		2.098		4.188		2.144	
Sex Seg Score in Year 1													69.837	***	71.139	***	69.667	***
R-squared	0.341	***	0.326	***	0.108	*	0.359	***	0.350	***	0.218	**	0.644	***	.640	***	.562	**

Table 3.3: SEM Predicting Percent Women in Degree Field with Feminine (vs. Masculine) Self-Conceptions

	Percent Women in Degree Field						Change in Percent Women from Year 1 Major to Degree					
	WOMEN			MEN			WOMEN			MEN		
	Unst Estimate	**S.E.**		**Unst. Estimate**	**S.E.**		**Unst. Estimate**	**S.E.**		**Unst. Estimate**	**S.E.**	
Feminine SC	**6.865**	**2.875**	*****	**2.983**	**2.562**		**.091**	**2.150**		**.214**	**.317**	
% women in yr 1 major	---			---			.713	.044	***	.644	.051	***
MIT	-13.237	4.649	**	-5.459	3.411		-3.846	3.633		-3.906	2.690	
Smith	-3.113	3.338					-3.691	2.583				
Olin	-33.856	5.962	***	-17.837	4.412	***	-13.357	4.760	**	-9.479	3.537	**
African-American	-3.801	4.741		11.785	21.161		1.901	3.696		-12.631	6.737	
Hispanic or Latino/a	5.916	4.607		-1.906	4.000		3.605	3.107		-3.824	3.127	
Asian or Asian-American	7.001	4.030	+	2.808	2.791		.261	2.081		-3.497	2.190	
SAT Math	-.070	.019	***	-.046	.021	*	-.034	.015	*	-.038	.016	*
SAT Verbal	.033	.016	*	.020	.018		.014	.012		.020	.014	
χ^2 *(df)*	45.3(40)			60.5 (36)			45.6(44)			63.6(40)		
RMSEA	.017			.049			.009			.046		
CFI	.995			.934			.992			.953		
R^2	.280			.168			.768			.545		

Table 3.4: SEM Predicting Percent Women in Degree Field with Unsystematic (vs. Systematic) Self-Conceptions

	Percent Women in Degree Field						Change in Percent Women from Year 1 Major to Degree					
	WOMEN			**MEN**			**WOMEN**			**MEN**		
	Unst Estimate	**S.E.**		**Unst. Estimate**	**S.E.**		**Unst. Estimate**	**S.E.**		**Unst. Estimate**	**S.E.**	
Unsystematic SC	**2.854**	**1.489**	*****	**4.201**	**2.162**	*****	**.880**	**1.467**		**2.047**	**1.902**	
% women in yr 1 major	---			**---**			.931	.142	***	.630	.053	***
MIT	-15.078	4.896	**	-2.769	3.731		-4.366	3.833		-2.526	2.857	
Smith	-5.545	3.624					-4.272	2.796				
Olin	-36.539	6.325	**	-14.971	4.752	**	-14.270	5.065	**	-8.190	3.686	*
African-American	-3.117	4.745		-24.748	9.428	*	1.826	3.682		-25.777	14.944	+
Hispanic or Latino/a	6.398	4.081		.793	4.552		3.498	3.134		-1.804	3.437	
Asian or Asian-American	.756	2.757		3.162	2.827		.074	2.115		-3.694	2.203	+
SAT Math	-.062	.020	**	-.063	.022	*	-.031	.016	*	-.045	.017	**
SAT Verbal	.032	.016	*	.024	.018		.013	.012		.019	.014	
χ^2 *(df)*	7.2 (9)			9.5 (8)			8.6(10)			9.5(9)		
RMSEA	.000			.025			.000			.014		
CFI	1.00			.955			1.00			.999		
R^2	.291			.198			.588			.553		

Table 3.5: OLS Predicting Percent Women in Degree Field with People-Oriented (vs. Things-Oriented) Self-Conceptions

	Percent Women in Degree Field						Change in Percent Women from Year 1 Major to Degree					
	WOMEN			**MEN**			**WOMEN**			**MEN**		
	Unst Estimate	**S.E.**		**Unst. Estimate**	**S.E.**		**Unst. Estimate**	**S.E.**		**Unst. Estimate**	**S.E.**	
People-Oriented Self-Conception	**2.001**	**.816**	**	**1.095**	**1.021**		**.980**	**.663**		**1.534**	**.753**	*
% women in yr 1 major	---			---			.639	.065	***	.702	.082	***
MIT	-14.640	6.114	*	2.242	6.114	*	-3.307	5.640		.498	4.136	
Smith	-.899	4.566					-.581	3.665				
Olin	-28.409	6.670	***	-14.851	6.322	*	-10.848	5.640	**	-6.385	4.754	
African-American	-7.552	8.011		-23.535	17.597		-6.478	6.430		-8.802	13.059	
Hispanic or Latino/a	5.761	6.596		-.183	7.905		6.107	5.272		.152	5.816	
Asian or Asian-American	.243	3.459		.175	4.522		-.715	2.778		-.996	3.329	
SAT Math	-.059	.023	**	-.103	.030	**	-.039	.018	*	-.073	.022	**
SAT Verbal	.034	.019	+	.034	.045	+	.023	.016		.038	.014	*
Constant	46.334	18.068	*	71.090	20.393	**	11.509	4.923	*	31.662	15.689	*
Adjusted R^2	.359***			.223***			.587***			.580***		

Table 3.6: SEM & OLS Models Predicting Graduating with an Arts and Humanities Degree with Self-Conceptions (SC)

ARTS &	With Feminine Self-Conceptions (SEM)						With Unsystematic Self-Conceptions (SEM)					
HUMANITIES	WOMEN			MEN			WOMEN			MEN		
	Unst. Est.	S.E.		Unst. Est.	S.E.		Unst. Est.	S.E.		Unst. Est.	S.E.	
Feminine SC	**.019**	**.062**		**.001**	**.003**							
Unsystematic SC							**.032**	**.042**		**.027**	**.026**	
MIT	-.003	.099		-.040	.036		-.025	.104		-.026	.038	
Smith	.227	.071	**				.200	.077	**			
African-American	.015	.103		-.072	.087		.022	.103		-.246	.182	
Hispanic or Latino/a	.024	.086		-.038	.043		.018	.086		-.018	.047	
Asian or Asian-American	.018	.059		-.038	.043		.011	.059		.050	.030	*
SAT Math	-.002	.000	***	-.001	.000	+	-.002	.000	***	-.001	.000	*
SAT Verbal	.002	.000	***	.001	.000	*	.002	.000	***	.001	.000	+
χ^2 *(df)*	42.5 (36)			55.1 (32)			5.3 (8)			7.1(7)		
RMSEA	.020			.054			.000			.009		
CFI	.993			.896			1.00			.999		
R^2	.292			.082			.294			.106		

ARTS &	With People-Oriented Self-Conceptions (OLS)					
HUMANITIES	WOMEN			MEN		
	Unst. Est.	S.E.		Unst. Est.	S.E.	
People-Oriented SC	**-.009**	**.019**		**.013**	**.010**	
MIT	.006	.135		-.018	.053	
Smith	.287	.101	**			
African-American	.076	.176		.012	.009	
Hispanic or Latino/a	-.063	.145		.048	.045	
Asian or Asian-American	.036	.081		.062	.030	*
SAT Math	-.002	.001	***	-.001	.000	*
SAT Verbal	.002	.000	***	.001	.000	**
Constant	.691	.406	+	-.004	.188	
Adjusted R^2	.299***			.059		

NOTE: Olin students, who are all engineering majors, are excluded from this analysis.

Table 3.7: SEM & OLS Predicting Graduating with a Social Sciences Degree with Self-Conceptions (SC)

SOCIAL	**With Feminine Self-Conceptions (SEM)**						**With Unsystematic Self-Conceptions (SEM)**					
SCIENCES	**WOMEN**			**MEN**			**WOMEN**			**MEN**		
	Unst. Est.	**S.E.**		**Unst. Est.**	**S.E.**		**Unst. Est.**	**S.E.**		**Unst. Est.**	**S.E.**	
Feminine SC	**.182**	**.073**	*****	**.002**	**.004**							
Unsystematic SC							**.009**	**.053**		**.019**	**.040**	
MIT	-.365	.110	**	-.105	.040	**	-.345	.115	**	-.097	.042	*
Smith	-.093	.079					-.111	.086				
African-American	-.039	.114		-.012	.101		-.013	.114		-.069	.204	
Hispanic or Latino/a	-.049	.095		-.032	.048		-.046	.095		-.017	.053	
Asian or Asian-American	-.001	.065		.001	.034		-.014	.066		-.001	.034	
SAT Math	.000	.000		.000	.000		.000	.000		.000	.000	
SAT Verbal	.001	.000	+	.000	.000		.000	.000		.000	.000	
χ^2 *(df)*	44.6(36)			56.2 (32)			5.9(8)			7.2(7)		
RMSEA	.023			.057			.000			.009		
CFI	.991			.887			1.00			.999		
R^2	.156			.076			.107			.131		

SOCIAL	**With People-Oriented Self-Conceptions (OLS)**					
SCIENCES	**WOMEN**			**MEN**		
	Unst. Est.	**S.E.**		**Unst. Est.**	**S.E.**	
People-Oriented SC	**.032**	**.019**	**+**	**.028**	**.016**	**+**
MIT	-.271	.102		-.101	.040	*
Smith	.018	.086				
African-American	-.109	.168		-.109	.168	
Hispanic or Latino/a	-.110	.139		.030	.099	
Asian or Asian-American	-.053	.078		-.016	.068	
SAT Math	-.001	.000	+	.000	.000	
SAT Verbal	.002	.000		.001	.000	
Constant	.188	.388		.190	.257	
Adjusted R^2	.058*			.088*		

NOTE: Olin students, who are all engineering majors, are excluded from this analysis

Table 3.8: SEM & OLS Predicting Graduating with a Business Degree with Self-Conceptions (SC)

BUSINESS	**With Feminine Self-Conceptions (SEM)**						**With Unsystematic Self-Conceptions (SEM)**					
	WOMEN			**MEN**			**WOMEN**			**MEN**		
	Unst. Est.	**S.E.**		**Unst. Est.**	**S.E.**		**Unst. Est.**	**S.E.**		**Unst. Est.**	**S.E.**	
Feminine SC	**.008**	**.051**		**-.001**	**.005**							
Unsystematic SC							**-.007**	**.039**		**-.067**	**.093**	
MIT	-.177	.082	*	-.124	.089		-.170	.085	*	-.154	.094	+
Smith	-.097	.058	+				-.092	.063				
African-American	-.065	.084		-.071	.202		-.066	.084		.232	.454	
Hispanic or Latino/a	-.133	.070	+	.064	.106		-.131	.070	+	.028	.118	
Asian or Asian-American	.073	.048		.116	.075		.074	.049		.119	.076	
SAT Math	.001	.000	+	.000	.001		.001	.000		.001	.001	
SAT Verbal	.000	.000		.000	.000		.000	.000		.000	.000	
χ^2 *(df)*	48.3 (36)			56.3 (32)			10.0(8)			7.8(7)		
RMSEA	.027			.055			.023			.022		
CFI	.987			.891			.998			.995		
R^2	.053			.049			.054			.064		

BUSINESS	**With People-Oriented Self-Conceptions (OLS)**				
	WOMEN			**MEN**	
	Unst. Est.	**S.E.**		**Unst. Est.**	**S.E.**
People-Oriented SC	**.009**	**.014**		**.015**	**.033**
MIT	-.174	.093	+	-.023	.161
Smith	-.101	.058	+		
African-American	-.078	.116		-.065	.135
Hispanic or Latino/a	-.105	.072		.029	.203
Asian or Asian-American	.065	.059		.064	.141
SAT Math	.000	.000		.000	.001
SAT Verbal	.000	.000		.001	.001
Constant	.149	.291		0(0)	
Adjusted R^2	.013			.009	

NOTE: Olin students, who are all engineering majors, are excluded from this analysis.

Table 3.9: SEM Predicting Graduating with a Biology Degree with Self-Conceptions (SC)

BIOLOGY	**With Feminine Self-Conceptions (SEM)**						**With Unsystematic Self-Conceptions (SEM)**					
	WOMEN			**MEN**			**WOMEN**			**MEN**		
	Unst. Est.	**S.E.**		**Unst. Est.**	**S.E.**		**Unst. Est.**	**S.E.**		**Unst. Est.**	**S.E.**	
Feminine SC	**-.094**	**.068**		**-.087**	**.068**							
Unsystematic SC							**.083**	**.050**	+	**-.077**	**.081**	
MIT	.041	.106		.082	.081		-.009	.110		.076	.084	
Smith	-.088	.075					-.130	.082				
African-American	-.186	.109	+	-.339	.216		-.193	.109	+	.145	.398	
Hispanic or Latino/a	.019	.090		.075	.096		.011	.092		.023	.106	
Asian or Asian-American	.009	.062		.051	.068		-.001	.063		.064	.069	
SAT Math	.000	.000		-.001	.000	**	.000	.000		-.002	.000	**
SAT Verbal	.000	.000		.000	.000		.000	.000		.000	.000	
χ^2 *(df)*	39.2 (36)			54.3 (32)			5.4(8)			6.9(7)		
RMSEA	.014			.053			.000			.000		
CFI	.997			.901			1.00			1.00		
R^2	.045			.080			.058			.147		

BIOLOGY	**With People-Oriented Self-Conceptions (OLS)**					
	WOMEN			**MEN**		
	Unst. Est.	**S.E.**		**Unst. Est.**	**S.E.**	
People-Oriented SC	**-.008**	**.023**		**-.019**	**.025**	
MIT	.067	.147		.155	.124	
Smith	-.057	.113				
African-American	-.264	.183		-.108	.203	
Hispanic or Latino/a	-.152	.160		.044	.156	
Asian or Asian-American	-.001	.093		.062	.108	
SAT Math	.000	.001		-.002	.001	*
SAT Verbal	.000	.001		.000	.001	
Constant	.522	.459		0(0)		
Adjusted R^2	.011			.143*		

NOTE: Olin students, who are all engineering majors, are excluded from this analysis.

Table 3.10: SEM & OLS Predicting Graduating with a Physical Sciences Degree with Self-Conceptions (SC)

PHYSICAL	**With Feminine Self-Conceptions (SEM)**						**With Unsystematic Self-Conceptions (SEM)**				
SCIENCES	**WOMEN**			**MEN**			**WOMEN**			**MEN**	
	Unst. Est.	**S.E.**		**Unst. Est.**	**S.E.**		**Unst. Est.**	**S.E.**		**Unst. Est.**	**S.E.**
Feminine SC	**-.162**	**.208**		**-.113**	**.090**						
Unsystematic SC							**-.098**	**.052**	*****	**-.041**	**.075**
MIT	.097	.102		-.012	.104		.129	.105		.038	.107
Smith	.065	.072					.121	.078			
African-American	.268	.105	*	-.430	.301		.262	.105	*	-.466	.536
Hispanic or Latino/a	.014	.087		.040	.123		.016	.088		.045	.134
Asian or Asian-American	-.059	.060		-.002	.088		-.046	.060		.022	.087
SAT Math	-.001	.000	*	.001	.001	*	.001	.000		.001	.001
SAT Verbal	.001	.000	*	.000	.001		-.001	.000	*	.000	.001
χ^2 *(df)*	44.9 (36)			46.0 (32)			9.2(8)			7.4(7)	
RMSEA	.023			.042			.018			.015	
CFI	.990			.936			.999			.998	
R^2	.177			.098			.095			.072	

PHYSICAL	**With People-Oriented Self-Conceptions (OLS)**					
SCIENCES	**WOMEN**			**MEN**		
	Unst. Est.	**S.E.**		**Unst. Est.**	**S.E.**	
People-Oriented SC	**-.006**	**.020**		**-.056**	**.017**	*****
MIT	.199	.130		.065	.095	
Smith	.085	.100				
African-American	.398	.162	*	.018	.103	
Hispanic or Latino/a	.254	.142	+	.090	.115	
Asian or Asian-American	-.157	.082	+	.010	.071	
SAT Math	.002	.000		.001	.000	*
SAT Verbal	-.002	.000	***	-.001	.000	+
Constant	.060	.405		-.134	.314	
Adjusted R^2	.095**			.062**		

NOTE: Olin students, who are all engineering majors, are excluded from this analysis.

Table 3.11: SEM & OLS Predicting Graduating with an Engineering Degree with Self-Conceptions (SC)

ENGINEERING	With Feminine Self-Conceptions (SEM)						With Unsystematic Self-Conceptions (SEM)				
	WOMEN			MEN			WOMEN			MEN	
	Unst. Est.	**S.E.**		**Unst. Est.**	**S.E.**		**Unst. Est.**	**S.E.**		**Unst. Est.**	**S.E.**
Feminine SC	**-.128**	**.212**		**-.283**	**.108**	******					
Unsystematic SC							**-.039**	**.052**		**-.064**	**.122**
MIT	.300	.111	**	.172	.121		.321	.115	**	.120	.125
Smith	-.048	.078					-.015	.086			
African-American	-.007	.114		.832	.354	*	-.018	.114		.695	.593
Hispanic or Latino/a	.034	.095		-.081	.143		.040	.095		-.067	.156
Asian or Asian-American	.001	.065		-.093	.103		.008	.066		-.134	.101
SAT Math	.001	.000		.000	.001		.001	.000		.001	.001
SAT Verbal	-.001	.000		.000	.001		-.001	.000		.000	.001
χ^2 *(df)*	50.2(36)			57.9 (32)			6.4(8)			7.7(7)	
RMSEA	.029			.057			.000			.020	
CFI	.986			.891			1.00			.996	
R^2	.197			.138			.199			.102	

ENGINEERING	With People-Oriented Self-Conceptions (OLS)				
	WOMEN			MEN	
	Unst. Est.	**S.E.**		**Unst. Est.**	**S.E.**
People-Oriented SC	**-.054**	**.022**	*****	**-.002**	**.038**
MIT	.265	.145	+	.061	.186
Smith	-.038	.110			
African-American	.144	.184		.144	.184
Hispanic or Latino/a	.077	.161		-.056	.238
Asian or Asian-American	.097	.093		-.133	.165
SAT Math	.001	.001		-.002	.001
SAT Verbal	.001	.001		.002	.001
Constant	-.293	.457		-.236	.621
Adjusted R^2	.190***			.007	

NOTE: Olin students, who are all engineering majors, are excluded from this analysis.

The Self-Expressive Edge of Sex-Segregation: The Role of Gender Schemas and Self-Conceptions in College Major Selection and Career Launch

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Chapter 4—Beyond College: Self-Conceptions and the Reproduction of Occupational Sex Segregation

How do the self-expressive career decisions of men and women translate into occupational sex-segregation at career launch? Chapter 2 demonstrated that the self-conceptions of the men and women in my sample fell along gendered lines: on average, women's self-conceptions are more feminine than men's, and men's self-conceptions are more masculine than women's. I also illustrated how these self-conceptions are partially determined by their individual-level cultural beliefs about gender.

As a result of the normative importance given to self-expressive career decision-making, we would expect that these culturally-shaped perceptions of self would guide men's and women's career decision-making. But, is there really a significant effect of self-conceptions on career decisions, net of the myriad structural, cultural, and individual constraints on such decisions? And, if self-conceptions do influence career decisions, does this occur in ways that help reproduce occupational sex segregation?

Chapter 3 showed that self-conceptions were indeed predictors of college major selection and change. Women and men with self-conceptions that align most closely with stereotypical traits associated with women (e.g. feminine, unsystematic, and people-oriented) were more likely to graduate with degrees in female-dominated subjects and less likely to graduate with male-dominated majors.

Not only did chapter 3 demonstrate that self-conceptions could predict whether respondents' choose male- or female-dominated college majors, it also showed that these effects happen in segregation-reproducing ways: Those most likely to choose the most sex-segregated majors were also those most likely to have perceptions of themselves that embody stereotypic traits of men and women.

These gendered self-beliefs were codified into decisions that reproduce the gendered structure in a clear way. But college major selection is, in many ways, the easy case. College is a time of tremendous freedom in career decision-making.

This flexibility to make career choices along self-expressive lines is greatly diminished once they leave college. Given these added constraints, will men's and women's self-conceptions still matter to their career decisions? This chapter tests whether culturally-informed self-conceptions help determine whether these college graduates enter male-or female-dominated career paths 18 months after they graduate.

What I find in this chapter is that men's and women's self-conceptions do indeed help determine whether they enter male-or female-dominated career paths. Culturally informed self-perceptions predict where men and women end up in the sex-segregated structure of occupations, even once respondents' college degrees are accounted for. As I argue, not only do these patterns reproduce the demographic sex-segregation of the occupations men and women enter, but they also effectively help reproduce the cultural sex-typing of male and female-dominated occupations as "masculine" and "feminine." The next section provides an overview of my theoretical approach to the investigation in this chapter. I then examine the empirical relationships between self-conceptions and beliefs and sex-segregation. Finally, I discuss the results in the context of the reproduction of occupational sex segregation in the workforce.

4.1 Theoretical Background

As discussed in the introductory chapter, there are forceful normative trends of choosing career paths for self-expressive reasons. I illustrated in chapter 2 the interconnection between perceptions of the gender structure and perceptions of self—

namely, respondents' gender schemas significantly predict their self-conceptions. If perceptions of self significantly predict the extent of sex-segregation in the post-graduation career choices men and women make, then I will have identified a mechanism by which sex-segregation is reproduced at the individual-level—*reproduction within a culturally-legitimated realm of individualistic self-expression.*

Career Launch and Occupational Sex Segregation

This chapter seeks to find out whether the trends identified between self-conceptions and respondents' contributions to sex-segregation continue once they have left college and entered the workforce or graduate school. The individual-level forces that reproduce sex segregation in college majors are somewhat similar to those that reproduce segregation in the workforce, and the segregation in the former certainly contributes to segregation in the latter (Jacobs 1989). While there is some slippage that allows one to enter different occupations than that in which he or she received an undergraduate education, the specialization inherent in a college degree necessarily limits the types of occupations and graduate programs he or she is qualified to enter. A college graduate with a degree in art history cannot get a job as an engineer, for example. For these reasons, college majors are an important factor in the reproduction of occupational sex segregation.

However, the career decisions men and women make just after leaving college have effects that arguably extend throughout their careers (Jacobs, 1989). Once one has established a career trajectory, career track changes are possible, but costly in terms of time, income, and job prestige. Additionally, due to the differential valuation of female-dominated versus male-dominated occupations (Charles & Grusky, 2004; England, 1984), if one chooses a female-dominated career track, they have entered a bracket of lower-paid, less prestigious jobs. Individuals in these occupations may certainly end up in jobs that are far above the median income for male-dominated occupations, women and men working in female-dominated jobs make, on average, less than people in male-dominated jobs (England, 1984).

I call this early stage of career decisions “career launch.” While career launch could encompass the first several years of one’s career, I study the sex-typing of men’s and women’s early occupations or of the graduate school program in which they have enrolled eighteen months after they have graduated. This time lag is purposeful. The first year after college graduation is a period of adjustment (Astin, 1993); some men and women take a year off from employment to “figure out what they want to do with their lives.” Others might work a temporary job while they search for a more long-term position in their field of interest. The respondents in my study also hit the beginning of the 2007-2008 economic downturn as they exited college, likely making entrance into graduate school programs more competitive and job searches a multi-year process for many. I exclude from this analysis the four respondents who were either traveling or looking for a job at the time of the year 5 survey. The lag between graduation and the time in which I measure career launch allows for this volatility to stabilize, while not allowing enough time to elapse that they have the opportunity to make another large career move.

To the extent that they have freedom to make decisions about their trajectories at career launch, I expect men and women to make such decisions along self-expressive lines. As it was for college major selection, self-expression is an important normative consideration for decisions about one's career: young men and women are still expected to give self-expressive answers to the question, "what will you do with your degree?"

I am particularly interested in two aspects of the career launch decision process in this chapter: whether respondents choose female-dominated or male-dominated occupations after graduation, and the extent to which men and women move into more male-dominated or more female-dominated occupations than that the fields in which they graduated. As in the previous chapter, I use a measure I call respondents' *career launch sex-segregation score*. Instead of a dichotomous variable predicting whether or not respondents enter a female-dominated (or male-dominated) occupation, the sex-segregation score captures the percent female of the occupation respondents choose. This is a purely demographic measure of sex-segregation: the cultural sex-typing of occupations is not necessarily completely determined by the representation of men and women therein. However, it is a useful indication of whether respondents' self-conceptions influence where they locate themselves along the spectrum of sex-segregated occupations. It is in indication as well of their individual-level contribution to reproducing or undermining occupational sex-segregation.

4.2 Hypotheses

To investigate the possibility that gendered self-expression leads to gendered decisions at career launch, I examine the effects of feminine, unsystematic, and people-oriented self-conceptions on the probability that men and women will choose male-dominated or female-dominated career tracks. I use several types of self-conceptions in an attempt to show that any effects I find are likely not specific to a narrowly-defined type of self-conception. Again, my purpose is to show examples of mechanisms by which self-conceptions influence career launch decisions. These are not the only self-conceptions that influence career launch; rather they are useful exemplars of substantive categories of self-beliefs. If I find an effect of self-conceptions here, it is likely there are many other self-conceptions that follow the same pattern.

I expect self-expressive patterns of career selection to follow those identified in chapter 3; namely, that students with self-conceptions traditionally stereotyped as feminine will be more likely to enter female-dominated career launch paths and be more likely to move into an even more female-dominated field after college graduation. Similar patterns should exist for unsystematic and people-oriented self-conceptions.

This chapter tests the assumption that respondents' career launch decisions are made, in part, as gendered expressions of self. The analysis will help determine whether these gendered self-concepts contribute to the reproduction of occupational sex segregation.

Although self-expression may seem to be a likely determinant of career launch decisions, it is plausible that self-conceptions are not significant predictors of such decisions. Given the economic situation during which these young men and women entered their careers, and the structural constraints imposed on people just emerging from their undergraduate education, these constraints may simply be too strong to allow men and women much room to make decisions along self-expressive lines. Or, their decisions may not be patterned in such a way that self-conceptions stereotypically associated with women lead respondents to choose more female-dominated occupations (and self-conceptions associated with men lead respondents to choose male-dominated occupations). If I find that self-conceptions are significantly predictive of sex-segregation scores and the change in sex-segregation scores between degree and career launch, it is likely that such effects would be identified in larger samples with more detailed measures of self-conceptions.

4.3 Methods

The dependent variable is a measure of the percent women in respondents' post-college occupations or graduate school programs on a scale ranging from 0-100% women. A positive coefficient predicting this scale means that respondents with that characteristic are more likely to choose female-dominated occupations or graduate programs; negative predictor coefficients would imply that characteristic lead respondents to choose career launch paths that are more male-dominated. I identified a sex-segregation score for each person by matching their detailed field of work or study (identified by year 5 survey questions) with national statistics of the percent women in each of these occupations. For those in the workforce, I referenced U.S. Department of Labor's *Bureau of Labor Statistics* to find the percent women in respondents' field of work. I used statistics computed by the National Science Foundation's Division of Science Resource Statistics for the percent women in science and engineering-related graduate programs[49] and the National Center for Education Statistics' *Digest of Educational Statistics* for the percent women in non-science or engineering graduate programs.[50]

I use a measure of the change in respondents' sex-segregation scores in descriptive models. To create this variable, I subtracted the percent female in their

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[49] NSF detailed majors data: http://www.nsf.gov/statistics/wmpd/pdf/tabc-5.pdf
[50] Digest of Educational Statistics: http://nces.ed.gov/programs/digest/d09/tables/dt09_286.asp

undergraduate degree field from the percent female in their career launch field.[51] People with a positive change score moved into more female-dominated field than the field in which they earned their degree. People with a negative change score switched into a more male-dominated field than the one in which they graduated. I model change in the demographic analysis and the causal models by including respondents' sex-segregation scores of their degrees in the structural equation models predicting sex-segregation scores in their career launch occupations (see below for a description of my analytic strategy). My key independent variables are the year 2 latent measures of feminine self-conceptions (introduced in chapter 2) and unsystematic and people-oriented self-conceptions (introduced in chapter 3).

All models control for the following race/ethnicity and school measures: whether respondents identify as African-American (yes=1), Hispanic or Latino (yes=1) or Asian or Asian-American (yes=1), or non-Hispanic white (yes=1; reference category); and whether they attended MIT (yes=1), Olin (yes=1), Smith (yes=1) or UMass (yes=1; reference category). I also control for whether respondents entered graduate school or the workforce after graduation (1=entered graduate school; 0=entered the workforce). The demographic models in Table 4.2 measure a more complete list of characteristics, including respondents' gender (women=1)[52], whether respondents were born in the U.S. (yes=1), their family's income (in dollars), whether they identify as gay, lesbian or bisexual (yes=1), their political conservatism (1=very liberal to 7=very conservative), and how they rate their religiosity compared to their peers (1=lowest 10% to 5=highest 10%).

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[51] See Appendix 2 and chapter 3 for information on the calculation of the sex-segregation scores for respondents' undergraduate degrees.
[52] The structural equation models are ran separately for men and women, so they do not include a control for gender.

Table 4.1 presents descriptive statistics for the mean sex-segregation scores and the change in respondents' sex-segregation scores between college and career launch and Table 4.2 lists the most common occupations among those respondents who entered the workforce. I use OLS regression in Table 4.3 and 4.4 to determine the demographic predictors of sex-segregation scores and change in sex-segregation scores over time. The remainder of the analysis in this chapter uses structural equation modeling. I remind the reader that latent variables are meant to represent overarching concepts, components of which are captured by the manifest variables predicted by the latent variable. The benefit of latent variables is that not all possible measures of this concept must be included as manifest variables for the concept to be adequately represented by the latent variable (Byrne, 2010). Table 4.5-4.6 present the structural model (the relationships between the latent independent variable and the dependent variable) and the controls. Table 4.7 uses OLS regression to predict the effect of people-oriented self-conceptions on sex segregation scores. All structural and OLS models presented in this chapter control for school attended, race/ethnicity, and whether respondents entered the workforce or a graduate school program. (No other demographic factors were significant predictors of sex-segregation scores in the demographic models, thus I did not include them in the models presented below.)

The next section details the demographic trends of respondents' career launch paths. The following section presents the structural equation and OLS models predicting percent women in respondents' career launch paths and the changes in sex-segregation scores between their degrees and their occupations or graduate school programs.

4.4 Demographic Predictors of Sex-Segregation Scores at Career Launch

Table 4.1 presents the means and standard deviations for women's and men's sex-segregation scores at career launch and the change in their sex-segregation scores between college degree and career launch. I provide the pooled statistics, as well as the descriptives by gender, career launch activity (employment or graduate programs) and school. As expected, women enter significantly more female-dominated occupations and graduate school programs than men: women have an average sex-segregation score of 42.8%; men's average score is 26.9%. Women enter significantly more female-dominated occupations whether they enter graduate school or employment after graduation. This gendered pattern also holds in every school except Olin, where all students graduate with engineering degrees. Because of the nature of the populations from which my sample was drawn, the average sex-segregation score of the sample is shifted toward the male-dominated end of the spectrum. The scores for UMass are likely most representative of the typical college in the U.S. Women who graduated from UMass have a sex-segregation score of 56.8 percent, substantially higher than women graduates of MIT (32.6%) or Olin (17.8%), but only slightly higher than Smith (51.2%).

Men's sex-segregation scores are more consistent than women's scores across the career launch activities and among graduates of the three schools. Men with degrees from Olin enter significantly more male-dominated occupations than men from MIT or UMass. It is an interesting reflection of how sex-segregation is reproduced that men graduates of an average state school are no more likely to enter female-dominated occupations than those who graduate from a technical school like MIT. School selection, then, makes a large impact on where women end up among the segregated occupations, but much less so for men.   See Figure 4.1 for histograms and distribution curves for men's and women's sex-segregation scores.

There is no significant gender difference in the average changes in men's and women's sex-segregation scores between their degrees and their career launch occupations, although there is a slight difference once respondents' race/ethnicity, school, and other demographic measures are controlled for (see table 4.4). The biggest difference between men's and women's movement after graduation is among the graduates of UMass. Women enter slightly more female-dominated occupations and men enter slightly more male-dominated occupations than their degree fields. The means of these change scores are quite close to zero for both men and women. However, figure 4.2 shows that these values hide a good deal of movement into more or less dominated fields after graduation. Both men and women appear to be equally likely to move into more female-dominated or more male-dominated occupations.

It is clear from Table 4.1 that women enter significantly more female-dominated occupations than men, regardless if they enrolled in graduate school programs or entered the workforce.   However, the difference between men's and women's sex-segregation scores is smaller among those in graduate school programs than those in the workforce. In fact, women enrolled in graduate school programs have significantly lower sex-segregation scores than women who enter the workforce (34.74% versus 44.27%, p=.009). Furthermore, women who started their career in the workforce moved into more female-dominated occupations than those in which they graduated (average change in sex-segregation score for employed women: 3.60%), while women who entered graduate programs entered less female-dominated occupations (average change in sex-segregation scores for women in graduate school: -7.02%). This difference is statistically significant (p=.000). There are no significant differences in sex-segregation scores or change in sex-segregation scores between men that entered the workforce and those that entered graduate programs. Women who enter graduate school go into more male-dominated field than those in which they graduated, but there is no difference in change scores among men.

Table 4.2 lists the five most common occupations for respondents who entered the workforce for everyone, and for men and women separately. Engineering occupations feature prominently in these lists because all Olin students and many MIT students graduated with engineering degrees. The purpose of this table is to show the diversity of jobs that men and women enter. The largest categories for women and men had 10 and 17 people, respectively. In other words, respondents are not crowded into a handful of occupations, but, as shown in Figure 4.2, are spread out across the spectrum of male- and female-dominated degree fields.

Tables 4.3 and 4.4 present demographic OLS models predicting sex-segregation scores and the change in respondents' sex-segregation scores at career launch, both pooled and for men and women separately. As expected, women are significantly more likely to enter female-dominated occupations then men. Respondents who graduated from MIT and Olin are significantly more likely to enter male-dominated career paths than those who graduated from UMass. This makes sense, given the substantive specializations of MIT and Olin in male-dominated math and science occupations. These school differences appear to be driven by women only. As suggested by the bivariate statistics, women whose career launch begins in graduate school are marginally more likely to be in a male-dominated field, compared to women who start their careers in the workforce.

In addition, Asian and Asian-American women are more likely to be in female-dominated occupations than non-Hispanic white women. This is consistent with cultural stereotypes that Asian and Asian-American women as upholding many of the stereotypical characteristics of femininity (submissiveness, cooperativeness, friendliness, etc) (Pyke & Johnson 2003).[53] Hispanic women are marginally more likely than non-Hispanic white women to be in a male-dominated field. This result disappears once gendered self-conceptions are included in the model, suggesting that this difference is the result of Hispanic women's slightly less feminine self-conceptions, compared to white women.

The demographic models predict much less of the variation in men's sex-segregation scores: men who graduate from Olin are more likely to enter a male-dominated field at career launch than men who graduate from UMass. No other predictors of sex-segregation scores are significant for men.

The OLS regression models predicting the change in respondents' sex-segregation scores are presented in Table 4.4. To measure the change in sex segregation scores between college and career launch, I added respondents' degree sex segregation score to the model in table 4.3. I find only a small gender difference in this change: women are marginally more likely than men to enter an even more female-dominated occupation than the field in which they graduated. MIT and Olin seem to have some success

[53] Pyke and Johnson (2003) describe the normatively femininity of Asian-American women as "subordinate femininity," which has a similar relationship to emphasized femininity for white women as does masculinity among Asian-American men has to hegemonic masculinity among white men.

launching women into more male-dominated occupations than UMass, controlling for their college degrees. Graduate students are more likely than those in the workforce to have moved into a more male-dominated field after graduation. This effect is largely driven by women's results, however, as enrollment in graduate schools is a significant and negative predictor of sex-segregation change scores for women. None of the demographic predictors are significant for men's change scores. As in the previous table, Asian-American women are more likely than white women to enter even more female-dominated career launch occupations once they have graduated.

The overall trending of these characteristics suggest that the men and women in this sample are helping to reproduce occupational sex segregation in their career paths—women are more likely to enter into female-dominated occupations and men are more likely to enter into male-dominated occupations. The next part of this chapter attempts to help explain *why* they chose these paths. Specifically, what role do men's and women's gendered self-perceptions play in their career launch decisions? The next section presents the results of the causal models predicting sex-segregation and the change in sex-segregation scores at career launch.

4.5 Predicting the Career-Launch Sex Segregation Scores

Do respondents' self-conceptions predict whether they enter male-dominated or female-dominated occupations after graduation? Do self-conceptions have an effect net of respondents' college degree fields? This section uses structural equation modeling (SEM) and OLS regressions to model the relationship between these individual-level beliefs and respondents' sex-segregation scores at career launch, and the change in their sex segregation score between college and career launch.

I begin by testing whether respondents' year 2 perceptions of themselves as feminine, unsystematic, and people-oriented predict their sex-segregation scores at career launch. Tables 4.5 and 4.6 present the structural equation models with the latent measures for feminine and unsystematic self-conceptions and table 4.7 presents the OLS model with people-oriented self-conceptions. Because the processes that influence men's and women's career decisions are likely different, I run separate models for men and women. Each table presents the unstandardized coefficient estimates, the standard error and the significance level (based on two-tailed tests) for each independent measure. I provide the chi-squared, degrees of freedom, CFI and RMSEA as fit statistics, as well as the squared multiple correlation (R^2) of the dependent variable.

Looking to the first two columns of table 4.5, I find strong relationships between self-conceptions and respondents' sex-segregation scores, for women. The coefficient for the feminine self-conceptions latent measure is significant and positive for women, meaning that every point more feminine women perceive themselves to be corresponds to a 6.1 percent increase in the percent women in their career launch occupations. Feminine self-conceptions are not similarly predictive of sex-segregation scores for men.

In addition to respondents' sex-segregation scores, I am also interested in the extent to which they have entered more female-dominated or more male-dominated occupations than the ones in which they earned their undergraduate degree. To model this change, I add a measure of the percent women in respondents' degree to the models presented in the first two columns in Tables 4.5-4.7. Controlling for the percent women in their degree fields effectively means that the dependent variable—respondents' sex-segregation scores at career launch—indexes the differences in gender composition between the sex-segregation measures at the two time points. In these change models, a significant and positive coefficient indicates that a respondent with that characteristic is more likely to move into a more female-dominated field after graduation; a negative coefficient means that those respondents are more likely to transition into a more male-dominated field.

Looking to the third and fourth columns in 4.5, women with feminine self-conceptions are more likely than other women to enter even more female-dominated occupations after graduation. This effect exists for men as well: men who perceive themselves as more masculine are more likely to enter male-dominated occupations or graduate school programs after college.

Table 4.6 indicates that both men and women who perceive themselves as unsystematic are significantly more likely to enter a female-dominated career-launch occupations, and to move into even more female-dominated fields than the ones in which they earned their degree. This effect is double the size for men than women: for every point unsystematic men perceive themselves to be, the percent women increases by more than eleven points. This is a revealing finding, as many male-dominated professions (i.e. engineering and science) are stereotyped to require people who are highly logical and systematic. Women and men who do not feel as though they have such characteristics are more likely to go into more female-dominated jobs or graduate programs. This result holds even after controlling for the sex segregation of respondents' college degrees.

People-oriented self-conceptions also predict women's entrance into female-dominated career launch occupations, and whether they move into even more female-dominated fields than the ones in which they earned their degree (Table 4.7). People-oriented self-conceptions do not predict men's sex segregation scores.

Tables 4.5-4.7 indicate school and demographic differences in sex-segregation scores as well. Among women, those who graduated from MIT and Olin enter significantly more male-dominated career launch occupations than UMass graduates. Once unsystematic self-conceptions are controlled for, Smith women are also more likely than UMass women to enter a male-dominated occupation. Consistent with the descriptive results, those who enter graduate school are in significantly more male-dominated fields than those who enter the workforce. Among men, Olin graduates are more likely to enter more male-dominated fields than Umass graduates. MIT graduates' sex-segregation scores are not significantly different from those of male UMass grads.

Several demographic factors are significant predictors of the change in sex-segregation scores between college and career launch. First, women who graduated from Olin are more likely than UMass graduates to enter an even more male-dominated career than their degree field. The effect for career launch activity (whether they enter graduate school or the workforce) remain after sex-segregation of degree is controlled for. Among men, there are no significant school effects on whether men move into more or less male-dominated occupations after graduation.

As in the OLS models, Asian and Asian-American women are more likely to enter female-dominated occupations than women. Once the gendered self-conceptions and degree sex segregation score are controlled for, Hispanic men are more likely than non-Hispanic white men to move into more female-dominated majors after graduation. This may be due to the stereotypes of Hispanic men as less "naturally" skilled at male-dominated occupations such as math and science (Eglash 2003), but I cannot say for sure from these data. Net of unsystematic self-conceptions, African-American men are more likely than white men to enter male-dominated occupations.

The results above indicate that culturally informed self-perceptions predict where men and women end up in the sex-segregated structure of occupations, effects that persist even once respondents' college degrees are accounted for. Table 4.8 summarizes these results, listing the self-conceptions that predict the career launch sex segregation score and the change in sex segregation score between respondents' degree and their career launch activity. The next section places these results in context: what does it mean that sex-segregation and the change in sex-segregation scores can be predicted by individual-level beliefs about the self?

4.6 Conclusion

This chapter identified gendered patterns in men's and women's career launch paths: women enter occupations or graduate programs that have significantly higher representation of women than the occupations and graduate programs that men enter. It is perhaps unsurprising that the men and women in my sample reproduce occupational sex segregation in their career launch decisions. These findings also reveal that the average changes in men's and women's sex-segregation scores (the difference in percent women between their undergraduate degree field and their career launch field) are not very different. In the aggregate, men and women maintain the level of sex-segregation from their college degrees. This suggests that the bulk of early sex-segregative processes (at least as they unfold for college graduates) takes place in the shuffling of men and women into sex-segregated undergraduate degrees. There is some variation by type of career launch activity, as women who enter graduate programs actually move into more male-dominated occupations than women who enter the workforce, but overall there is not much aggregate trending in their movement after graduation. However, the fact that the mean of the change scores is near zero for both men and women hides important substantive differences between the men and women who do move into sex-segregated occupations.

What helps explain these patterns? Female-typed occupations are generally associated with traits stereotypically assigned to women (e.g. feminine, people-oriented, less systematic or systematic) and male-typed occupations associated with traits stereotypically assigned to men—e.g. masculine, systematic, and objects-oriented. As a result of the cultural beliefs that accompany the sex-typing of occupations, I expected that men and women would make career decisions based on the extent to which they understand themselves as consistent with the perceived characteristics of those occupations. Therefore, I tested the hypotheses that men and women with perceptions of themselves as relatively feminine, unsystematic, and more people-oriented would select into more female-typed occupations and grad programs, *regardless of the actual content of those occupations.* My analysis in chapter 5 engages with the question of how field-specific cultures and activities affect sex-segregative processes within them.

Women who perceive themselves as feminine, unsystematic, and people-oriented end up in more female-dominated career launch occupations than women with more masculine, systematic, and things-oriented self-conceptions. It is not just that women, *qua women*, are more likely to end up in female-dominated occupations, but that the more they see themselves adhering to traits stereotypically associated with women, the more likely they are to end up in the most female-typed occupations. Not only, then, do these women reproduce the demographic sex-segregation of their occupations, they also reproduce the cultural *sex-typing* of those fields as social locations inhabited by people who are generally feminine, unsystematic, and people-oriented. In other words, the cultural perceptions of those occupations as suitable for people who are feminine, unsystematic and people-oriented becomes a self-fulfilling prophecy.

I also find evidence of similar effects among men. Men who perceive themselves as highly systematic are more likely to end up in male-dominated occupations. Again, not only are men who enter male-dominated occupations reproducing the demographic over-abundance of men in these occupations, they are also reinforcing the stereotypes of those occupations as suitable for people who are systematic. Men who do not believe they have these characteristics are more likely enter female-dominated occupations. This reproduces the cultural perceptions of female-dominated occupations as locations for people who are unsystematic, even as men's entrance into female-dominated occupations challenges the demographic imbalance of these occupations.

Beyond the relationship between self-conceptions and the percent women in respondents' career launch occupations, I also found several factors that predict whether men and women moved into more female-dominated or more male-dominated occupations after earning their undergraduate degrees. This college-to-work juncture is an important point where occupational sex segregation is reproduced above and beyond college majors (Jacobs 1995, 1989, Seymour & Hewett, 1997; Xie & Shauman, 2003).

My results show that when movement did happen, it reinforced the cultural sex-typing of these occupations. Both men *and* women who perceived themselves as more feminine and less systematic than their peers were more likely to move into a more female-dominated field than the ones in which they earned their undergraduate degrees. This, again, reinforces the cultural sex-typing of those occupations as places for people with feminine and unsystematic self-conceptions.

This degree-to-career transition represents a degree of freedom with which men and women can tailor their careers to fit their sense of self. Net of the structural barriers imposed by their certifications in certain occupations, men and women do have some freedom to move into more female-dominated or more male-dominated fields after graduation. My results also show that men who perceive themselves as people-oriented are more likely to move into female-dominated occupations or graduate programs—fields that stereotypically are more likely to fulfill the expression of that self-conception than male-dominated occupations.

Important to our understanding of occupational sex segregation, the effect of self-conceptions on sex-segregation scores does not appear to end after college. College is a time of relative flexibility in career decision-making, compared to the labor force, and this freedom may allow more self-expressive decision-making than other points in the career path. The fact that self-conceptions remain a significant predictor of sex-segregation and change in sex-segregation at career launch, despite the increased rigidity that makes it more difficult for people to align their career trajectories with self-expressive priorities, is important. The continued salience of self-conceptions on the sex-segregation of people's career launch occupations, over and above the segregation in their undergraduate degrees, suggests that the influences of self-conceptions may extend beyond the career launch phase and occur throughout the career pipeline.

Looking Forward

This chapter painted a broad-brushed picture of the effects of self-conceptions and gender schemas on the individual-level reproduction of sex-segregation. The strength of this analysis lies in its ability to put everyone on the same metric: the percent women in respondents' career launch field and the change in sex-segregation scores between their college degree and career launch. However, this analysis also flattens much variation by individual field. Additionally, as discussed in chapter 3, there are likely intra-field cultural factors that influence the ways in which self-conceptions lead to persistence in or attrition from those occupations. Focusing on these intra-field processes also facilitates the identification of particular factors which lead men and women to select into or out of a field.

As a case study of these intra-field processes of sex-segregation, I examine the portion of my sample who entered college intending to be engineering majors. While there are many aspects of any field that help facilitate gender differences in persistence, I focus on one of particular importance: the ways in which gender schemas and self-conceptions filter men and women engineering students' development of (gendered) professional identities, and how those gendered professional identities, in turn, lead to differential persistence in the field of engineering. It is an example of the cultural processes that underlie the sex-segregated structure of occupations in the United States.

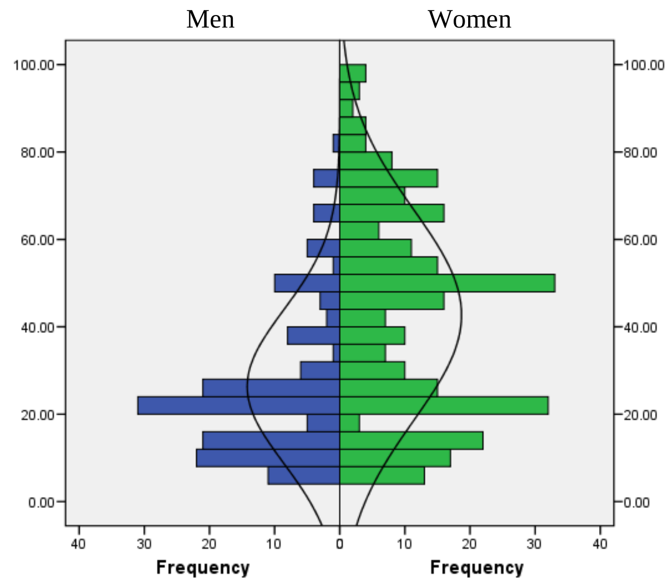

Figure 4.1: Histograms and Normal Distributions of Sex-Segregation At Career Launch (measured in % women)

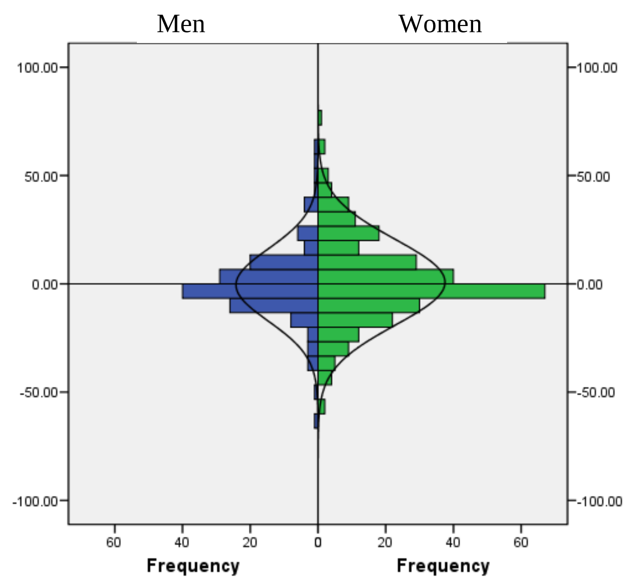

Figure 4.2: Histograms and Normal Distributions of Changes in Sex- Segregation between Degree Field and Career Launch Field (% women)

Table 4.1: Univariate and Bivariate Statistics for Sex-Segregation and Change in Sex-Segregation Scores, by Gender, Career Launch Activity, and School

	ALL		WOMEN		MEN		*p*
	Mean	*SD*	Mean	*SD*	Mean	*SD*	(men vs.women)
All							
Sex-Segregation Score (% female in career launch field)	36.61	*23.05*	42.68	*24.17*	26.32	*17.53*	***
Δ in Sex-Segregation Score (change in the % female between respondents' college degree and their career launch field)	0.27	*18.19*	0.74	*19.86*	-0.52	*16.69*	
Workforce Entrance							
Sex-Segregation Score	38.39	*25.2*	44.28	*25.92*	28.87	*19.13*	***
Δ in Sex-Segregation Scores	0.21	*18.29*	3.60	*19.33*	-0.85	*15.71*	+
Graduate School Entrance							
Sex-Segregation Score	31.94	*15.27*	34.72	*16.26*	26.29	*11.29*	*
Δ in Sex-Segregation Scores	-4.75	*17.06*	-7.02	*19.01*	0.16	*10.58*	+
UMass							
Sex-Segregation Score	41.93	*25.91*	56.81	*23.32*	29.87	*21.93*	*
Δ in Sex-Segregation Scores	-1.94	*20.74*	3.17	*22.25*	-6.44	*19.12*	+
MIT							
Sex-Segregation Score	30.36	*18.07*	32.66	*19.67*	27.69	*15.85*	+
Δ in Sex-Segregation Scores	-0.91	*17.11*	-1.81	*18.24*	0.12	*15.89*	
Olin							
Sex-Segregation Score	17.65	*13.23*	17.80	*10.48*	17.92	*15.17*	
Δ in Sex-Segregation Scores	2.82	*12.33*	2.17	*9.97*	3.57	*15.42*	
Smith							
Sex-Segregation Score			51.24	*23.19*			
Δ in Sex-Segregation Scores			1.98	*21.59*			

+ p<.10 * p<.05 ** p<.01 *** p<.001

Among men, no significant difference in sex-segregation scores or change scores between respondents entering the workplace or entering a graduate school program.

Among women, those who entered the workplace after graduate have a significantly higher sex-segregation score (p=.009) and change score (P<.000) than women who entered graduate school.

MIT has significantly lower sex-seg scores than UMass (p<.000); Olin has significantly lower sex-seg scores than UMass (p<.000); Smith has significantly higher sex-segregation scores than Umass (p=.013).

Table 4.2: Most Common Jobs Among those Who Entered Employment

Everyone	Women	Men
Electrical Engineer (27) Mechanical Engineer (16) Computer/Software Engineer (16) Biological Scientists (13) Business Operation Specialist (11)	Biological Scientist (10) Electrical Engineer (9) Mechanical Engineer (7) Primary/Secondary Teacher (6) Chemical Engineer (6)	Electrical Engineer (17) Computer Software Engineer (12) Mechanical Engineer (9) Securities, Commodities and Exchange Agent (8) Business Operation Specialist (5)

Table 4.3: Descriptive Measures Predicting Sex-Segregation Scores

SEX-SEGREGATION	All		WOMEN		MEN	
SCORES	Unst. Coeff	Sig	Unst. Coeff	Sig	Unst. Coeff	Sig
Constant	54.747	***	77.601	***	24.87	
Gender (1=women)	7.663	**				
MIT Graduate	-18.405	***	-29.129	***	-5.777	
Olin Graduate	-29.823	***	-41.186	***	-19.463	***
Smith Graduate	-0.121		-8.41			
Hispanic or Latino	-7.285		-12.668	+	4.854	
Black or African-American	-3.892		0.158		-8.54	
Asian or Asian-American	4.874		8.738	*	-3.148	
Born in the US	-1.768		-1.926		-0.503	
Family Income	-0.001		0.001		-0.001	
Lesbian, Gay or Bisexual	2.694		2.149		8.942	
Political Conservatism	0.015		0.465		-0.46	
Religiosity	0.444		0.29		0.977	
Enrolled in Grad School (vs. employed)	-4.637	+	-5.864	+	-0.783	
R-squared	0.286	***	0.279	***	0.047	*

Table 4.4: Descriptive Measures Predicting Change in Sex-Segregation Scores

CHANGE IN SEX-	All		WOMEN		MEN	
SEGREGATION SCORES	Unst. Coeff	Sig	Unst. Coeff	Sig	Unst. Coeff	Sig
Constant	34.314	**	59.280	***	-11.239	
Percent Women in Degree	0.577	***	0.550	***	0.664	***
Gender (1=women)	4.070	+				
MIT Graduate	-9.322	**	-17.870	***	0.348	
Olin Graduate	-11.696	**	-20.353	**	-2.480	
Smith Graduate	0.397		-5.113			
Hispanic or Latino	-6.077		-11.249		6.355	
Black or African-American	0.276		3.104		1.013	
Asian or Asian-American	3.897		8.639	*	-5.109	
Born in the US	-2.536		-2.910		0.252	
Family Income	0.001		0.001		0.001	
Lesbian, Gay or Bisexual	0.214		1.271		2.113	
Political Conservatism	-0.019		0.213		-0.305	
Religiosity	1.054		0.651		1.983	+
Enrolled in Grad School (vs. employed)	-5.214	*	-7.620	*	1.062	
R-squared:	0.472	***	0.438	***	0.472	***

Table 4.5: SEM Predicting Percent Women in Career Launch Field with Feminine (vs. Masculine) Self-Conceptions

	Percent Women in Career Launch Field						Change in Percent Women from Degree to Career Launch					
	WOMEN			**MEN**			**WOMEN**			**MEN**		
	Unst Estimate	**S.E.**		**Unst. Estimate**	**S.E.**		**Unst. Estimate**	**S.E.**		**Unst. Estimate**	**S.E.**	
Feminine SC	**6.105**	**3.396**	*****	**.349**	**.405**		**2.994**	**1.568**	*****	**5.243**	**2.226**	*****
% women in Degree	**---**			**---**			.567	.058	***	.581	.078	***
MIT	-24.231	4.397	***	-1.177	3.194		-13.619	3.915	***	4.374	2.851	
Smith	-4.016	4.042					-1.995	3.463				
Olin	-39.736	6.530	***	-12.759	4.566	**	-18.244	6.021	**	.606	4.309	
African-American	1.419	5.947		-8.449	10.063		3.608	5.065		-40.356	34.323	+
Hispanic or Latino/a	-.769	4.920		9.636	4.497	*	-4.699	4.215		9.209	3.956	*
Asian or Asian-American	5.571	3.318	+	-.792	3.400		5.533	2.837	+	-2.969	3.092	
Grad School after College	-9.496	2.748	***	.386	3.094		-9.277	2.333	***	-.095	2.725	
χ^2 *(df)*	50.6 (36)			50.6 (32)			52.6 (40)			57.3 (36)		
RMSEA	.029			.045			.026			.044		
CFI	.980			.887			.986			.917		
R^2	.280			.078			.477			.345		

Table 4.6: SEM Predicting Percent Women in Career Launch Field with Unsystematic (vs. Systematic) Self-Conceptions

	Percent Women in Career Launch Field						Change in Percent Women from Degree to Career Launch					
	WOMEN			MEN			WOMEN			MEN		
	Unst Estimate	**S.E.**		**Unst. Estimate**	**S.E.**		**Unst. Estimate**	**S.E.**		**Unst. Estimate**	**S.E.**	
Unsystematic SC	**7.028**	**2.569**	**	**11.093**	**4.701**	*	**5.048**	**2.427**	*	**7.851**	**3.987**	*
% women in Degree	---			---			.561	.058	***	.516	.076	***
MIT	-25.781	4.386	***	.030	3.336		-15.411	3.911	***	4.899	2.882	+
Smith	-8.956	4.063	*				-5.741	3.498				
Olin	-42.989	6.622	***	-10.683	4.781	*	-20.683	6.144	***	.570	4.294	
African-American	2.579	5.867		-42.925	21.564	*	4.438	5.000		-32.145	18.531	+
Hispanic or Latino/a	-1.228	4.952		15.499	4.983	**	-4.247	4.226		13.596	4.179	**
Asian or Asian-American	4.628	3.333	+	-1.654	3.490		4.967	2.838	+	-4.412	2.964	
Grad School after College	-8.823	2.794	**	.469	3.283		-8.695	2.374	***	.147	2.757	
χ^2 *(df)*	5.7(8)			13.0 (7)			8.2 (9)			12.5 (8)		
RMSEA	.000			.055			.000			.044		
CFI	1.00			.948			1.00			.976		
R^2	.313			.186			.489			.372		

Table 4.7: OLS Predicting Percent Women in Career Launch Field with People-Oriented (vs. Things-Oriented) Self-Conceptions

	Percent Women in Career Launch Field						Change in Percent Women from Degree to Career Launch					
	WOMEN			MEN			WOMEN			MEN		
	Unst Estimate	**S.E.**		**Unst. Estimate**	**S.E.**		**Unst. Estimate**	**S.E.**		**Unst. Estimate**	**S.E.**	
People-Oriented SC	**2.844**	**.987**	**	**-0.497**	**1.065**		**1.780**	**0.886**	*	**-.430**	**.828**	
% women in Degree	---			---			.546	.077	***	.639	.083	***
MIT	-27.061	5.413	***	-1.897	4.758		-16.232	5.031	***	4.412	3.786	
Smith	-4.613	5.031					-3.962	4.453				
Olin	-35.844	6.583	***	-16.869	5.324	**	-17.740	6.368	**	-.648	4.646	
African-American	-2.294	8.002		-11.598	17.671		1.531	7.103		-.306	13.805	
Hispanic or Latino/a	-5.403	6.496		8.384	8.285		-6.875	5.754		7.246	6.439	
Asian or Asian-American	7.196	4.100	+	-3.287	4.626		8.338	3.632	*	-5.655	3.680	
Grad School after College	-7.679	3.368	*	-1.502	4.100		-9.658	2.994	***	.908	3.244	
Constant	64.195	14.923	***	20.620	18.999		45.505	13.472	**			
Adjusted R^2	.310***			.072*			.460***			.445***		

Table 4.8: Summary of Results

	Self-Conceptions that Predict Career Launch Sex Segregation Score	**Self-Conceptions that Predict Change in Sex Segregation Scores, Degree to Career Launch**
Women	Feminine Unsystematic People-Oriented	Feminine Unsystematic People-Oriented
Men	Unsystematic	Feminine Unsystematic

The Self-Expressive Edge of Sex-Segregation: The Role of Gender Schemas and Self-Conceptions in College Major Selection and Career Launch

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CHAPTER 5-- Gendered Professional Identities and Gendered Persistence: A Case Study of Engineering Students

The previous two chapters explored how culturally-informed self-conceptions lead to sex-segregation in college major selection and career launch. Not only do the self-expressive decisions of men and women reproduce demographic sex segregation, they also help reproduce the occupations that men and women enter as culturally male-typed and female-typed domains.

The reproduction of sex-segregation is not limited to inter-field processes, however. Processes *within* occupational fields can influence whether women and men decide to commit to and persist in a male- or female-dominated field, or whether they leave it for some other line of work. In an era where self-expression is an influential factor in career decision-making, one's perceived fit with the culture of one's future profession is likely an important axis along which decisions to stay or leave are made. I argue here that professional identity development—a part of the cultural process of professional socialization—is filtered by gendered self-conceptions, leading men and women to have slightly different professional identities at the end of their training experiences. These gendered professional identities in turn, are differently likely to promote persistence among men and women, and thus can reinforce sex segregation.

Professional identities are an important site for understanding the intra-field cultural processes of sex segregation. Professional identities are developed through professional socialization (Becker et al. 1964; Merton et al. 1982) and they encompass the intra-field cultural beliefs about what it means to be a professional in that particular field. Because they are internalized as identity features, professional identities may react with self-conceptions and become important factors in self-expressive decision making.

In this chapter, I examine the role of professional identities in self-expressive career decision-making by studying the subsample of respondents in undergraduate engineering programs. Specifically, I investigate how gendered self-conceptions influence respondents' development of several dimensions of professional identities as they progress through the professional socialization of their engineering programs, and how these gendered professional identities, in turn, influence whether men and women persist in engineering. The four professional identity dimensions I study are: math and science prowess, technological leadership, commitment to managerial and communication skills, and social consciousness. I find that men and women develop different professional identities on average, and that the gendering of these professional identities is partly the result of gendered self-conceptions filtering the internalization of these dimensions. These gendered professional identities, in turn, lead to gendered persistence: women are less likely to have the professional identity features that increase the likelihood of persisting in this male-dominated field. I examine the effects of gendered professional identities on two types of persistence: *behavioral persistence* (staying in an engineering major and continuing in engineering through career launch) and *intentional persistence* (whether they plan to be an engineer in five years). These findings support my argument that intra-field cultural processes—in addition to broader, inter-field processes—lead to the reproduction of sex segregation through seemingly individualistic, self-expressive decisions.

I begin by describing professional socialization and professional identity development and then introduce the four professional identity dimensions I use in this chapter. I demonstrate empirically that these professional identity dimensions are developed, at least in part, out of respondents' professional socialization experiences. Next, I show how these identities are gendered, and how the development of these identities is filtered by respondents' self-conceptions. Third, I illustrate how these gendered professional identities are related to behavioral and intentional persistence in engineering. Finally, I discuss whether these processes might occur in other professions, and what this means for the self-expressive edge of segregation overall. Figure 5.1 provides a schematic of this chapter's analyses.

5.1 Why Engineering?

Engineering is a useful case study for examining intra-profession cultural mechanisms of segregation for several reasons. First, it has a condensed yet flexible credentialing process that should amplify the mechanisms of interest (Cech et al. 2011). On the one hand, engineering programs must prepare students to represent their profession after only four years of undergraduate education. On the other hand, engineering students enjoy the career decision-making flexibility that undergraduate education provides—more flexibility than that of stand-alone, post-graduate professional credentialing programs such as law or medical school, for example (Becker et al. 1964; Epstein 1993). Engineering also has a rich and fairly well-documented professional culture, but it has not been studies as extensively as medicine and law. Third, engineering remains heavily male-dominated, even as women have increasingly moved into previously male-dominated professions such as law and medicine in the last four decades (NSF 2008). As my previous analysis shows, there are many barriers to women entering engineering. Understanding why they stay or leave once they have chosen an engineering major is equally as important to decoding sex segregation as understanding their choice to enter these fields in the first place.[54] Finally, on a practical note, engineering students are the largest group in my data, and several survey questions explicitly reference engineering and engineering education.

5.2 Professional Culture and Professional Socialization

Professions are more than the sum of their characteristic tasks and expertise; they also nurture elaborate meaning systems about those tasks and expertise. Alongside their specialized training, legally-recognized certification procedures and organized associations, professions maintain a heritage of traditions, hierarchies of valuation, and norms of behavior (Trice 1993; Weeden and Grusky 2005). A *professional culture* is the system of meaning, lifestyle and demographic "reputations," and rituals, myths, and symbols associated with profession and its tasks (Abbott 1988; Cech 2011; Grusky 2005). Widespread social beliefs like gender schemas have salience within professional cultures, but the particular values and beliefs that make up professional cultures may not occur elsewhere in the social landscape (Haas and Shaffir 1991).[55]

Professional cultures are important to the reproduction of occupational sex segregation because these cultures are not benign. The belief systems that give meaning to the tasks and expertise within a profession's boarders can have built within them biases about who is best suited to carry out those tasks and expertise. Professional cultures can bias employers' and co-workers' judgments of women (through what I call elsewhere

[54] Making these career choices in the first place may be influenced by professional cultures to some degree, but such cultures likely are shallow and caricatured to outsiders. Abbott (1981) showed that the status hierarchies of medicine and law varied markedly, depending on whether insiders or outsiders were asked. The male- and female-typed stereotypes that accompany those fields are likely much more salient to outsiders than professional cultures. Future versions of this project with have a chapter on self-expressive decision-making, so I will be able to speak to these decisions.

[55] These cultures may make little sense or have little resonance to those who have not been trained in the profession (Haas & Shaffir 1991).

"professional competence schemas," seemingly objective cultural models about professional skills and expertise) as well as other "demand-side" processes of discrimination (Cech 2011).[56] Professional cultures can also influence peoples' *own* understanding of how they fit within a profession: men and women use those same professional competence schemas, for example, to evaluate their own skills. Although the intra-professional cultural factors that lead to segregation and inequality through institutional and interactional-level processes are important, I am interested here in the individual-level mechanisms by which professional culture can translate into the reproduction of sex segregation and, particularly, can influence men's and women's decisions to stay or leave the profession.

Professional cultures become most familiar to individuals through *professional socialization,* the process of inculcating neophytes into their professional roles (Epstein 1970). Professional socialization happens most explicitly in the credential acquisition process, during which aspiring professionals earn the credentials needed to practice in the profession (Cech et al. 2011). Socialization also happens to varying degrees in workplaces and mentoring relationships. Professional socialization inculcates neophytes into a "web of values, norms, rules, beliefs, and taken-for-granted assumptions" (Barley and Tolbert 1997, pg 93) that are expected of a members of their field and helps them develop the "habits of mind" of a committed professional. Through classes, summer jobs, assignments, involvement in student chapters of professional organizations, hall talk and friendships, students are transformed into a "professionals," adopting values and

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[56] Additionally, exclusionary ideologies can be embedded in the cultural myths, humor and tales of origin of a profession, such as lore about "founding fathers," or within a profession's norms of social interaction, such as the bravado typical of a surgical theater (Cech 2011).

norms and learning to project a confident, capable image to the public (Becker et al. 1961; Dryburgh 1999; Granfield 1992; Greenwood 1966).

These intra-profession cultural ideologies are transmitted through the professional socialization process to a new generation of professionals. As a result, men and women learn early what it means to be a member of the profession and are encouraged to try on that role for size as they progress through their training.

Professional Identity Development

The most important element of professional cultures for the individual-level reproduction of sex-segregation are *professional identities.* These identities are the "relatively stable and enduring constellation of attributions, beliefs, values, motives, and experiences in terms of which people define themselves in a professional role" (Ibarra 1999, p. 764 referencing Schein 1979). Professional socialization is deeply attitudinal in nature, and the culture, skill and etiquette of a professional appear in the individual as personal traits. The longer they spend in the initiation process, the more firmly impressed upon students are the values and beliefs of the profession (Hughes 1967; Ritzer 1971).

Professional identities develop through iterative and self-reflective experimentation with the different identity features of the profession that respondents learn through professional socialization. Neophytes adapt these identities by observing and emulating their role models and by experimenting with "provisional selves"-- their representation of the attitude and behaviors expected of their new role. Neophytes are evaluated on these provisional selves from external feedback from teachers and peers and by judging themselves against their own internal standards (Ibarra 1999).[57]

These "provisional selves" are vulnerable to influences from other aspects of people's identities. Not all provisional selves that respondents try on will fit with their existing notions of themselves. Provisional selves that are congruent with their self-conceptions are the more likely to "stick;" professional identity features that feel inorganic or discordant with their conceptions of themselves are more likely to be rejected (Ibarra 1999). Thus, as individuals progress through their professional socialization experiences, they may cobble together quite different professional identities, depending on their self-conceptions.[58]

Some of these professional identities may be more consistent with the cultural norms of the professional role and with the realities of professional practice than others. Neophytes who develop professional identities that emphasize values, priorities or expertise that are tangential to what the dominant professional culture values will be less likely to remain in the profession. Similarly, if their professional identities are not reflected in the experience of being a member of the profession on a day-to-day basis, they will more likely to seek out another field. For those who develop dominant professional identities, *performance of their professional roles can feel self-expressive.*

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[57] See Ibarra (1999) for an excellent model of this adaptation process.

[58] This process is iterative, and others (e.g. Becker & Howard 1965; Schein 1978) have argued that there is some change of self-conceptions as a result of professional identity development, but I am more interested here in the lesser-studied aspects of this relationship: how existing self-conceptions filter the development of professional identities. This is important for understanding how professional identities may come to be gendered. As I move forward with this project, I will check for the reverse relationship: whether professional identities influence self-conceptions over time.

In this chapter, I examine how four dimensions of professional identity— math and science prowess, technical leadership, managerial and communication commitments, and social consciousness—are gendered, and how these gendered professional identity dimensions, in turn, lead to gendered persistence in engineering. Little is known in the professional socialization literature about how professional identities are gendered, and how this may lead to differences in women's and men's decisions to remain in professions in the short and long-term. This chapter contributes an in-depth examination of the contributions of professional identity development to gendered persistence in engineering. As I argue, gendered professional identities are an important mechanism in the self-expressive edge of sex-segregation because of their intimate connections to self-conceptions.

I next describe the four professional identity dimensions I investigate. I then explore how these dimensions are gendered: how men's and women's adoption of these professional identity dimensions differs, and, more interestingly, how the development of these professional identity features is filtered by their self-conceptions. Finally, I show how these gendered professional identities lead to gendered persistence in this male-dominated field.

5.3 Professional Identity in Engineering

Engineering students must not only learn to do engineering work—to wield the competencies and skills of a professional—but they must also learn to *be* engineers (Cech 2010; Porcello 2004). Initiates are expected to commit to and find personal meaning in the role of a professional in their field. Explicitly and implicitly, students learn what it means to embody the role of the engineer—in values, in dress, speech, mannerisms, and styles of interaction—through professional socialization. Those who can seamlessly incorporate the role of the professional into their own identity should be more likely to remain in engineering and enjoy the field.

Professional identities can vary from individual to individual. Some people's professional identities may emphasize the ethical and societal contributions of engineering work, while others' identities may relish the rapid technical change facilitated by engineering design. The ideologies that underlie such professional identities can be found within the culture of engineering, but some have more prominence in the professional culture than others. Ethical practice is certainly a part of engineering culture, but it is far less emphasized in engineering culture than technological innovation (Cech 2010). Most engineering colleges, for example, require only a one-semester course on engineering ethics. As I argue below, those who develop professional identities that most closely align with the values systems within engineering will be more likely to finish an engineering degree, enter an engineering career track after college, and intend to be an engineer in the future.

I examine four professional identity dimensions in engineering. Each are based on deeply-held ideologies within the professional culture of engineering, and are thus likely to be transmitted through professional socialization. The measures I use tap characteristics that respondents believe are important to a "successful career" or ones that they hold "personally important." Each dimension, measured as latent variables in SEMs, consists of several manifest variables. After defining each dimension, I note the manifest variables that comprise that dimension and the results of the latent measure's confirmatory factor analysis (CFA).

The first dimension is *math and science prowess*—respondents' identification with the math and science competence that is assumed to underlie engineering work. The application of math and science to "real world problems" is the basis of engineers' claim to expertise and is deeply engrained in its professional culture (Hughes 2005). Most engineers take great pride in their math and science abilities, and displaying such prowess is seen as a marker of engineering competence par excellence (Florman 1994). Identifying with the math and science prowess of engineering is likely important to staying in the field. This dimension is captured by a latent measure that is predicted by the following three manifest variables "What, in your opinion, makes a successful career?" "Math skills," "Strong background in math and science," and "understanding machines" (1=very unimportant to 5=very important; all variables in the CFA are significant at the .000 level).[59]

Related to math and science prowess, I examine respondents' identification with the role of engineers as technological innovations. Is it important to them to be personally involved in inventing new technologies and being part of scientific breakthroughs? *Technological leadership,* like math and science prowess, is exalted in the value system of engineering and, for many, is the most exhilarating aspect of their work (Dryburgh 1999; Faulkner 2007). This dimension is comprised of three manifest variables: "Importance to me of:" "Creating or managing future technologies," "making

[59] Fit statistics for year 1 measure of Math and Science Prowess: χ^2 =0, df=0, RMSEA=.000, and CFI=1.00 for men and for women. Fit statistics for year 3 measure of Math and Science Prowess: χ^2 =0, df=0, RMSEA=.000, and CFI=1.00 for men and for women.

important scientific discoveries," and "inventing new technologies" (1=very unimportant to 4=very important; all variables in the CFA are significant at the .000 level). [60]

Two other dimensions of professional identity are less exalted in the culture of engineering than math and science prowess and technological leadership. C*ommitment to managerial and communication skills* captures respondents' identification with a career that emphasizes management, writing, leadership and social skills. Such skills are important to the everyday work of engineers, particularly of engineers who work as project leaders, but they are seen as "social" skills and thus have less value in the professional culture (Faulkner 2007, 2000).[61] Compared to the numerous math, science, and technical lab courses required to earn an engineering degree, engineering students have far less training in communication and management skills (National Academy of Engineering 2004). The latent measure of commitment to managerial and communication skills is predicted by the following four manifest variables "What, in your opinion, makes a successful career?" "Management skills," "writing and speaking skills," "social skills," and "leadership skills" (1=very unimportant to 5=very important; all variables significant at the .000 level).[62]

Finally, I investigate respondents' *social consciousness*. This dimension taps into an ideology in engineering culture that the profession exists to "improve society" (NAE

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[60] Fit statistics for year 1 measure of Technological Leadership: χ^2 =0, df=0, RMSEA=.000, and CFI=1.00 for men and for women. Fit statistics for year 4 measure of Technological Leadership: χ^2 =0, df=0, RMSEA=.000, and CFI=1.00 for men and for women.

[61] While managerial work is seen as a masculine activity in most other realms of the labor market (Dinovitzer et al. 2009), managerial work is identified as social and thus within the purview of women's assumed expressiveness and communicative skills (Cech 2011; Faulkner 2000).

[62] Fit statistics for year 1 measure of Managerial and Communication Skills: χ^2 =8.5, df=2, RMSEA=.078, and CFI=.965 for women; χ^2 =8.4, df=2, RMSEA=.062, and CFI=.976 for men. Fit statistics for year 3 measure of Managerial and Communication Skills: χ^2 =8.2, df=2, RMSEA=.075, and CFI=.965 for women; χ^2 =7.8, df=2, RMSEA=.078, and CFI=.969 for men.

2004). While social consciousness underlies engineering's code of ethics and is recognized as important in the abstract, social consciousness is usually not a salient part of day-to-day engineering practice. In fact, concerns for social consciousness are usually bracketed as "political" or "irrelevant" to on-the-ground engineering work (Faulkner 2000; Cech & Waidzunas 2010). I include the following manifest variables in my latent measure of social consciousness: "Importance to me of:" "improving society," "being active in my community," "promoting racial understanding," and "helping others in need" (1=very unimportant to 4=very important; all variables in the CFA are significant at the .000 level).[63] All professional identity dimensions were asked in year 1. Math and science prowess and managerial and communication skills measures were asked again in year 3, while the technological leadership and social consciousness measures were repeated in year 4. Tests for discriminant validity between these four latent measures were significant at the .000 level for both men and women in years 1 and years 3 and 4.[64]

Professional Socialization and Professional Identity Dimensions

To demonstrate that these professional identity dimensions are at least partially determined by students' professional socialization experiences, I predict these dimensions with several measures of the cultural emphases of students' engineering programs. Specifically, engineering students were asked in year 1, "how important does your engineering program consider each of the following:" (1) "Scientific advancement and knowledge," (2) "innovation, inventions and industrial applications," (3) "basic

[63] Fit statistics for year 1 measure of Social Consciousness: χ^2 =1.5, df=2, RMSEA=.000, and CFI=1.00 for women; χ^2 =2.4, df=2, RMSEA=.027, and CFI=.999 for men. Fit statistics for year 4 measure of Social Consciousness Skills: χ^2 =8.1, df=2, RMSEA=.071, and CFI=.984 for women; χ^2 =4.6, df=2, RMSEA=.068, and CFI=.989 for men.

[64] None of the manifest measures in these latent measures are more highly correlated with one of the variables in a different latent group than it is correlated with the variables in its own latent group.

research," (4) "entrepreneurship," (5) "willingness to take risks," (6) "business practice," (7) "economic development," (8) "teamwork," (9) "leadership," (10) "policy implications of engineering," (11) "ethical and/or social issues," and (12) "general education in the humanities and social sciences." If these professional identity dimensions are the result of the professional socialization process, then they should be sensitive to students' perceptions of what their programs emphasize.[65] My intent is to show broadly that these professional identity dimensions are partially derived from their socialization experiences, rather than to describe each relationship in detail.

I ran SEMs predicting each professional identity dimension using each of these twelve programmatic emphases measures (included in the model one at a time). In the interest of space, I present only the estimated relationships between each latent professional identity dimension and each programmatic emphasis measure (Table 5.1). All models control for school, race/ethnicity, and SAT math and verbal scores, and are ran separately for men and women (coefficients for the controls are not shown). Table 5.1 illustrates that each professional identity dimension is predicted by several programmatic emphasis measures. I do not offer particular hypotheses about these relationships, except that the suite of programmatic emphases should generally be positively related to these professional identities since they both stem from the culture of engineering. This table shows that the emphasis of respondents' programs do matter to how they develop their professional identities. The analysis in Table 5.1 suggest that the professional

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[65] It is more useful to capture students' *interpretations* of their programs' cultural emphases rather than the programs' perceptions of what they emphasize, as students are the ones whose professional identity develops in response to what they interpret from their socialization experiences (Cech 2010).

socialization in respondents' programs has a direct and widespread effect on students' professional identities.

Gendered Professional Identities

Men and women are not blank slates onto which professional socialization imprints professional identities. They navigate this professional socialization experience with pre-existing self-conceptions and that may *filter* professional socialization. As noted above, neophytes in the process of professional socialization try on "provisional selves" that correspond to their developing understandings of the professional role (Ibarra 1999). Experimenting with these profession-related provisional selves gradually leads to the internalization of a corresponding professional identity. However, only those provisional selves that are congruent with men's and women's pre-existing self-conceptions are likely to be internalized and incorporated into their professional identities (Howard 2000; Rosenthal et al. 2011). Professional identity dimensions that are discordant with respondents' self-conceptions may either cause respondents' self-conceptions to change (which is inconsistent with my findings in chapter 2 about the relative stability of these self-conceptions over time), or those provisional selves will be discarded. As a result of this filtering process, neophytes may emerge from the professional socialization process with quite different professional identities.

Gender is an important axis along which such filtering may occur. Because men and women enter engineering with different self-conceptions, different "provisional selves" are likely to be consistent with men's and women's self-conceptions. They may, then, internalize different groups of professional identity dimensions from among those that are peddled in the professional socialization process.

Given that women are more likely to have more feminine (vs. masculine), unsystematic (vs. systematic), and more people-oriented (vs. things-oriented) self-conceptions, women should be more likely to develop professional identities in engineering that are consistent with feminine, unsystematic, and people-oriented self-conceptions. In particular, the dimensions of management and communication skills and social consciousness should be stronger in women's professional identities than in men's, since the self-conceptions of women are consistent with normative social conceptions of femininity and with an emphasis on work that engages with people rather than things. This is consistent with other research that has found that women are more engaged with and interested in questions of the ethical implications of science and engineering than men (Dryburgh 1999; Eccles 2007).

On the other hand, men's professional identities may be more likely to emphasize math and science prowess and technical leadership, as these are consistent with systematic, masculine, and things-oriented self-conceptions. This link is supported by cultural ideologies within the engineering profession, such as the "technical/social dualism," associate masculinity with technical competence (Faulkner 2000).

To examine the gender differences in professional identities, I predict the four professional identity dimensions with gender (female=1) and controls for school, race/ethnicity, and SAT math and verbal scores. Table 5.2 presents the SEMs for each corresponding dimension of professional identity. The patterns in this table are consistent with my expectations: math and science prowess and technological leadership are stronger in the professional identities of men than of women, while women's professional identities are more likely than men's to emphasize managerial and communication skills and social consciousness.

These results suggest that men and women emerge from their socialization experiences with different notions of what it means to be a professional engineer. I examine later in this chapter whether these gendered professional identity differences translate into differences in men's and women's likelihood to persist in the field. I next attempt to explain how these professional identities come to be gendered.[66]

5.4 Self-Conceptions and the Development of Gendered Professional Identities

My data allow me to go further than merely speculating about the filtering process discussed above to actually empirically investigate whether self-conceptions predict professional identity development over time. I am interested in both whether these self-conceptions predict men's and women's adoption of these professional identity dimensions, and whether self-conceptions predict the changes in the salience of these dimensions in respondents' self-conceptions over time. First, I predict the four dimensions of professional identity (measured in year 3 or 4) with the three self-conceptions I introduced in previous chapters: perceptions of self as feminine, unsystematic, and people-oriented (measured in year 2). I then use self-conceptions to predict the change in these dimensions between years 1 and 3 or 4. I expect that dimensions consistent with respondents' self-conceptions would increase in strength over

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[66] An interesting question outside the scope of this dissertation is whether these differences in professional identity lead to differences in professional practice. Do men and women who internalize the professional role differently also practice engineering differently? Such research may find that, consistent with the common assumption that women bring something different to the table, women may indeed have a different prospective and different professional priorities than men. However, my research suggests that such differences are due not to some innate, essential differences between men and women, but rather differences in men's and women's culturally –informed self-conceptions.

time, while those that are contradictory to their self-conceptions would decrease over time. In this way, I can show the over-time process by which self-conceptions lead to the emphasis or de-emphasis of certain dimensions of professional identity.

Table 5.3 presents the SEMs that predict the importance of math and science prowess in respondents' professional identities, using feminine, unsystematic, and people-oriented self-conceptions, plus controls for school, race/ethnicity, and SAT math and verbal scores. I run models separately for men and women, since I expect the relationships between self-conceptions and the professional identities to differ by gender. I find that men who perceive themselves as more people-oriented than other men in their engineering programs are less likely to have professional identities that emphasize math and science prowess. On the other hand, the professional identities of men who perceive themselves as things-oriented are more likely to value such prowess. Interestingly, I find that the relationship between unsystematic self-conceptions and math and science prowess is positive for women—those who perceive themselves as unsystematic are more likely to find math and science prowess an important part of their professional identity. This result is net of their math "ability," as measured by their SAT math and verbal scores. Past research on women in science and engineering has shown that women hold lower perceptions of their math abilities than men (net of performance or preparation) (Correll 2001). This finding may thus result from women who perceive themselves as unsystematic being sensitive to their perceived weakness, inflating the importance of math and science prowess for success in engineering in their minds. unsystematic self-conceptions are not a significant predictor of the importance of math and science prowess for men.

The next table (5.4) predicts the change in the importance to respondents of math and science prowess by adding year 1 measures of this professional identity dimension to the models in Table 5.3. The inclusion of year 1 variables effectively indexes the change in the importance of math and science prowess between year 1 and year 3 results, and shows whether this change is significantly determined by respondents' self-conceptions. Consistent with the pattern in the previous table, women who perceive themselves as more unsystematic think math and science prowess are *increasingly* important to a successful career. For men, less masculine and more people-oriented self-conceptions are related to a *decrease* in the importance to them of math and science prowess.

Tables 5.5 and 5.6 show technological leadership is predicted by feminine, unsystematic, and people-oriented self-conceptions. Here, I find that women who perceive themselves as people-oriented are less likely to think that technological leadership important, compared to women who consider themselves things oriented. Also, women with unsystematic self-conceptions are likely to find technological leadership less important over time. None of the three self-conceptions predict the importance that men give to technological leadership.

I showed earlier that math and science prowess and technological leadership are more prominent in men's professional identities than in women's. Two other dimensions, managerial and communication skills and social consciousness, are more prominent in the professional identities of women. The first of these, managerial and communication skills, is predicted by models in Tables 5.7 and 5.8. Here, among women, those who perceive themselves as feminine are more likely to believe that managerial and communication skills are important to a successful career than women with more masculine self-conceptions (Table 5.7). Such self-conceptions among women are also positively related to the changes in the importance they give to managerial and communication skills between year 1 and 3 (Table 5.8); people-oriented self-conceptions also marginally predict this change among women. Similarly, men with less masculine and more people-oriented self-conceptions are more likely to consider managerial and communication skills important (Table 5.7) and men with more feminine and people-oriented self-conceptions are also increasingly likely to see these skills as important as they progress through their professional socialization experiences (Table 5.8).

Finally, for men, perceiving themselves as less masculine and more people-oriented leads them to be more interested in social consciousness than men with more masculine and things-oriented self-conceptions (Table 5.9). Women with more things-oriented self-conceptions are also more likely to become even *less* interested in social consciousness over time (Table 5.10).

These results illustrate that self-conceptions play an important role in how professional identities develop among men and women engineering students. Women who exhibit self-conceptions stereotypical of women are more likely to develop professional identities that emphasize managerial and communication skills and less likely to emphasize technological leadership. Men with stereotypically male self-conceptions are more likely to have professional identities that emphasize math and science prowess, and less likely to emphasize managerial and communication skills and social consciousness. It seems that these gendered self-conceptions filter the socialization process through which men and women develop professional identities. Only those identity dimensions that are consistent with their self-conceptions “stick,” while those that are discordant diminish in importance over time. Gendered self-conceptions, in other words, mediate the professional socialization experiences where men and women "try on" these professional identity dimensions, helping to produce gendered professional identities among men and women.

5.5 Gendered Professional Identities and Persistence in Engineering

This gendered professional identity development is interesting in its own right and deserves further investigation in engineering and in other professional fields. For my purposes, these gendered professional identity dimensions are interesting in the extent to which they affect sex segregation. Do certain professional identity dimensions tend to reproduce engineering as male-dominated? Are men and women with these gendered professional identities differentially likely to stay in engineering? These are the questions to which I now turn.

Following previous work (Cech et al. 2011), I examine two different types of persistence. The first, *behavioral persistence,* is a measure of whether men and women actually remain in the engineering field. I measure both respondents' behavioral persistence through an engineering degree program and their behavioral persistence in engineering through career launch. Completing a major in engineering or even entering the workforce as an engineer does not guarantee that respondents plan to remain in the field for their career, however. *Intentional persistence* is respondents' expectation in year 4 of the likelihood that they will be an engineer in five years. The baseline sample in all these analyses are students who entered engineering programs as freshman.

I am interested in whether gendered professional identities are significantly related to behavioral and intentional persistence. Specifically, I use the four professional identity dimensions to predict behavioral and intentional persistence measures. (I run each combination of professional identity dimensions and persistence measures separately.) Using this same sample, my colleagues and I (Cech et al. 2011) have shown that men's and women's confidence in their abilities to wield the competencies and skills of engineering ("expertise confidence") and their confidence that engineering is the right "fit" for them ("career-fit confidence") helps explain gendered persistence. This latter factor, career-fit confidence, is a direct measure of respondents' assessment of whether engineering is a self-expressive career option for them. My analysis here of gendered professional identity development helps explain why that career confidence is different for men and women.[67]

Table 5.11 predicts behavioral and intentional persistence with math and science prowess (plus controls for institution, race/ethnicity, and SAT math and verbal scores). Among men, the salience of math and science prowess in their professional identities is positively related to their behavioral persistence through an engineering major and into an engineering career launch activity, and their intentions to persist in engineering in five years. For women, those whose professional identities emphasize math and science prowess are also significantly more likely to intend to persist in engineering in five years.

Belief in the importance of technological leadership is also a strong predictor of persistence. Women whose professional identities emphasize technological leadership are more likely to persist in engineering through their engineering major, into career launch and to intend to persist in engineering in five years (Table 5.12). Men's technical

[67] Further research (perhaps in a separate paper) will investigate the relationship between professional identities and career-fit confidence.

leadership emphasis also leads them to be more likely to persist into an engineering career and intend to be an engineer in the future.

The remaining two professional identity dimensions have quite different effects on persistence. Managerial and communication skills are not related to persistence for women, but they are *negatively* related to persistence for men: men who are committed to managerial and communication skills are marginally less likely to persist through an engineering major, and to choose an engineering field at career launch (Table 5.13).

Finally, social consciousness has a different relationship to persistence for women and men. For women, emphasis on social consciousness in their professional identities is positively related to behavioral persistence through an engineering major and their intentional persistence (Table 5.14). For men, however, commitment to social consciousness is negatively related to intentional persistence.

These professional identity measures do indeed predict both men's and women's actual persistence in engineering through their degrees and into the labor force, and their intent to persist in the profession in the future. As I discuss below, these gendered professional identities play in important role in the reproduction of engineering as a male-dominated field.

5.6 Conclusions

The purpose of this chapter was to examine intra-field cultural processes of sex-segregation—specifically, how gendered professional identities influenced men's and women's decisions to persist in this male-dominated field. My analysis proceeded in several steps. First, I identified four dimensions of professional identity in engineering (math and science prowess, technological leadership, commitment to managerial and communication skills, and social consciousness) and showed these to be (at least in part) the outcome of men's and women's professional socialization experiences. I then showed that these professional identity measures are gendered: women and men, on average, develop professional identities that emphasize different dimensions. Men's professional identities are more likely to emphasize math and science prowess and technological leadership, while women's professional identities are more likely to emphasize managerial and communication skills and social consciousness.

I argued that this gendering of professional identities partly arises out of a process by which men's and women's self-conceptions filter their professional identity development—only those dimensions that are consistent with students' self-conceptions will be incorporated into their professional identities. I illustrated this process by examining the relationship between the four professional identity dimensions and three self-conception measures: perceptions of self as feminine, unsystematic, and people-oriented. I found that there are strong relationships between these self-conception measures and respondents' professional identities. In some cases, I was able to show this filtering in action, whereby self conceptions predicted a change in the salience of certain dimensions of respondents' professional identities over time. Finally, I demonstrated that these gendered professional identities predict behavioral and intentional persistence in engineering.

In several of these cases, I was able to trace self-conceptions acting through professional identities to affect persistence. For men, those with masculine and things-oriented self-conceptions are more likely to value math and science prowess, a professional identity dimension that is positively related to men's behavioral persistence.

Similarly, those same self-conceptions reduce the chances that men will value managerial and communication skills and social consciousness—two dimensions of professional identity that diminish men's likelihood of persisting in engineering. For women, being people-oriented reduces the likelihood that they will find technical leadership important—a professional identity measure that is particularly important for women's persistence in engineering.

Thus, men who exhibit traits stereotypical of men (masculine, things-oriented) are likely to develop professional identities that are conducive to persistence in engineering. This is not true for women. Women with self-conceptions typical of women (feminine and people-oriented) are more likely to find managerial and communication skills important, but this professional identity dimension is irrelevant to their persistence. Women who are people-oriented (and thus less likely to have technological leadership be prominent in their self-conceptions) are less likely to persist.

It is quite easy, in other words, for men to harmonize societal norms of self-conceptions and professional identity dimensions that are conducive to persistence in engineering. This is less the case for women. The self-conceptions that are stereotypical of women (feminine, unsystematic, and people-oriented) in some cases are dissonant with the professional identity dimensions that are most conducive to their persistence in engineering. These findings also suggest that women may face a disconnect between their gendered self-conceptions and the identities they are supposed to develop as a result of their professional socialization experiences. Women who develop alternative or marginal professional identities (e.g. those that exalt managerial and communication skills) are less likely to remain in the field.

Intra-profession mechanisms reproducing sex-segregation are complex but important. Men and women, in the process of becoming professionals, are expected to internalize the role of a professional, and to identify with that role. They are expected not only to *do* professional work, but to *be* professionals. If the professional identities that men and women develop are not consistent with either the intra-profession cultural ideals of what it means to be a professional, or with the day-to-day work of that profession, than those individuals are less likely to persist in the profession. What I have shown here is that, partly the result of these gendered self-conceptions, the very process of developing those professional identities in engineering is gendered. Men and women emerge from their socialization process as slightly different professionals. Because these professional identities are important determinants of persistence, these gendered professional identities translate into gendered persistence in engineering.

Obviously, there are many demand-side factors (such as chilly climates, marginalization, etc) that push women out of male-dominated fields like engineering, and many other social-psychological factors that lead them to leave the field (e.g. expertise and career fit confidence, Cech et al. 2011). Here, I am concerned with how the self-expressive edge of sex segregation might get played out in the intra-professional level—how self-expression and professional cultures might intersect to reproduce sex segregation. The development of a professional identity is a very self-expressive process. Ideally, men and women develop professional identities that blend seamlessly with their self-conceptions and the role of the professional becomes part of them. The work of the professional, then, becomes an extension of their self-expression. Men and women who either do not develop the identity features emphasized most in a profession, or develop alternate or marginal professional identities are more likely to sense a mismatch between their professional identities and the work of a professional, are less likely to stay. Alternately, they may be judged by others as having the wrong approach or the wrong priories and are channeled out of the profession.

The gendering of these professional identities is not determined by these three self-conceptions only; these are merely examples of the ways in which self-conceptions could filter professional development. There are many other self-conceptions that could act as relevant filters which would help to produce these gender differences. I have not attempted here to capture the entirety of this filtering process, with all its relevant dimensions. Rather, I have sought to show examples of this process at work.

Although I analyzed engineering students only, I expect that similar processes exist in other professional fields. Professional cultures are part of all high-skilled occupations (Weeden & Grusky 2005) and professional socialization and professional identity development are integral parts of the education and credentialing processes of those occupations (Becker et al. 1961). In each field, women and men must rectify their professional identity development with their self-conceptions. To the extent that the professional identity features promoted within a particular professional culture are dissonant with the self-conceptions typical of men or women, the sex-typing of that field will be reproduced through similar processes as those as I describe for engineering. In nursing, for example, culturally valued professional identities may not coalesce with most men’s self-conceptions, leading men to develop alternate nursing identities, compared with their women peers. Such alternate professional identities may lead men to be less likely to persist in nursing education or a nursing career.

Male-typed and female-typed occupations are more likely to have professional identities that are easiest to reconcile with the self-conceptions typical of men and women, respectively. Previously male-dominated fields such as law that are still culturally male-typed may still reproduce segregation through these intra-profession mechanisms. Even through women and men enter law school in equal proportions, women's long-term persistence in this occupation may be undermined in the process of professional identity development. Among gender-neutral fields such as business, where the professional culture seems to emphasize both stereotypically male and female characteristics, men and women may cobble together different professional identities, but those professional identities may be equally likely to encourage persistence.

These intra-occupational processes are likely most salient at credential acquisition, when professional socialization is most intense. For professional occupations that require graduate and professional degrees (e.g. medical school), these processes will be most important after one's undergraduate education, compared to fields such as nursing and engineering where one can practice in the profession with a bachelor's degree. For fields where further education is encouraged or expected (e.g. in chemistry), such intra-field processes may happen at both the undergraduate and graduate levels.

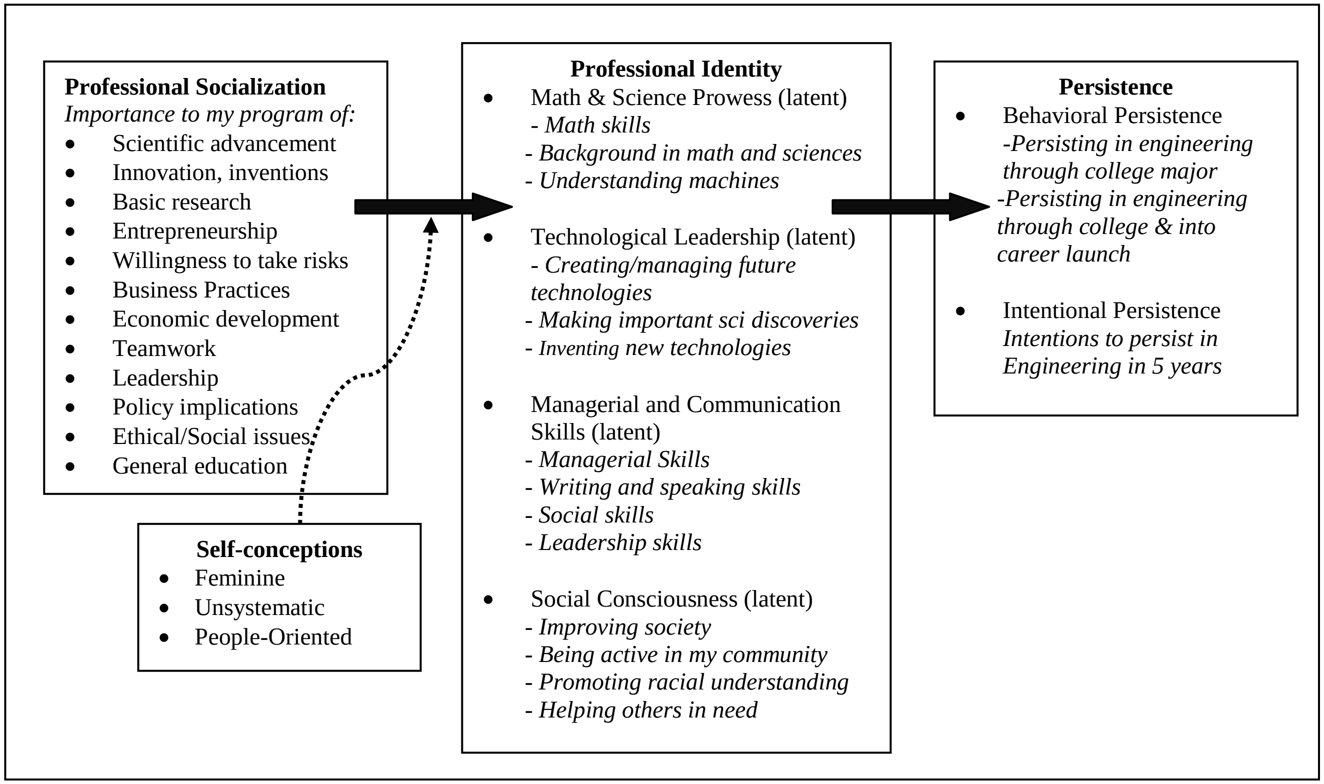

Figure 5.1: Schematic of Chapter 5 Analysis

Table 5.1: Unstandardized Coefficient Estimates Between Professional Identity Dimensions and Cultural Emphasis of Respondents' Engineering Program

		Sci Adv	Innov-ation	Basic Research	Entrepre-neurship	Risks	Business Practice	Economic Developmt	Teamwk	Lead	Policy	Ethical Social Issues	Gen Edu
Math/ Science Prowess	Women	.161*	.029	.021	.033	.141+	.066	.086	-.093	-.024	.028	.184**	.122+
	Men	.179*	.238*	.083	.174*	.161*	.172*	.149+	.021	.141+	.244*	.189*	.186*
Technological Leadership	Women	.100	.205*	.079	-.321	.115	-.026	.017	.051	.140+	.022	-.021	.214*
	Men	.017	.143	.060	.170+	.280**	.125	.209*	-.120	.073	.256*	.065	.099
Management & Communication	Women	.222*	.144	.147	.152	.204	-.028	.025	.094	.044	.023	.272**	.140
	Men	-.052	.024	.124	.121+	-.066	.110	.096	-.004	.166*	.068	.083	.182
Social Consciousness	Women	.151+	.102	.259**	.135*	.072	.161*	.213**	.303**	.153*	.192**	.215*	.284***
	Men	-.029	.048	.163	-.082	.209**	.034	.029	.019	.109	.208*	.245***	.226**

+ p<.10 * p<.05 ** p<.01 *** p<.001

Separate structural equation models were ran for each professional identity dimension-cultural emphasis pair. Each model included controls for institution, race/ethnicity, and SAT math and verbal scores. Cultural Emphases questions asked respondents to report the importance to their engineering program of the following: Scientific advancement and knowledge, innovation, inventions and industrial applications, basic research, entrepreneurship, willingness to take risks, business practice, economic development, teamwork, leadership, policy implications of engineering, ethical and/or social issues, and general education in the humanities and social sciences.

Table 5.2: SEMs Predicting 5 Dimensions of Professional Identity

Dimensions of Professional Identity:	**Math & Science Prowess**			**Technological Leadership**			**Managerial & Comm. Skills**			**Social Consciousness**		
	Unst. Est.	**S.E.**		**Unst. Est.**	**S.E.**		**Unst. Est.**	**S.E.**		**Unst. Est.**	**S.E.**	
Female	**- .086**	**.046**	*****	**-.545**	**.088**	*******	**.143**	**.069**	*****	**.213**	**.059**	*******
MIT	.110	.068		.271	.133	*	-.081	.102		-.045	.090	
Olin	-.120	.089		.289	.170	+	.112	.133		-.018	.115	
Smith	-.041	.061		-.004	.115		.079	.092		.004	.078	
African-American	.016	.096		.081	.182		.013	.146		.164	.124	
Hispanic or Latino/a	.067	.071		-.069	.134		.053	.107		-.155	.091	+
Asian or Asian-American	-.075	.049		.074	.092		.034	.074		-.006	.062	
SAT Math	.001	.000	***	.001	.001		-.001	.000		-.001	.000	*
SAT Verbal	-.001	.000	**	-.001	.001	**	.000	.000		.001	.000	
χ^2 *(df)*	29.4 (18)			63.9 (18)			74.8 (29)			79.2(29)		
RMSEA	.028			.057			.045			.047		
CFI	.994			.982			.977			.977		
R^2	.147			.194			.074			.100		

Table 5.3: SEM Predicting Math & Science Prowess with Self-Conception (SC) Measures, by Gender (N=188)

MATH & SCIENCE	**With Feminine Self-Conceptions**					**With Unsystematic Self-Conceptions**				
PROWESS	**WOMEN**			**MEN**		**WOMEN**			**MEN**	
	Unst. Est.	**S.E.**		**Unst. Est.**	**S.E.**	**Unst. Est**	**S.E.**		**Unst.Est**	**S.E.**
Feminine SC	**.361**	**.307**		**.058**	**.106**					
Unsystematic SC						**.128**	**.057**	*	**-.030**	**.064**
MIT	-.146	.218		.163	.111	-.063	.201		.155	.294
Olin	-.481	.240	+	-.061	.142	-.429	.220	*	-.094	.329
Smith	-.198	.192				-.068	.179			
African-American	-.065	.157		-.192	.723	.144	.136		.095	.428
Hispanic or Latino/a	-.127	.179		.206	.136	-.114	.165		-.233	.307
Asian or Asian-American	.022	.102		-.005	.094	.020	.095		.159	.205
SAT Math	.000	.001		.001	.001	.001	.001		-.001	.001
SAT Verbal	-.001	.001		-.001	.001	-.001	.001	*	-.001	.001
χ^2 *(df)*	70.5 (66)			101.9 (60)		57.2(29)			47.8(26)	
RMSEA	.022			.050		.062			.021	
CFI	.992			.911		.920			.933	
R^2	.093			.066		.306			.063	

MATH & SCIENCE	**With People-Oriented Self-Conceptions**				
PROWESS	**WOMEN**		**MEN**		
	Unst. Est.	**S.E.**	**Unst.Est.**	**S.E.**	
People-Oriented SC	**.034**	**.026**	**-.072**	**.033**	*
MIT	-.110	.206	.091	.157	
Olin	-.340	.222	-.085	.179	
Smith	-.113	.185			
African-American	.050	.133	-.609	.390	
Hispanic or Latino/a	-.185	.168	-.200	.161	
Asian or Asian-American	.031	.096	.148	.115	
SAT Math	.000	.001	-.001	.001	
SAT Verbal	-.001	.001	.000	.001	
χ^2 *(df)*	36.7(18)		19.4(16)		
RMSEA	.072		.036		
CFI	.967		.988		
R^2	.103		.144		

Table 5.4: SEM & OLS Predicting *Change In* Math & Science Prowess with Self-Conception Measures (Yr 1 to 3), by Gender

Δ MATH & SCIENCE PROWESS	With Feminine Self-Conceptions: WOMEN Unst. Est.	S.E.		With Feminine Self-Conceptions: MEN Unst. Est.	S.E.		With Unsystematic Self-Conceptions: WOMEN Unst.Est.	S.E.		With Unsystematic Self-Conceptions: MEN Unst.Est.	S.E.	
Feminine SC	**.385**	**.283**		**-.374**	**.148**	**						
Unsystematic SC							**.124**	**.053**	*	**-.002**	**.100**	
Yr 1 M/S Prowess (latent)	.332	.209	+	.691	.246	**	.286	.156	+	.875	.285	**
MIT	-.239	.246		.057	.158		-.174	.202		.178	.195	
Olin	-.602	.273	*	.016	.189		-.495	.220	*	.202	.225	
Smith	-.238	.207					-.100	.173				
African-American	-.146	.194		.066	.122		.085	.131		.424	.299	
Hispanic or Latino/a	-.239	.199		-.251	.179		-.225	.168		-.040	.191	
Asian or Asian-American	.058	.110		-.255	.175	*	.034	.091		.093	.134	
SAT Math	-.001	.001		-.001	.001		.001	.001		-.000	.001	
SAT Verbal	-.001	.001		.000	.001		-.001	.001		.001	.001	
χ^2 *(df)*	103.3(101)			119.7(93)			87.1(55)			44.6(50)		
RMSEA	.013			.042			.063			.054		
CFI	.996			.942			.950			.937		
R^2	.470			.495			.427			.321		

Δ MATH & SCIENCE PROWESS	With People-Oriented Self-Conceptions: WOMEN Unst. Est.	S.E.		With People-Oriented Self-Conceptions: MEN Unst. Est.	S.E.	
People-Oriented SC	**.045**	**.028**		**-.181**	**.059**	**
Yr 1 M/S Prowess (latent)	.363	.206	+	1.109	.279	***
MIT	-.141	.209		.284	.344	
Olin	-.068	.189		.254	.401	
Smith	.044	.097				
African-American	-.228	.171		-1.028	.796	
Hispanic or Latino/a	-.009	.138		-.281	.335	
Asian or Asian-American	.045	.028		.323	.237	
SAT Math	-.001	.001		-.001	.001	
SAT Verbal	-.311	.224		-.001	.001	
χ^2 *(df)*	62(41)			49.2(37)		
RMSEA	.059			.034		
CFI	.965			.980		
R^2	.325			.394		

Table 5.5: SEM Predicting the Importance of Technical Leadership with Self-Conception Measures, by Gender

TECHNICAL	**With Feminine Self-Conceptions**						**With Unsystematic Self-Conceptions**					
LEADERSHIP	**WOMEN**			**MEN**			**WOMEN**			**MEN**		
	Unst.Est.	**S.E.**		**Unst.Est.**	**S.E.**		**Unst.Est.**	**S.E.**		**Unst. Est.**	**S.E.**	
Feminine SC	**1.678**	**1.455**		**.124**	**.080**							
Unsystematic SC							**-.001**	**.143**		**-.168**	**.113**	
MIT	-.848	.384	*	.086	.303		-1.292	.512	*	.249	.398	
Olin	-.759	.384	*	.046	.342		-1.163	.525	*	.116	.442	
Smith	-.497	.320					-.684	.449				
African-American	.172	.234		1.336	1.443		.378	.339		-1.298	.536	*
Hispanic or Latino/a	-.007	.278		-.685	.291	*	-.064	.406		-.993	.351	**
Asian or Asian-American	.282	.178		.066	.190		.446	.243	+	.146	.244	
SAT Math	.001	.001		-.003	.002		.002	.001		-.004	.002	
SAT Verbal	.001	.001		.002	.001		.001	.001		.002	.001	+
χ^2 *(df)*	87.4(66)			80.3 (60)			50.0(29)			31.7(26)		
RMSEA	.052			.066			.071			.036		
CFI	.917			.909			.964			.985		
R^2	.141			.165			.099			.126		

TECHNICAL	**With People-Oriented Self-Conceptions**					
LEADERSHIP	**WOMEN**			**MEN**		
	Unst. Est.	**S.E.**		**Unst. Est.**	**S.E.**	
People-Oriented SC	**-.071**	**.033**	*	**.023**	**.047**	
MIT	-.602	.283	*	.102	.276	
Olin	-.644	.295	*	.029	.311	
Smith	-.400	.230	+			
African-American	.151	.154		-.512	.611	
Hispanic or Latino/a	-.075	.183		-.694	.266	**
Asian or Asian-American	.250	.127	*	.067	.173	
SAT Math	.000	.001		-.003	.002	
SAT Verbal	.001	.001		.002	.001	
χ^2 *(df)*	26.0(18)			19.7(16)		
RMSEA	.053			.067		
CFI	.987			.965		
R^2	.224			.139		

Table 5.6: SEM Predicting the *Change In* Importance of Technical Leadership with Self-Conception Measures (Yr 1 to 4)

Δ TECHNICAL LEADERSHIP	**With Feminine Self-Conceptions**						**With Unsystematic Self-Conceptions**					
	WOMEN			**MEN**			**WOMEN**			**MEN**		
	Unst. Est.	**S.E.**		**Unst Est.**	**S.E.**		**Unst.Est.**	**S.E.**		**Unst.Est.**	**S.E.**	
Feminine SC	**.296**	**.386**		**.188**	**.175**							
Unsystematic SC							**-.186**	**.111**	+	**-.068**	**.104**	
Y1Tech Lead (latent)	.427	.097	***	.345	.104	**	.500	.099	***	.363	.103	***
MIT	-.599	.346	+	.027	.265		-.581	.362		.064	.261	
Olin	-.686	.359	+	-.061	.303		-.798	.376	*	-.043	.295	
Smith	-.425	.292					-.361	.316				
African-American	-.055	.234		-3.070	2.470		.173	.238		-.655	.368	+
Hispanic or Latino/a	.040	.265		-.457	.253	+	.045	.289		-.648	.279	*
Asian or Asian-American	.210	.158		-.006	.167		.171	.172		-.013	.166	
SAT Math	.000	.001		-.001	.002		.003	.002		-.002	.002	
SAT Verbal	.000	.001		.002	.001		.000	.001		.002	.001	
χ^2 *(df)*	108.9(101)			109.7(93)			92.6(55)			67.9(50)		
RMSEA	.023			.040			.069			.031		
CFI	.990			.983			.955			.970		
R^2	.478			.227			.537			.235		

Δ TECHNICAL LEADERSHIP	**With People-Oriented Self-Conceptions (OLS)**					
	WOMEN			**MEN**		
	Unst.Est.	**S.E.**		**Unst. Est.**	**S.E.**	
People-Oriented SC	**-.036**	**.041**		**.059**	**.044**	
Y1Tech Lead (latent)	.403	.099	***	.373	.103	***
MIT	-.600	.338	+	.092	.262	
Olin	-.705	.354	*	.018	.296	
Smith	-.473	.296				
African-American	.047	.207		-.162	.477	
Hispanic or Latino/a	-.044	.261		-.445	.248	+
Asian or Asian-American	.249	.157		-.026	.166	
SAT Math	.000	.001		-.002	.001	
SAT Verbal	.001	.001		.002	.001	
χ^2 *(df)*	61.5(41)			58.4(37)		
RMSEA	.059			.071		
CFI	.974			.921		
R^2	.462			.245		

Table 5.7: SEM Predicting the Importance of Managerial & Communication Skills with Self-Conception Measures

MANAGERIAL &	**With Feminine Self-Conceptions**						**With Unsystematic Self-Conceptions**			
COMM. SKILLS	**WOMEN**			**MEN**			**WOMEN**		**MEN**	
	Unst.Est.	**S.E.**		**Unst.Est.**	**S.E.**		**Unst.Est.**	**S.E.**	**Unst.Est.**	**S.E.**
Feminine SC	**.230**	**.097**	*****	**.268**	**.125**	*****				
Unsystematic SC							**.055**	**.089**	**-.093**	**.231**
MIT	-.243	.149		-.149	.167		-.307	.315	-.157	.182
Olin	-.191	.194		-.064	.189		-.161	.319	-.129	.203
Smith	-.012	.110					-.115	.278		
African-American	-.103	.157		-1.323	.572	*	-.002	.207	-.044	.280
Hispanic or Latino/a	-.047	.133		-.044	.161		-.184	.254	-.207	.284
Asian or Asian-American	-.103	.157		-.029	.116		.199	.152	-.052	.131
SAT Math	.000	.001		.001	.001		.001	.001	.002	.001
SAT Verbal	-.002	.001		.000	.001		-.001	.001	.000	.001
χ^2 *(df)*	13.5 (81)			82.4(74)			63.6(41)		48.1(37)	
RMSEA	.036			.026			.062		.059	
CFI	.964			.975			.960		.961	
R^2	.135			.207			.105		.070	

MANAGERIAL &	**With People-Oriented Self-Conceptions**					
COMM. SKILLS	**WOMEN**			**MEN**		
	Unst.Est.	**S.E.**		**Unst. Est.**	**S.E.**	
People-Oriented SC	**.076**	**.043**		**.075**	**.032**	*
MIT	-.354	.355		-.132	.166	
Olin	-.081	.367		-.050	.188	
Smith	-.073	.317				
African-American	-.039	.230		.859	.439	*
Hispanic or Latino/a	-.206	.285		-.047	.160	
Asian or Asian-American	.218	.168		-.088	.116	
SAT Math	.001	.001		.001	.001	
SAT Verbal	-.002	.001	+	.000	.001	
χ^2 *(df)*	52.7(29)			22.3 (26)		
RMSEA	.075			.000		
CFI	.956			1.00		
R^2	.093			.198		

Table 5.8: SEM Predicting the *Change In* Importance of Managerial & Comm. Skills with Self-Conception Measures (Y1 to 3)

Δ MANAGERIAL & COMM. SKILLS	**With Feminine Self-Conceptions**						**With Unsystematic Self-Conceptions**					
	WOMEN			**MEN**			**WOMEN**			**MEN**		
	Unst. Est.	**S.E.**		**Unst. Est.**	**S.E.**		**Unst.Est.**	**S.E.**		**Unst.Est.**	**S.E.**	
Feminine SC	**.283**	**.106**	**	**.088**	**.049**	*						
Unsystematic SC							**.190**	**.137**		**.123**	**.170**	
Y1 MgrComm (latent)	-.136	.270		.367	.132	***	.273	.209		.697	.284	**
MIT	-.335	.356		-.203	.162		-.225	.343		-.253	.375	
Olin	-.278	.361		-.189	.186		-.252	.345		-.380	.547	
Smith	-.091	.313					-.049	.300				
African-American	-.169	.249		1.648	1.061		.150	.232		.424	.369	
Hispanic or Latino/a	-.133	.290		-.141	.159		-.111	.283		.590	.262	
Asian or Asian-American	.221	.167		.003	.112		.180	.165		.115	.376	
SAT Math	.002	.001	+	.002	.001	+	.002	.002		.004	.005	
SAT Verbal	.000	.001		.000	.001		-.001	.001		.001	.002	
χ^2 *(df)*	221(137)			177.5(127)			160.1(85)			98.3(78)		
RMSEA	.065			.049			.078			.040		
CFI	.879			.915			.893			.959		
R^2	.440			.369			.178			.444		

Δ MANAGERIAL & COMM. SKILLS	**With People-Oriented Self-Conceptions**					
	WOMEN			**MEN**		
	Unst. Est.	**S.E.**		**Unst. Est.**	**S.E.**	
People-Oriented SC	**.095**	**.027**	+	**.066**	**.030**	*
Y1 MgrComm (latent)	.170	.133		.401	.131	**
MIT	-.207	.220		-.190	.162	
Olin	-.091	.225		-.175	.186	
Smith	-.041	.195				
African-American	.035	.141		.545	.426	
Hispanic or Latino/a	-.113	.179		-.144	.158	
Asian or Asian-American	.144	.106		-.040	.113	
SAT Math	.001	.001		.002	.001	+
SAT Verbal	-.001	.001	+	.000	.001	
χ^2 *(df)*	136.7(69)			83.1(63)		
RMSEA	.079			.044		
CFI	.899			.959		
R^2	.186			.391		

Table 5.9: SEM Predicting the Importance of Social Consciousness with Self-Conception Measures

SOCIAL CONSCIOUSNESS	**With Feminine Self-Conceptions**					**With Unsystematic Self-Conceptions**			
	WOMEN		**MEN**			**WOMEN**		**MEN**	
	Unst. Est.	**S.E.**	**Unst. Est.**	**S.E.**		**Unst.Est.**	**S.E.**	**Unst. Est.**	**S.E.**
Feminine SC	**.972**	**.903**	**.424**	**.202**	*				
Unsystematic SC						**-.044**	**.067**	**.040**	**.080**
MIT	-.168	.249	.033	.317		-.224	.250	.004	.213
Olin	-.193	.253	.184	.358		-.153	.253	.052	.239
Smith	-.058	.212				-.126	.217		
African-American	.041	.166	.748	.500	+	.126	.162	.309	.285
Hispanic or Latino/a	.127	.199	-.182	.295		.013	.195	-.179	.219
Asian or Asian-American	.069	.115	.041	.198		.102	.117	.035	.133
SAT Math	-.001	.001	-.002	.002		-.001	.001	-.001	.001
SAT Verbal	.001	.001	.001	.001		.001	.001	.001	.001
χ^2 *(df)*	121.4(81)		82.4 (74)			68.4(41)		55.6(36)	
RMSEA	.059		.026			.068		.067	
CFI	.931		.978			.954		.941	
R^2	.111		.159			.076		.067	

SOCIAL CONSCIOUSNESS	**With People-Oriented Self-Conceptions**				
	WOMEN		**MEN**		
	Unst.Est.	**S.E.**	**Unst. Est.**	**S.E.**	
People-Oriented SC	**.032**	**.029**	**.111**	**.035**	**
MIT	-.164	.247	.048	.201	
Olin	-.075	.252	.155	.228	
Smith	-.018	.215			
African-American	.133	.159	1.297	.438	**
Hispanic or Latino/a	.093	.193	-.078	.185	
Asian or Asian-American	.082	.114	-.003	.126	
SAT Math	-.001	.001	-.001	.001	
SAT Verbal	.000	.001	.001	.001	
χ^2 *(df)*	48.9(29)		22.4(26)		
RMSEA	.069		.000		
CFI	.964		1.00		
R^2	.095		.224		

Table 5.10: SEM Predicting the *Change In* Importance of Social Consciousness with Self-Conception Measures (Y1 to Y4)

Δ SOCIAL	With Feminine Self-Conceptions						With Unsystematic Self-Conceptions					
CONSCIOUSNESS	**WOMEN**			**MEN**			**WOMEN**			**MEN**		
	Unst. Est.	**S.E.**		**Unst. Est.**	**S.E.**		**Unst. Est.**	**S.E.**		**Unst. Est.**	**S.E.**	
Feminine SC	**.313**	**.583**		**-.122**	**.216**							
Unsystematic SC							**-.019**	**.053**		**.234**	**.051**	
Y1 Soc Consc (latent)	.799	.264	**	.747	.196	***	.880	.220	***	1.056	.527	*
MIT	-.044	.206		-.198	.205		-.046	.200		-.508	.617	
Olin	-.111	.213		-.276	.240		-.087	.203		-.592	.678	
Smith	-.079	.172					-.105	.173				
African-American	-.057	.137		.812	.906		-.045	.134		.424	.707	
Hispanic or Latino/a	.309	.169	+	-.343	.218		.276	.167	+	.561	.758	
Asian or Asian-American	.029	.094		-.016	.125		.022	.094		.036	.292	
SAT Math	-.001	.001		.000	.001		-.001	.001		.003	.005	
SAT Verbal	.000	.001		.001	.001		.000	.001		.001	.002	
χ^2 *(df)*	204.2 (137)			129.6 (127)			107.4(85)			68.0 (78)		
RMSEA	.058			.008			.043			.000		
CFI	.919			.998			.972			1.00		
R^2	.546			.437			.526			.431		

Δ SOCIAL	With People-Oriented Self-Conceptions					
CONSCIOUSNESS	**WOMEN**			**MEN**		
	Unst.Est.	**S.E.**		**Unst. Est.**	**S.E.**	
People-Oriented SC	**.046**	**.025**	*****	**.044**	**.037**	
Y1 Soc Consc (latent)	.980	.247	***	.599	.152	**
MIT	-.011	.196		-.152	.199	
Olin	-.143	.200		-.174	.225	
Smith	-.158	.172				
African-American	.042	.090		-.019	.123	
Hispanic or Latino/a	.251	.161		-.209	.186	
Asian or Asian-American	.059	.132		.702	.611	
SAT Math	-.001	.001		.000	.001	
SAT Verbal	.001	.001		.001	.001	
χ^2 *(df)*	88.8(69)			58.5(63)		
RMSEA	.045			.000		
CFI	.974			1.00		
R^2	.575			.432		

Table 5.11: SEM predicting Persistence with Math & Science Prowess, by Gender

	Behavioral Persistence (Major) N=168						**Behavioral Persistence (Career Launch) N=188**						**Intentional Persistence N=179**					
	WOMEN			**MEN**			**WOMEN**			**MEN**			**WOMEN**			**MEN**		
	Unst. Est.	**S.E.**		**Unst. Est.**	**S.E.**		**Unst. Est.**	**S.E.**		**Unst. Est.**	**S.E.**		**Unst. Est.**	**S.E.**		**Unst. Est.**		**SE.**
Y3 M&S Prowess (latent)	**.159**	**.143**		**.339**	**.116**	**	**.105**	**.221**		**.345**	**.114**	**	**.590**	**.230**	**	**.480**	**.121**	***
MIT	.078	.117		-.188	.095	*	.092	.214		.136	.119		.141	.213		.039	.117	
Olin[a]							.314	.275		.424	.153	**	.163	.275		.226	.151	
Smith	.102	.112					.172	.155					.314	.155	*			
African-American	-.104	.143		.025	.260		-.061	.220		-.040	.255		.222	.221		-.085	.251	
Hispanic or Latino/a	.140	.178		-.208	.145		.216	.189		-.143	.143		-.077	.190		.013	.141	
Asian or Asian-Amer	-.018	.107		-.056	.100		-.160	.128		-.070	.098		.222	.221		-.236	.096	*
SAT Math	.001	.100		.000	.001		.001	.001		-.001	.001		-.001	.100		.000	.001	
SAT Verbal	.001	.001	+	.000	.000		-.001	.000		.000	.001		.001	.001	*	.000	.000	
χ^2 *(df)*	25.6 (16)			13.7(14)			24.6 (18)			16.2(16)			30.1 (18)			18.7(16)		
RMSEA	.064			.000			.028			.007			.037			.024		
CFI	.972			1.00			.994			.999			.989			.993		
R^2	.096			.133			.063			.184			.160			.258		

a= Olin Students not included Behavioral Persistence in Majors because they cannot leave engineering without leaving Olin

Table 5.12: SEM predicting Persistence with Technological Leadership, by Gender

	Behavioral Persistence (Major) N=168						Behavioral Persistence (Career Launch) N=188						Intentional Persistence N=179					
	WOMEN			**MEN**			**WOMEN**			**MEN**			**WOMEN**			**MEN**		
	Unst. Est.	**S.E.**		**Unst. Est.**	**S.E.**		**Unst. Est.**	**S.E.**		**Unst. Est.**	**S.E.**		**Unst. Est.**	**S.E.**		**Unst. Est.**	**SE.**	
Y4 Tech Leadrsp (latent)	**.135**	**.065**	*	**.018**	**.041**		**.154**	**.061**	*	**.169**	**.054**	**	**.264**	**.059**	***	**.202**	**.052**	***
MIT	.130	.111		-.080	.069		.167	.207		.109	.122		.350	.201	+	-.004	.122	
Olin[a]							.152	.150		.345	.156	*	.210	.258		.065	.155	
Smith	.113	.110					.353	.265					.359	.146	*			
African-American	-.112	.140		.176	.189		-.074	.214		.099	.255		.119	.210		.092	.251	
Hispanic or Latino/a	.101	.175		-.110	.104		.217	.183		-.006	.141		-.213	.179		.112	.140	
Asian or Asian-Amer	-.063	.108		.034	.072		-.177	.122		-.045	.098		.046	.120		-.233	.096	*
SAT Math	.000	.001		.000	.001		.000	.001		.000	.001		-.001	.001		.001	.001	
SAT Verbal	.001	.001	*	.000	.000		-.001	.001		-.001	.001		.000	.001		-.001	.001	
χ^2 *(df)*	29.7(16)			16.7(14)			60.9(18)			26.1(16)			57.8(18)			23.7(16)		
RMSEA	.071			.026			.070			.047			.068			.986		
CFI	.958			.994			.972			.982			.974			.041		
R^2	.127			.025			.118			.160			.247			.153		

a= Olin Students not included Behavioral Persistence in Majors because they cannot leave engineering without leaving Olin

Table 5.13: SEM predicting Persistence with Managerial & Communication Skills, by Gender

	Behavioral Persistence (Major) N=168						Behavioral Persistence (Career Launch) N=188						Intentional Persistence N=179					
	WOMEN			MEN			WOMEN			MEN			WOMEN			MEN		
	Unst. Est.	S.E.		Unst. Est.	S.E.		Unst. Est.	S.E.		Unst. Est.	S.E.		Unst. Est.	S.E.		Unst. Est.	SE.	
Y3 Mgmt & Com (latent)	**.100**	**.105**		**-.100**	**.065**	+	**-.127**	**.114**		**-.177**	**.088**	+	**.050**	**.117**		**.100**	**.092**	
MIT	.128	.114		-.090	.068		.076	.214		.179	.122		.201	.220		.066	.124	
Olin[a]							.284	.272		.424	.160	**	.064	.281		.112	.163	
Smith	.134	.112					.151	.154					.332	.159	*			
African-American	-.096	.142		.184	.188		-.056	.220		.039	.264		.223	.228		-.090	.264	
Hispanic or Latino/a	.128	.178		-.116	.104		.169	.188		-.082	.147		-.160	.195		.008	.148	
Asian or Asian-Amer	-.028	.109		.033	.072		-.139	.126		-.042	.102		.027	.131		-.193	.101	+
SAT Math	.001	.001		.000	.001		.000	.001		-.001	.001		.000	.001		.000	.001	
SAT Verbal	.001	.001	+	.000	.000		-.001	.001		-.001	.001		.000	.001		.000	.001	
χ^2 *(df)*	79(26)			34.8(23)			71.7(29)			42.6(26)			70.8(29)			46.6(26)		
RMSEA	.059			.043			.055			.047			.055			.053		
CFI	.956			.963			.966			.962			.967			.953		
R^2	.101			.081			.073			.110			.085			.057		

a= Olin Students not included Behavioral Persistence in Majors because they cannot leave engineering without leaving Olin

Table 5.14: SEM predicting Persistence with Social Consciousness, by Gender

	Behavioral Persistence (Major) N=168					Behavioral Persistence (Career Launch) N=188					Intentional Persistence N=179					
	WOMEN			MEN		WOMEN		MEN			WOMEN			MEN		
	Unst. Est.	**S.E.**		**Unst. Est.**	**S.E.**	**Unst. Est.**	**S.E.**	**Unst. Est.**	**S.E.**		**Unst. Est.**	**S.E.**		**Unst. Est.**	**SE .**	
Y4 Soc Consc (latent)	**.245**	**.130**	*	**-.045**	**.090**	**.117**	**.102**	**-.121**	**.094**		**.309**	**.100**	**	**-.184**	**.089**	*
MIT	.121	.112		-.067	.079	.113	.213	.186	.122		.288	.211		.065	.123	
Olin[a]						.179	.154	.409	.158	*	.144	.270		.147	.159	
Smith	.130	.111				.302	.272				.372	.153	*			
African-American	-.126	.141		.141	.187	-.092	.220	.048	.264		.170	.220		-.026	.261	
Hispanic or Latino/a	.091	.176		-.133	.122	.206	.188	-.127	.149		-.145	.188		-.035	.148	
Asian or Asian-Amer	-.023	.107		.039	.089	-.170	.126	-.044	.101		.029	.126		-.208	.100	*
SAT Math	.001	.001		.000	.001	.000	.001	-.001	.001		.000	.001		.000	.001	
SAT Verbal	.001	.001		.000	.000	-.001	.001	-.001	.001		.000	.001		.000	.001	
χ^2 *(df)*	48.5(26)			22.1(23)		76.0(29)		38.6(26)			75.2(29)			36.5(26)		
RMSEA	.077			.000		.058		.041			.057			.038		
CFI	.934			1.00		.965		.974			.966			.978		
R^2	.136			.033		.076		.108			.177			.086		

a= Olin Students not included Behavioral Persistence in Majors because they cannot leave engineering without leaving Olin

Chapter 6—Conclusion

This project was driven by a particular puzzle: why, despite the rise and broad dissemination of egalitarian legal and cultural mandates over the last four decades, is occupational sex segregation so resilient in the U.S.? Occupational sex segregation declined steadily from the 1960s through the 1980s, but changed little after the mid-1990s (Cotter et al. 2011). The continued segregation men and women into different occupations disadvantages women in prestige, pay, and power.

I argued that institutional-level factors (such as queuing and organizational practices) and interactional-level factors (such as cognitive biases and discrimination) are not the only social forces reproducing inequality. Individual-level cultural mechanisms—particularly women's and men's decisions about college majors and careers—play an important role in reproducing sex segregation. Existing literature on individual-level decision-making processes, however, is inadequate to explain how these decisions are gendered. Both the human capital (e.g. Becker 1993) and role expectations literatures (e.g. Eccles 1994, 1987) make the flawed assumptions that female-dominated fields are more "family friendly" than male-dominated fields, and that men and women actually have access to such information when they are making critical career decisions.

Socialization literature, on the other hand, tries to explain the gendering of interests in the tasks stereotypically associated with male- and female-typed occupations by tying such interests to men's and women's childhood socialization experiences (Chodorow 1978; Bem 1993). While boys and girls are certainly encouraged to develop different types of skills and interests, there is little connection between these childhood interests and their adult careers (Jacobs 1989). Interests and identities do not remain stagnant after being internalized at an early age (West & Zimmerman 1987); it is more accurate to understand career decisions as a function of past and present constraints and identities over the life course.

Finally, recent social-psychological literature has demonstrated that women and men develop gendered understandings of their abilities, net of their actual skills and performance (Correll 2001, 2004; Spencer et al. 1999; Steele 1997). While positive self-assessments on the core intellectual tasks (e.g. math) of an occupation is likely necessary for men and women to even consider it as a career option, perceived ability is not a sufficient condition for selection of academic majors or careers.

A more salient individual-level factor in the reproduction of occupational sex segregation among college-educated men and women is *self-expression.* Young men and women are encouraged and expected to select fields of study and career activities that are self-expressive. Recent gender literature has suggested that self-expressive career decisions are an important site for the reproduction of sex segregation (e.g. Charles & Bradley 2009; Cotter et al. 2011, England 2010), but have not explored these insights theoretically or empirically at the individual level. Charles and Bradley (2009) have shown that national contexts—both economic and cultural—influence whether men and women have the latitude to "indulge their gendered selves." In developing countries, women's representation in high-paid, male-dominated fields is higher because personal economic security is of central importance. In affluent, post-materialist societies like the United States, women and men (at least those in the middle class) can afford to "indulge" their gendered interests in less lucrative, but still economically secure, careers. Using country-level data, Charles and Bradley illustrate that cultural and economic latitude for gendered decision-making facilitates occupational sex segregation. Their research provides the structural and cultural context for my individual-level analysis of the self-expressive edge of inequality.

This project shows how this "indulgence" actually happens by using individual-level data from a single national context that encompasses variation both between and among men and women. Specifically, I follow a sample of young men and women as they enter college at one of four institutions (MIT, Smith, Olin and UMass), earn their undergraduate degrees, and enter a graduate program or the workforce. This is an ideal stage in the life course to examine the process of self-expressive career decision-making because it is a time of great flexibility (compared to once people have been in the workforce for awhile), and it is also a time when men and women are expected to explore their interests and identities. These data also allow me to see whether self-expression matters for career decisions even net of the structural constraints imposed by their degree certification.

This project developed a theoretical framework for understanding the process by which self-expression is co-constructed with the cultural structure of gender, and how that gendered self-expression, in turn, comes to reproduce occupational sex segregation. The foundation of this self-expression is individuals' *self-conceptions*—the theories they hold about themselves as experiencing, functioning, unique individuals within a deeply individualistic culture. Rather than expressing a group membership (e.g. gender or religion), self-expression is seen as a fundamentally individualistic process whereby respondents express their conceptions of themselves in their career decisions. In the process of this self-expression, women and men make career decisions that maximize the congruence between their beliefs, values, and identity features and their college major or occupation. In this way, being a member of an occupation, and engaging in occupational tasks, becomes self-expressive.

People's conceptions of themselves are, however, deeply gendered. As I review below, self-conceptions are co-constructed with beliefs about the gender structure. As the basis for self-expressive career decision-making, these gendered self-conceptions can reproduce occupational sex segregation.[68]

These self-conceptions do not necessarily appear gendered to their holders, however; they may just appear individualistic. The very notion of individuality that underlies post-WWII notions of the "self" means that self-conceptions are supposed to be one's "own bit of space" where they are "utterly free to be an individual." The cultural meanings surrounding self-conceptions and their tie to individuality, in other words, mask the gendering of these concepts. Self-expressive career decision-making is thus encouraged and exalted without appearing as a mechanism for inequality reproduction.

I want to reiterate that my focus on self-expressive major and career decision-making is not the same as "blaming the victim." I do not argue that these decisions are somehow innate to men and women, nor do I suggest that women are responsible for the disadvantages in wages, power, etc. that accompany their selection of female-dominated fields. On the contrary, I show that seemingly self-expressive decisions are deeply influenced by cultural gender beliefs. If I "lay blame," it is on those unequal cultural gender beliefs such as essentialism, traditional gender role beliefs, and hegemonic masculinity and femininity that men and women internalize. My key finding is that

[68] As noted elsewhere, I plan to include a separate chapter that uses the qualitative interview and diary data to show that respondents are using logics of self-expression (rather than, say, personal economic security) to explain their college major decisions and to talk about their career plans.

cultural beliefs act through self-expressive decisions to reproduce occupational sex segregation. My focus on individual-level cultural processes elucidates a part of the gender structure that is less well-understood than institutional or interactional-level processes. This does not mean that I disregard broader structural or discriminatory factors.

This chapter briefly reviews my findings and ties them back to my theoretical framework. I then discuss the theoretical and policy implications of this work. I end by speculating on how this might be applicable to gender inequality more broadly—whether their might be a “self-expressive edge of inequality” and what theoretical and empirical questions that approach might suggest.

6.1 Review of Findings

The self-expressive edge of inequality is the mechanism by which cultural gender beliefs reinforce occupational sex segregation by acting through men’s and women’s self-expressive career decisions. In order to claim that self-expression is really culturally-informed, I needed to show examples of cultural gender beliefs informing the self-understandings on which such expression is based. Chapter 2 did this by examining the relationship between self-conceptions and gender schemas, the shared cultural models about the role of men and women in society. Specifically, I used a measure of feminine (vs. masculine) self-conceptions and three measures of gender schemas: gender role beliefs, gender category beliefs, and gender essentialist beliefs. I found that self-conceptions and gender schemas are gendered in expected ways: women have more feminine self-conceptions, have less traditional gender role beliefs, and are more likely to believe that other members of their gender category are feminine. In contrast, men perceived themselves as more masculine, were more likely to agree with traditional gender role beliefs, and perceived members of their gender category to be masculine. Self-conceptions were less polarized between men and women than gender schemas, suggesting that, consistent with Epstein (1999), the perception of differences is more extreme than the actual differences between men's and women's self-conceptions.

I theorized and found evidence for mechanisms by which gender schemas influence self-conceptions and vice versa. First, beliefs about one's gender category can be *extrapolated* into men's and women's self-conceptions. For example, women who perceive their gender category to be hegemonically feminine also perceive themselves as feminine. Through *biological fatalism,* men and women who adhere to gender essentialist beliefs see themselves as more hegemonically masculine and feminine, respectively, then their peers who reject gender essentialism. Third, for men only, traditional gender schemas *prescribe* identity features that are assumed appropriate for what men "ought" to be like. The prescription process does not operate for women, likely because they have cultural alternatives (such as the "separate but equal" ideology) that allow them to reject the explicit hierarchies in traditional gender role beliefs while still maintaining hegemonically feminine self-identities.

The relationship between self-conceptions and gender schemas is not unidirectional; self-conceptions influence people's adherence to gender schemas. Gender stereotypical (or astereotypical) self-conceptions can *reinforce (*or *subvert*) individuals' beliefs in traditional gender roles and in gender essentialism. I find this process, for example, in the positive relationship between women's feminine self-conceptions in year 2 and their gender essentialism in year 5. I also found evidence of an iterative process between gender schemas and self-conceptions over time. For example, women's adherence to essentialist beliefs leads them to be more likely to see themselves as feminine, and women's feminine self-conceptions, in turn, lead them to adhere to essentialist beliefs more strongly. I speculate on just what this means below. Interestingly, I found no evidence for a *generalization* process whereby men and women generalize their self-conceptions to other members of their gender category. The fact that men and women can uphold ideologies of hegemonic masculinity or femininity in their gender category—even if they themselves are exceptions to those ideologies—helps us understand the resilience of these hegemonic categories.

These findings suggest that co-constitutive relationships may exist between gender schemas and many other types of self-conceptions. I analyzed only one measure of self-conceptions in chapter 2. This co-construction illustrates that self-conceptions are not the individualistic, agentic notions they are popularly understood to be. Self-conceptions cannot be disentangled from the gender structure—the gender schemas people hold become part of how they understand themselves.

Next, I wanted to show that these culturally-informed self-conceptions help to reproduce occupational sex segregation. Specifically, I examined how self-conceptions affect decisions about college majors and career launch. In chapter 3, I showed that women who perceived themselves as feminine (vs. masculine), unsystematic (vs. systematic) and people-oriented (vs. things-oriented) were more likely than other women to earn female-dominated degrees, while men who perceive themselves as systematic were more likely than other men to earn male-dominated degrees. These effects are not driven by one or two majors, as I showed through an analysis of six individual majors, but seem to be spread throughout the spectrum of male- and female-dominated degrees. Not only do men and women with self-conceptions stereotypical of men and women, respectively, reproduce the demographic sex typing of male- and female-dominated majors, they also reproduce the cultural sex typing of these occupations as culturally masculine and feminine domains.

Similar processes exist for career launch decisions. As men and women decide what jobs or graduate school programs to pursue after graduation, gendered self-conceptions lead to gendered self-expressive decisions that reproduce occupational sex segregation. Specifically, women with feminine, unsystematic, and people-oriented self-conceptions enter female-dominated career-launch occupations, while men with masculine and more systematic self-conceptions enter male-dominated fields. Obviously, the reverse relationship holds: women with more masculine, things-oriented and systematic self-conceptions are more likely to enter male-dominated fields, while men with less masculine and unsystematic self-conceptions are more likely to enter female-dominated fields. These results hold net of the sex segregation of respondents' college degree field: men and women with stereotypically male and female self-conceptions are likely to enter an even *more* male- or female-dominated career launch fields, respectively, than the ones in which they earned their degree. Career launch seems to represent a degree of freedom where individuals' careers can be tailored to their self-conceptions. This suggests that self-conceptions may influence career decisions at degrees of freedom in individuals' career paths long after college.

The influence of gendered self-conceptions is important for understanding the distribution of men and women across the spectrum of male and female-dominated fields, and my later analysis of qualitative data will explore how this self-expression works on the micro level. However, selection of gendered career fields is only one part of the process; gendered persistence issues are also important. Once men and women have selected career fields, do gendered self-conceptions influence their persistence in those occupations? I illustrate that, among a subsample of engineering students, gendered self-conceptions filter professional identity development and help produce gendered professional identities. These gendered professional identities, in turn, predict women's and men's persistence. Men are more likely than women to develop professional identity dimensions that encourage behavioral and intentional persistence.

Through both inter- and intra-occupational processes, I find that culturally-informed self-conceptions influence whether men and women choose sex-segregated fields, and whether they choose to remain in those fields once there. By being imbedded in individual's self-conceptions, cultural gender beliefs come to be a mechanism for the reproduction of inequality at the individual level.

Effects of Educational Institution

The four schools in my sample are very different: UMass is a large, public land-grant university, Smith is a small, private, women-only liberal arts college, Olin is a new small university offering only engineering degrees, and MIT is a private, science and engineering-focused college. Given this diversity of institutions and the variety in their student bodies, I expected more institutional differences in these mechanisms than I actually found. Perhaps consistent with literature on institutional isomorphism (DiMaggio & Powell 1983; Meyer 1977; Seron & Silbey 2009), the effects for students at these schools were relatively homogeneous. Women at MIT and Smith have more neutral self-conceptions and less traditional gender schemas than UMass women, which is likely an indication of selection effects into these schools. The differences decrease by year 5 (see Appendix 1 for more extensive discussion of these differences). Olin women have more male-dominated degrees and career-launch occupations than women at UMass. Olin women are also more likely than their UMass peers to enter male-dominated occupations, controlling for their degrees. In this way, Olin is living up to its mission to foster women's entrance into science and engineering fields. I do not find institutional affects on men's career outcomes, except that Olin students are more likely to move into more male-dominated fields at career launch. Men's institution of higher education does not affect whether they enter male- or female-dominated occupations after graduation.

I expected that, as attendees of a liberal, single-gender college, Smith women would be more empowered (both ideologically and in terms of the prestige of their educational credential) to enter more male-dominated occupations than women at UMass. However, Smith women were not significantly more likely to earn male-dominated degrees or enter male-dominated occupations, compared to UMass women. Smith women have slightly more progressive gender schemas and more neutral self-conceptions than their peers at UMass in year 2, but these differences largely diminish by year 5. The exception is that Smith women continue to be more likely than UMass women to reject essentialist gender beliefs. It is hard to make any attributions without more information, but it in this case, it does not appear that the single-sex context of Smith curtails the self-expressive processes that reproduce sex segregation at the other institutions.

As I stated in chapter 4, the elite status of these institutions work to my advantage: Olin and MIT pride themselves in graduating leaders of the science and engineering occupations. Women especially are encouraged to persist in these fields, so it becomes a harder case to show that gendered self-conceptions matter to career selection among students of these institutions. Students at less elite universities, who fill the rank-and-file positions in professional occupations, are likely to feel less pressure to enter the most prestigious (male-dominated) occupations. However, I find that gendered self-conceptions do influence the major selection and career launch decisions among MIT and Olin graduates, over and above any pressure that may come from being a graduate of these programs. In short, the great diversity of institutional structures of these schools did not translate into diversity in the ways that gendered self-conceptions influence sex segregation. The overall lack of institutional effects also suggests that these processes happen at other colleges and universities in the U.S. If they are not different at UMass and Smith, for example, then they should also exist across less extreme institutional forms of higher education. I encourage further research across a nationally-representative sample of colleges.

Racial/Ethnic Differences

I found relatively few differences by race/ethnicity. I did not find any consistent patterns in the self-conceptions of men and women by race/ethnicity—something I might see in a less selected group or in a larger sample (see Appendix 1). Consistent with literature on racial/ethnic differences in gender beliefs, African-American women have less traditional gender role beliefs, while their male counterparts have more traditional gender role beliefs (Davis & Robinson 1991; Dane 2000). African-American women are more likely to choose the two male-dominated fields (engineering and physical sciences) than their white peers, and African-American men are more likely to enter male-dominated fields. This may be an effect of the lower average socio-economic status (SES) of the under-represented minority students rather than a racial/ethnic effect per se. Other research has found that students that come from lower SES backgrounds, regardless of their race/ethnicity, are more likely to choose male-dominated fields. This literature presumes that this is due to lower-SES students having more incentive to ensure their future economic security (Ma 2009). However, among my sample, family income was not related to selecting more male-dominated fields. Perhaps non-economic factors of class status (i.e. cultural or social capital) affect major selection and career launch decisions more than family income. For example, some female-dominated fields such as art history may require students to have a certain type of cultural capital to select them—cultural capital more likely among white middle-class students.

Regarding career launch, and consistent with their greater adherence to traditional gender role beliefs, Asian women are more likely to enter female-dominated fields than ones in which they earned their degree. Hispanic and African-American men, consistent with their more traditional gender beliefs and the SES argument above, are more likely to move into even more male-dominated occupations than their college degree fields (see Appendix 1 and 2).

Careful research is needed to understand how these self-expressive processes might work differently for members of under-represented minorities. Due to the elite status of three of the four schools I study, this sample likely has a higher average SES than the population of U.S. college students as a whole. Future qualitative research might investigate how lower-class students, both racial/ethnic minority and white students, balance self-expressive norms with seeking economic security. Beyond identifying interesting racial/ethnic differences in the self-expressive edge of sex segregation, a parallel investigation could examine how the expression of racial/ethnic identities might reproduce occupational racial/ethnic segregation.

6.2 Theoretical Implications

This project sought to understand how occupational sex segregation is reproduced at the individual level. Much progress has been made in understanding the institutional- and interactional-level factors that constrain men's and women's career opportunities and encourage them to pursue some career paths and not others. But, the common cultural assumption about career choice is that it is, actually, about *choice.* As described in chapter 1, social scientists understand that this agency is constrained in myriad ways by the structural and interactional factors. Nonetheless, there is clear cultural valuation of what are seen as free and independent choices.[69]

For college-educated men and women in the U.S., college decisions are supposed to be self-expressive; they are expected to choose occupations that fit with and express their "true selves." However, self-expression has been understudied in the existing individual-level sociological literature on occupational sex segregation. But, it is an important sociological issue because cultural gender ideologies are folded into this self-expressive decision-making: when men and women choose careers that "fit them," they reproduce the gender structure.

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[69] The rhetoric about removing organizational or educational barriers is based around a belief that anyone should be whomever they want to be and nothing should stand in their way, rather than around a belief in the need for equal representation of men and women in each sector of society (see, e.g. National Science Foundation 2007).

There is much to be explored about the self-expressive edge of sex segregation: does it continue to be salient once men and women have been in the workforce for five or ten years? Do similar processes exist among community college students? Do salient life demands like parenthood trump self-expressive career decision-making, especially among women, or are these decisions actually self-expressive because they are couched in women's culturally-informed self-conceptions as "mothers?" Is self-expression an option for working-class men and women, and does it help to reproduce sex segregation of lower-paid work in the same way? Can self-expression reproduce vertical sex segregation as well as horizontal segregation? Finally, to what extent do people incorporate structural obstacles into their self-conceptions and tell self-expressive stories to justify those obstacles? These are questions that would help us understand the extent and operation of gendered self-expression in occupational sex segregation.

Chapter 2 was key in demonstrating that self-conceptions and the self-expressive decisions based on these self-conceptions are informed by cultural gender beliefs. That chapter also illustrated something of broader theoretical importance: that gender schemas and self-conceptions are actually co-constructed over time. The turn in gender literature recognizes that gender is not simply a stable identity feature; it is enacted on a daily basis in everyday life (West & Zimmerman 1987). This enactment is heavily structured. "Gender involves cultural beliefs and distributions of resources at the macro level, patterns of behavior and organizational practices at the interactional level, and selves and identities at the individual level" (Ridgeway & Correll 2004, 510). The possibility of alteration from this enactment is countered by structural forces at the macro and interactional levels. Beyond this enacting-constraining process whereby men and women enact their gender within a structured environment, the structure penetrates "selves" and "identities" in a much more fundamental way: the gender structure is actually *built into* these selves and identities. Through their everyday enactment of gender, men and women reproduce the gender structure. The gender structure and the gendered individual, in other words, are co-constructed.

Understanding the power and resilience of the gender structure requires understanding the co-construction of the gender structure and the gender individual. I attempted to examine this co-construction empirically and theorize specific mechanisms (e.g. gender schemas prescribing certain self-conceptions that lead women to be more likely to choose a female-dominated college degree) though which it helps to produce inequality. I found that culture is embedded in both the complex, messy and iterative development of self-conceptions and in the very purposeful, thought-out and important life decisions.

Gender isn't merely a coercive social structure built into social institutions and interactions, it is internal and meaningful to social actors. As part of the socially – constructed "self," gender is embedded in our deepest understandings of our and can motivate even our most self-expressive actions. Not only do men and women enthusiastically and voluntarily *respond* to social structures, through their expression of gendered self-conceptions, they may enthusiastically and voluntarily *reproduce* them.

Furthermore, the very idea that self-conceptions are co-constructed with societal gender beliefs is incongruous with the cultural ideology of individuality. Unlike other mechanisms (e.g. discrimination) reproducing occupational sex segregation, the cultural meanings about self-expression prevent it from being a site for social action. Perhaps not coincidentally, the place where the gender structure may be most strongly reproduces is also the site where it is most socially unacceptable for policy-makers and social activists to meddle.

Although I focus on how this co-construction creates an iterative process that reproduces the gender structure, it also has the potential to undermine that structure. My findings in chapter 2 suggest that we are not fully determined by our cultural beliefs. What cultural beliefs we choose to adhere to, and those we choose to reject, is shaped by our self-understandings. When men and women have more neutral perceptions of themselves, they are less likely to adhere to traditional gender role beliefs and are less likely to believe in gender essentialism. As I showed with the case of engineering students, self-conceptions also filter the cultural ideologies such that men and women are less likely to accept beliefs that are dissonant with their self-conceptions. Expanding Blair-Loy's (2003) and Sewell's (1992) work on schemas, these self-conceptions may be an additional resource through which schemas may change. The potential for self-conceptions to be an agent of cultural change deserves further investigation.

6.3 The Self-Expressive Edge of Inequality?

This project sought to understand how gendered self-conceptions are the basis of career decisions that reproduce segregation. But, are there self-expressive mechanisms in the reproduction of other types of inequality? Ones that appear to be much less about "choice?" There are many situations where people's responses to the inequities they experience are important to the perpetuation or remediation of these inequalities. For example, whether women negotiate for salary raises or confront colleagues who do not treat them fairly. It is not, of course, the responsibility of disadvantaged groups to remedy their own disadvantage, but many employers take advantage of women's hesitancy to negotiate or push back. Many scholars simply attribute this to their gender, broadly-speaking (e.g. Dinovitzer et al. 2009). Self-conceptions and self-expression may help us to understand how this operates. For example, women's hesitancy to negotiate may be driven by the dissonance between such behaviors and their self-conceptions. They may believe, "it is just not 'me' to negotiate." This may cause a particular problem for those trying to solve the discrepancy between men's and women's negotiation strategies. It is not enough to point out to women that members of their gender category tend to negotiate less forcefully than men. If such behaviors go against their self-conceptions because they have internalized cultural beliefs that women are not to be "pushy" or "immodest," such training is unlikely to help.

Secondly, chapter 5 shows that some professional identities promote persistence in engineering more than others. A more basic process may occur where the daily activities of occupational or organizational settings that are discordant with women's or men's self-conceptions may lead them to leave. Constantly being expected to act in ways that contradict with one's self-conceptions may lead people to seek other occupations. In short, self-conceptions and self-expression may interact with the institutional and interactional-level factors to reproduce other inequalities in salary, advancement, and leadership.

This attention to self-expression suggests the need to understand more broadly what role individual identities play in the reproduction of inequality. Unequal structures are not only reproduces by the actions and beliefs of wealthy white men. Women, to a large extent, adhere to and internalize the same unequal cultural structures as men and organize their selves and beliefs around those structures (Jost et al. 2004). "When a group or system distributes resources unequally among its members, those members (or most of them) must also view the system as fair" (Olson & Hafer 2001:157). Thus, inequalities can be perpetuated even when those who are disadvantaged do not recognize that disadvantage, and the beliefs and actions of members of disadvantaged groups can reproduce that disadvantage for themselves and other members of their group (Cech & Blair-Loy 2010; Jost et al. 2004).

The trick to avoid "blaming the victim" in this sort of research is to constantly stress the socially constructed nature of these beliefs and identities, and to suggest policy actions that do not put the burden on the disadvantaged individuals to simply "change." On the empirical front, examining the self-expressive edge of inequality requires detailed individual-level data. Qualitative analysis would be helpful to document men's and women's underlying explanations for the decisions they make. Preferably, both quantitative and qualitative analyses would use over-time data to help with issues of causality. I hope such research would be expanded to other types of inequality, not just gender.

6.4 Policy Implications

In a society where male-dominated and female-dominated occupations were equally rewarded and respected, and where the cultural ideologies that informed career choices were not gender biased, such self-expression would be interesting sociologically but would not play a role in reproducing inequality. The reason such gendered self-expression is an issue of inequality is because people are not fully free to define themselves as they choose—women and men internalize the biased cultural ideologies that devalue both women's contributions to work and the worksites that are dominated by women. Because the dominant cultural ideologies that inform these self-conceptions are biased, and because the fields in which women crowd are devalued in prestige, pay, and power, this gendered self-expression reproduces the unequal status of women.

As discussed above and in chapter 1, the self-expressive edge of inequality is particularly resistant to social change. The most obvious solution—to limit self-expressive freedoms or to change people's self-conceptions—are culturally unacceptable. Cultural gender beliefs that are embedded within self-conceptions could also be challenged, but such widespread cultural change is difficult.

What can be done? There are two pragmatic policy issues that could be addressed: whether young men and women are given the opportunity or encouragement to develop more gender-neutral self-conceptions, and whether the sex-typing of occupations is being adequately undermined. First, the trend of giving secondary students and college students increasing freedom over the courses they take means that gendered self-expression gets translated into sex-segregation at an earlier stage—coinciding with the moment when young women and men feel the most pressure to live up to stereotypical expectations of men and women. If young men and women were required to take a variety of courses (auto mechanics class *and* family and consumer science, for example), such self-expressive specialization would be reduced and young men and women would have exposure to more activities which may expand their self-conceptions beyond those stereotypical to members of their gender. Similarly, career counseling and even the occupational interest tests often given to high-school students should be examined to make sure that their encouragement of self-expressive career decision-making does not artificially limit individuals' possible choices based on their gender.

Second, boys and girls could be encouraged to expand their self-conceptions and to incorporate more gender-neutral or gender-opposite dimensions during the time when their self-conceptions are most pliable. This could be done through exposure to opposite-gender toys and activities in a judgment-free setting (letting boys play with barbies and girls with trucks) or by explicitly challenging commonly-held stereotypes about men's and women's "natural" abilities.

Third, reducing the cultural sex-typing of occupations would help reduce the patterns of gendered decision-making. Primary education might teach students about a broad range of male- and female-typed occupations and practice role-playing opposite-sex-typed occupations. Explicit discussion of the sex typing of occupations may bring consciousness to this process. Finally, there are an increasing number of summer programs that offer young girls exposure to male-dominated fields such as math and science, but there is little opportunity for boys to attend summer camps to learn about nursing or elementary education. To the extent that this expansion of self-conceptions happens, it should include both men and women.

The self-expressive edge of sex segregation points to one of the most difficult conundrums of social inequality: disadvantaged groups sometimes internalize their disadvantaged status and build meanings and identities around that status. Awakening recognition of this disadvantage may require challenging meanings and identities that members of those groups hold dear. Although such intrusion may reduce inequality in the long term, it may further burden these groups with emotional and identity work in the short-term. How is inequality to be addressed once it has become part of disadvantaged groups' identities, without further disadvantaging those groups? The only equitable answer is to change the social environment that responds to such identities. Gender essentialism and separate but equal ideologies perpetuate a complacence about the continued presence of occupational sex segregation. Challenging these ideologies may be the first step toward changing that social environment. Even when gender differences are self-expressive and meaningful, different is never equal for unequal groups in society.

The Self-Expressive Edge of Sex-Segregation: The Role of Gender Schemas and Self-Conceptions in College Major Selection and Career Launch

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Appendix 1: Self-Conceptions and Gender Schemas by Gender, Race/Ethnicity & Other Demographic Categories

This appendix explores variances in self-conceptions and gender schemas by gender, race/ethnicity, and other social categories. These results are summarized in part one of Chapter 2. As the intersectionality literature argues (Bettie 2003; Hill Collins 1991), there is not a monolithic experience of being a “man” or a “woman”—gender expectations and beliefs vary in important ways along other axes of social difference. This appendix explores this variation. I also present tables representing the change in self-conception and gender schema measures over time.

Gender Differences

Chapter 2 presents the univariate and bivariate statistics by gender and provides a summary of the multivariate models that I present below. Table A1.1 presents the OLS regressions predicting year 2 and year 5 values on each of the individual self-conception measures using gender and the other key demographic variables. I combine several of these variables together to make the latent self-conception measures of masculine/feminine, more/less logical, and things-oriented/people-oriented used in chapters 2-5.

Here, I am interested in the extent to which gender is a significant predictor of these measures controlling for other demographic factors. Among the self-conception measures, the significant gender differences that I found in the bivariate statistics discussed in Chapter 2 are also present in the OLS regression results: women are significantly more likely to see themselves as less logical, more feminine, and more emotional in both year 2 and 5.

The gender category belief measures (Tables A1.2) also echo the bivariate statistics in Chapter 2: for all but the unsystematic measure, women see members of their gender category as more stereotypically feminine (cooperative, social, less logical, emotional, people-oriented, friendly, and feminine) than men saw other men. The same comparative polarization exists for men's perceptions of other men as well.

The gender differences remain for most of the other gender schema beliefs as well (Table A1.3). Women are significantly less likely to have traditional beliefs about gender roles than men: Women are more likely than men to disagree that a wife should take her husband's name at marriage (year 2 and 5) and that some jobs are better suited for men (year 2 and 5). Women are more likely to agree that women should not let having kids stand in the way of a career (year 2 and 5), and that women can live a full and happy life without marrying (year 5). Women are also more likely to consider themselves a feminist in both years 2 and 5. However, when other demographic variables are controlled, gender is not a significant predictor of gender essentialist views. Interestingly, overall, men see other men as having less hegemonically masculine traits over time. Women's perceptions of other women does not follow a clear pattern: Women see other women as more social by year 5, but they see women as less cooperative, more systematic, and less emotional in year 5 than in year 2. It appears that men's experiences in college and as they leave college and enter the workplace or graduate school challenges their perceptions of men as stereotypically masculine and they begin to see members of their gender category as being more neutral.

Differences by Race/Ethnicity

Beliefs about and experiences of gender are not monolithic across groups of "men" and "women" (Kane 1992, 2000; Ransford & Miller 1983). Although my sample is relatively homogeneous (all college students around the same age), I still expect to see differences in self-conceptions and gender schemas across categories of race and ethnicity.

I control for differences across four race/ethnic groups: Black or African-American respondents, Asian or Asian-American respondents, Hispanic or Latino respondents, and white respondents. Table 2.2 in Chapter 2 gives the percent men and women who identify as a member of these categories. Tables A1.1-A.13 use these categories to predict self-conceptions and gender schemas variables. I discuss instances where race/ethnic categories are significant predictors of self-conceptions and gender schemas measures, net of the other variables in the model. (Race/ethnicity variables are dichotomous variables, 1=yes, 0=no. Comparison category: white respondents.)

It is also unclear from existing literature how self-conceptions might differ by race/ethnicity. We might expect that white respondents would have the most stereotypically masculine or feminine self-conceptions since normative views of women and hegemonic masculinity are predominantly white performances of gender.

In regards to self-conceptions, I find a few differences across the racial/ethnic groups in my sample, but no clear patterns are evident. Hispanic respondents (and Hispanic men in particular, when compared to other men) see themselves as significantly more emotional than white students. This difference disappears by year 5. Asian and Asian-American respondents see themselves as less logical and more people-oriented in year 5, compared to white students. No racial differences emerged between Black respondents and white respondents' self-conceptions.

The literature that discusses racial/ethnic differences in gender beliefs shows that African-American and Hispanic men and women tend to be more likely to recognize inequalities in general (Davis & Robinson, 1991; Kane, 2000). African-Americans tend to have less traditional gender schemas and Hispanic and Asian-American men and women tend to have more traditional beliefs about men's and women's gender roles than white men and women (Kane, 2000). It is unclear what these patterns might be regarding the gender category and gender essentialist variables.

Asian-American students and Hispanic women are more likely to disagree that women can live a full and happy life without marrying. Interestingly, African-American men are less likely than white men to agree that women should take their husband's name at marriage, but African-American women were more likely than white women to agree with this sentiment. African-American respondents are more likely to reject essentialist notions that men and women are "naturally different," but Asian/Asian-American respondents (particularly women) are more likely to adhere to gender essentialist beliefs than white respondents.

Some differences emerge in the gender category measures, but again, exhibit little trending. Hispanic or Latino students see other members of their gender category as more individualistic than white students, particularly among men. Hispanic women see other women as more unsystematic than white women perceive members of their gender category in year 2, but by year 5, this effect has disappeared. Hispanic women see their gender category as *more* logical than white women see other women. Asian and Asian-American women see members of their gender category as both more logical and more systematic than white women see other women.

Overall, responses on the gender schemas and self-conceptions measures were fairly consistent across demographic groups. There are no discernable patterns on *when* race/ethnic identities play a strong part in these beliefs—some differences appear in year 2, others only in year 5. A larger sample with more non-white respondents is needed to trace these patterns more clearly.

Differences by Nativity

Although Western cultural beliefs about gender are diffusing throughout the world (Inglehart & Norris 2003), there are still strong differences in beliefs about gender across national borders. Respondents who grew up of outside of the US may have significantly different self-conceptions and gender schemas than those that grew up in the U.S. In particular, the ideal of rugged individualism (Bellah et al., 1985) may mean that men's and women's self-conceptions are less gendered than among those born outside the US. While there are plenty of countries that have much more progressive gender role beliefs than the US (Norway and Sweden in particular) (Baxter & Kane, 1995), the sending countries of immigrants to the United States (e.g. Latin American and Asian countries) often have less progressive beliefs about gender (Charles & Cech, 2010). Therefore, I expect those born inside the U.S. to have more progressive beliefs than those who were born elsewhere.

Nativity is not the perfect measure of enculturation, but being born elsewhere makes it more likely that one's socialization experiences, where early beliefs and understandings about gender are formed (Bem, 1993), occurred outside the U.S. as well.

Not surprisingly, respondents born inside the US perceive themselves as more individualistic (in both Year 2 and year 5) than those born elsewhere. This is particularly true among women. Among men, those born in the U.S. perceive themselves as more logical than those born elsewhere. Respondents born in the US see members of their gender category as more social than those born elsewhere, and women born in the US see other women as more people-oriented than foreign-born women. Consistent with the expectation stated above, students born inside the US hold more progressive gender role beliefs than others: U.S.-born respondents are more likely to be feminists and to reject that some jobs are better suited for men rather than women.

Differences by Family's Income

Much gender belief trend analyses based on nationally-representative samples illustrate that wealthier individuals often hold less traditional gender role beliefs than lower or working-class individuals (Ransford & Miller 1983). Also, class-based experiences of identity formation may mean working-class men and women develop different self-conceptions than their wealthier peers. Income differences often lead to educational differences that promote different sorts of beliefs about gender and oneself (see, e.g. Kane 2000; Willis 1981).

Among all students, the higher respondents' parents' income, the more independent they perceive themselves to be (year 5), particularly among women. It appears that parents' income is positively related to seeing oneself in a less gender-stereotypic manner: women with high-income parents are less likely to perceive themselves as feminine than women with low-income parents, and men with high-income parents are less likely to see themselves as masculine than men with lower-income parents (year 2 and 5).

Interestingly, the higher the income of women's parents, the less likely they are to see members of their gender category as systematic and logical, but friendly (year 5). There were no significant differences by parents' income in year 2. Finally, the higher respondents' parents' income, the more likely they are to reject the notion that women should take husband's name at marriage (year 2).

Overall, there were little differences in gender schemas and self-conceptions by parents' income in year 2. As expected, respondents whose parents had lower incomes had more traditional gender role beliefs about wives taking their husband's name, but this difference disappeared by year 5.

Differences by Political Beliefs

It is no surprise that political conservatism affects gender role beliefs. Considering oneself politically conservative is accompanied by cohesive sets of beliefs about other non-political realms of society, such as gender (Davis & Greenstein, 2009). I expect that students who consider themselves to be politically conservative will have more traditional beliefs about gender roles, be less likely to recognize gender inequality, and be more likely to adhere to essentialist beliefs about men and women. But it is an open question whether such effects would emerge net of religiosity, nativity, and race/ethnicity. Also, we know little about how perceptions of self might differ by political beliefs.

Conservative men's and women's perceptions of themselves and their perceptions of their gender category are more stereotypically masculine or feminine, respectively. Conservative men see themselves as less emotional (year 2 and 5) and more logical (year 2) than more politically liberal men. Conservative women see themselves as more social and less systematic (year 2) than other women. Similarly, conservative men see other members of their gender category as more independent than more liberal men (year 5), and conservative women see members of their gender category as more feminine than more liberal women (year 2 and 5). Conservative men and women see members of their gender category as more systematic and logical than more liberal men and women (year 2).

As expected, conservative students hold more traditional gender role beliefs than more politically liberal students. They are more likely than politically liberal students to agree that a wife should take her husband's name at marriage (year 2 and 5) and less likely to see themselves as feminists (year 2 and 5). They are also much more likely to adhere to gender essentialist beliefs: conservative students are more likely to believe that some jobs are better suited for men than women (year 2 and 5), to expect men and women will act differently at work, that men and women are naturally talented at different things, and believe that men and women deserve equal rights but are different by nature (in year 5). The resilience of the effect of conservatism as a predictor of these gender schema beliefs is telling; conservatism is the most powerful predictor of gender schemas and self-conceptions, second only to gender. This is in important area of research: conservative political beliefs appear to be a powerful vehicle for the reproduction of traditional and essentialist gender beliefs.

Differences by Religiosity

Respondents were asked in year 1 to rank how "religious" they are in relation to their peers: in the top 10%, above average, average, below average, or in the bottom 10%. As with political conservatism, religiosity is often accompanied more traditional beliefs about gender (although certainly not in every denomination) (Edgell & Tranby, 2007).

Unsurprisingly, men and women who perceive themselves to be highly religious are more likely to see themselves as less logical (year 2 and 5), more emotional (year 5) and more interested in working with people (year 2). There are no significant differences between how highly religious and less religious respondents perceive members of their gender categories.

In regard to gender beliefs, the highly religious are more likely to agree that women should take husband's name at marriage (year 2 and 5), disagree that women should not let having children stand in the way of a career if they want one (year 2 and 5), and disagree that women can life a full and happy life without marrying (year 2 and 5). The highly religious are also more likely to expect men and women to act differently at work. There are no differences by religiosity in perceptions of gender inequality

These results are particularly interesting because they exist even after controlling for political conservatism. In other words, the effects of religiosity on gender role beliefs is not completely encompassed within political conservatism. Something about being religious leads to traditional beliefs about gender, which is likely due in part to the general traditionalism found among many religious institutions and organizations (Kane 2000).

Differences by Sexual Identity

Although sexual identity is not usually controlled for in quantitative studies of gender, it is an axis along which beliefs about gender (and gendered beliefs about the self) may vary. Sexual identity is often discussed in the language of gender, and dominant stereotypes of non-heterosexual individuals are cast in gendered language. The common portrayal of lesbian and bisexual women as "masculine" and gay and bisexual men as "feminine" (Yoshino, 2006) means that beliefs about gender and self-conceptions may differ markedly from heterosexual men and women.

Little quantitative research exists on lesbian, gay and bisexual (LGB) individuals' perceptions of themselves and their beliefs about gender in comparison with heterosexual individuals. Although a more representative sample would be useful to explicate these processes more broadly, I offer here, perhaps for the first time, descriptions of how LGB individuals' self-conceptions and gender schemas significantly differ from their heterosexual peers.

Overall, LGB students have more neutral and less gender stereotypical perceptions of themselves than heterosexual students. LGB women see themselves as less social (year 5), less friendly (year 5), and less feminine (year 2 and 5) than straight women. LGB men see themselves as less logical (year 5) and less masculine (year 5) than other men (Yoshino, 2006). These differences in self-conceptions appear most strongly in year 5. It may be that, as LGB students progress through college and develop their identity, they come to develop understandings of themselves that are divergent from heterosexual men and women.

In year 2, gay and bisexual men see other men as less social than heterosexual men see members of their gender category, but this difference goes away by year 5. Lesbian and bisexual women see other women as less feminine than do heterosexual women.

I find strong evidence to suggest that LGB respondents have much more progressive beliefs about gender than their heterosexual peers. LGB men and women are less likely to agree that women should take their husband's name at marriage (year 2 and 5) and are much more likely to be feminists (year 5). They are also much more aware of gender inequality: they are more likely to recognize income inequality (year 2) and discrimination against women by men (year 5) than heterosexual students. Finally, LGB men and women are less likely to hold gender essentialist beliefs that others: they disagree that some jobs are better suited for men more than their heterosexual peers, and they disagree that women and men are different by nature. Gender schemas among individuals who identify as lesbian, gay, and bisexual are an interesting and important site for further study.

Different Schools, Students with Different Beliefs?

Students attending the four schools (MIT, Olin, Smith and UMass) may differ in their self-conceptions and gender schemas in a couple of ways. First, selection effects may lead students with certain self-conceptions and gender schemas to choose one school rather than the others. As a single-sex institution, Smith has a certain liberal brand and character (although not as liberal as other Seven Sister schools in the area such as Wellesley and Mt. Holyoake (Horowitz, 1984) that may attract women who perceive themselves as more progressive and hold more progressive beliefs about gender. MIT is nationally-recognized as an elite technical institution, but its student body is often portrayed as “nerdy” or “geeky”. Olin was only a year old by the time this cohort of students entered its doors, so it scarcely had time to develop a rich collective identity. Olin students entered a school that was brand new, that had a strong commitment to innovative curriculum, and was free to attend. This combination of innovativeness and newness likely attracted a certain kind of intellectually adventurous student. In addition, it is likely that only a certain percentage of U.S. high school students who were interested in pursuing engineering had heard about Olin, and though Olin provided a “free” education, that percentage is likely skewed socio-economically advantaged. Students may have required a certain kind of cultural capital to have access to knowledge about this new program (Lareau & Weininger 2003).

Secondly, the four schools could differentially affect the ways men's and women's gender schemas and self-conceptions develop over time. Smith students, for example, encounter much more awareness of gender issues in their curriculum than most other schools (Horowitz 1984). Masculinities dominant at MIT, where technical and mathematical prowess are expected (Sinclair 1986) may be different than masculinities dominant at UMass, which has an avid sports program and displays of hegemonic masculinities are more likely. Thus, it is interesting to look at how students differ in year 2, when they are at the beginning of their education, and year 5, when they have finished their education and have left school.

Since UMass is the most representative of the schools where most of the students in the U.S. are educated, I use it as the comparison category. I examine how MIT, Olin, and Smith students' gender schemas and self-conceptions significantly differ from UMass students' beliefs in year 2 and year 5.

First, MIT students' self-conceptions in year 2 are not significantly different from students at UMass. By year 5, however, MIT graduates perceive themselves to be less feminine (marginally significant in year 2) and less interested in working with people than UMass students. MIT women graduates also perceive themselves as less social. This is somewhat consistent with the "nerdy" stereotype of MIT students; students may relish this stereotyped persona and come to see themselves in this way as an identity marker (Faulkner 2000, 2007). MIT men perceive members of their gender category to be less social than UMass students in year 2. MIT women, however, perceive other women to be more friendly than do UMass women in year 2. Men continue to perceive men of their gender category as more masculine and women continue to see other women as more friendly by year 5.

MIT students appear to hold slightly more progressive gender beliefs than UMass students: in year 2, they are more likely to consider themselves to be feminists. This difference continues in year 5, when MIT students are also more likely to reject the belief that women should take their husband's name in marriage.

Second, Olin students' self-conceptions are very similar to those of UMass students. Olin students are less people-oriented in year 2, although this difference disappears by year 5. There are several differences in perception of gender category, however. Olin men in year 2 are more likely to perceive their gender category is more systematic and more logical. Women at Olin in year 2 are also more likely than UMass women to see their gender category as logical. (This makes sense in light of the fact that all Olin students are engineers. It is interesting, however, that Olin students did not see themselves as significantly more logical and systematic than UMass students.) Olin students in year 2 also perceive members of their gender category to be more friendly than how UMass students perceive their gender category. Olin men perceive other men to be more emotional that UMass men perceive other men in year 2, but this difference goes away by year 5. Olin also differs in their gender role and essentialist beliefs. In year 2, Olin students are more likely to believe that women can live a full and happy life without marrying, and Olin women are more likely than UMass women to consider themselves feminists. Though, both of these differences disappear by year 5. In year 5, Olin women graduates are more likely to disagree that some jobs are better suited for men than for women, and that disagree that women should take her husband's name at marriage.

Third, Smith students show several significant differences in self-conceptions, compared to UMass women in year 2: they perceive themselves to be less social, less systematic and less logical than UMass women. This difference is in an unexpected direction—because of their more progressive beliefs overall, one might expect that women would perceive themselves to be systematic and logical to a greater extent than UMass women. These differences disappear by year 5. The only self-conception difference in year 5 is that Smith women graduates perceive themselves to be less emotional than UMass women graduates. Smith women's perceptions of their gender category are more gender neutral than UMass students' perceptions in year 2: Smith students see other women as less cooperative, less social, more systematic and more logical than Umass women perceive other women. Smith graduates continue to see women as more logical than UMass women graduates perceive members of their gender category. The rest of the year 2 differences in perceptions of other women disappear.

As expected, Smith students have more progressive gender schema beliefs than UMass women, and Smith women become *more* progressive in comparison with UMass students by year 5. Smith women are more likely to consider themselves feminists in year 2 and 5. By year 5, Smith women also more likely to reject gender essentialist beliefs (about some jobs being better suited for men, and about the natural talents of men and women) and are more likely to recognize gender inequality (both income inequality and discrimination). They are also more likely than UMass women graduates to reject that women should take their husband's name at marriage.

Overall, MIT students are slightly different than UMass students: they have slightly less gendered self-conceptions and slightly more progressive gender schemas. Olin students start out slightly different than UMass students, especially in perceptions of one's gender category, but these differences largely disappear by year 5. Smith students have several significant differences in their self-perceptions and their beliefs about themselves, but these differences largely disappear by year 5. Smith students do retain their more progressive gender role beliefs through college, and their beliefs become even more progressive in year 5, compared to UMass students.

Change Scores of Gender Schemas and Self-Conceptions over Time

Figure A1.1 illustrate the change scores of men and women on each of the self-conception, gender category, and gender role and essentialist beliefs. I calculated change scores by subtracting year 2 values from year 5 values. A positive score means there was a positive average change in that belief between years 2 and 5. The horizontal dotted lines in each chart are visual benchmarks for 5% change in the positive and negative directions.

The figure indicates stability of self-conceptions over time. Only one of the mean change scores for self-conceptions ("people-oriented") is above the 5% change mark in either direction. More consistent trends emerge in the change scores on gender role beliefs. On average, respondents' gender role beliefs become more progressive over time. Women—but not men—are more likely to reject essentialist beliefs over time

Table A1.1: Self-Conception Variables Predicted by Demographic Variables

	Y2 Iam Coop			Y5 Iam Coop			Y2 Iam Social			Y5 Iam social		
	ALL	Women	Men	ALL	Women	Men	ALL	Women	Men	ALL	Women	Men
(Constant)	4.658 ***	4.255 ***	4.785 ***	4.155 ***	4.533 ***	3.947 **	4.022 ***	3.458 ***	5.300 ***	5.884 ***	5.688 ***	6.047 ***
Female	-0.075	---		-0.282			0.353 +			0.161		
MIT student	0.073	-0.208	0.408	0.219	0.071	0.198	-0.297	-0.357	-0.177	-0.252	-0.726 *	0.290
Olin student	0.037	0.093	-0.067	0.328	0.051	0.399	-0.159	-0.338	-0.064	0.006	-0.115	0.146
Smith student	-0.203	-0.275		0.404	0.106	-0.724	-0.545 *	-0.621 *		0.147	-0.122	-0.244
Hispanic or Latino	-0.475	-0.283	-0.556	-0.241	-0.224		0.278	0.452	0.135	-0.339	-0.147	
Black or African American	0.927 +	1.060 +		0.128	0.624	-1.817	0.382	0.280		-0.475	-0.559	0.096
Asian or Asian-American	-0.255	0.028	-0.631 +	0.042	-0.174	0.325	-0.221	-0.260	-0.179	0.192	0.329	-0.180
R Was born in US	-0.519 *	-0.769 **	-0.044	-0.643 *	-1.028 **	-0.028	0.228	0.368	0.068	0.281	0.415 +	-0.044
Family Income	0.000	0.000	0.000	0.000 *	0.000 **	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Lesbian, Gay, or Bisexual	0.258	0.387	-0.104	-0.230	0.531	-1.341	-0.028	0.059	-0.082	-0.496 *	-0.635 **	-0.127
Political Conservatism	0.004	0.066	-0.131	0.046	0.032	0.114 +	0.033	0.161 *	-0.161	-0.020	-0.018	0.004
Religiosity	0.098	0.109	0.102	0.131 +	0.098	0.191	0.087	0.159 *	-0.023	-0.037	-0.022	-0.080
r2	0.017	.032 +	0.008	.034 *	.073 **	0.013	0.004	.045 *	-0.332	0.013	.076 **	-0.042

	Y2 Iam Les Systematic			Y5 Iam Less Systematic			Y2 I am Less Logical			Y5 I am Less Logical		
	ALL	Women	Men	ALL	Women	Men	ALL	Women	Men	ALL	Women	Men
(Constant)	3.801 ***	2.772 **	4.558 ***	3.199 ***	2.309 **	3.882 **	1.827 **	1.771 *	2.578 **	1.596 **	1.559 *	1.627 *
Female	-0.178			-0.347 *			0.375 *			0.317 *		
MIT student	-0.266	-0.054	-0.440	-0.319 +	-0.069	-0.632 +	-0.002	-0.091	0.044	-0.070	-0.138	-0.046
Olin student	-0.020	0.380	-0.432	-0.016	0.369	-0.419	0.173	0.299	0.005	-0.129	-0.178	-0.061
Smith student	0.305	0.580 *		0.198	0.454 +		0.217 *	0.170		0.129 +	0.122	-0.070
Hispanic or Latino	-0.434	-0.192	-0.640	-0.041	0.168	-0.354	0.006	0.130	-0.185	0.028	0.267	
Black or African American	0.115	0.085		0.346	0.415	-0.135	-0.008	0.018		0.497	0.352	1.425 *
Asian or Asian-American	-0.062	0.046	-0.156	0.312 +	0.343	0.346	0.120	0.171	0.041	0.317 *	0.413 +	0.022
R Was born in US	-0.060	-0.052	0.020	-0.112	-0.016	-0.231	-0.082	0.092	-0.350	-0.175	-0.025	-0.525 *
Family Income	0.000	0.000	0.000	0.000	0.000	0.000 +	0.000	0.000	0.000	0.000 +	0.000	0.000
Lesbian, Gay, or Bisexual	0.073	-0.093	0.559	0.072	0.019	0.042	0.043	0.199	-0.439	0.214	0.191	0.687 *
Political Conservatism	-0.073	-0.007	-0.217 *	-0.059	-0.041	-0.115	-0.027	0.018	-0.101	0.005	-0.008	0.075
Religiosity	0.066	0.055	0.101	-0.085	-0.129 *	-0.011	0.115 *	0.098	0.149 *	0.100 *	0.037	0.201 *
r2	0.013	0.002	0.040	.023 +	0.022	0.006	.031 *	0.019	0.008	.060 **	0.003	.117 **

	Y2 I am Feminine			Y5 I am Feminine			Y2 Iam Emotional			Y5 Iam Emotional		
	ALL	Women	Men	ALL	Women	Men	ALL	Women	Men	ALL	Women	Men
(Constant)	2.746 ***	4.618 ***	3.167 **	2.394 ***	4.861 ***	1.826 **	2.836 ***	4.203 ***	2.011 +	3.904 ***	4.134 ***	4.143 **
Female	2.568 ***			2.472 ***			0.997 ***			0.897 ***		
MIT student	-0.314 +	-0.533 +	-0.331	-0.356 *	-0.452 +	-0.341 +	-0.002	-0.261	0.283	-0.277	-0.454	-0.050
Olin student	-0.144	-0.062	-0.461	-0.190	-0.347	-0.452 +	0.214	0.052	0.271	0.079	-0.087	0.105
Smith student	0.135	0.165		-0.041	-0.009		-0.270	-0.364		-0.029 *	-0.144	
Hispanic or Latino	-0.058	0.208	-0.134	0.118	0.253	0.094	0.798 **	0.437	1.585 **	0.079	0.330	0.221
Black or African American	0.380	0.022	1.379	0.400	0.321	0.327	-0.026	0.027		-0.304	-0.348	-0.282
Asian or Asian-American	0.088	-0.076	0.299	0.060	-0.129	0.203	-0.226	0.003	-0.550 +	0.234	0.200	0.145
R Was born in US	0.051	0.211	-0.127 +	0.181	0.138	0.394 +	-0.095	0.184	-0.378	-0.151	-0.019	-0.453
Family Income	0.000	0.000 **	0.000 **	0.000	0.000 **	0.000 **	0.000	0.000	0.000	0.000	0.000	0.000
Lesbian, Gay, or Bisexual	-0.135	-0.398 *	0.587 +	-0.246	-0.733 ***	1.218 ***	0.468 +	0.400	0.707	0.243	0.433	0.854 +
Political Conservatism	0.038	0.109 *	-0.079	0.019	0.029	0.017	-0.112 *	0.000	-0.321 **	-0.066	0.048	-0.256 **
Religiosity	0.026	0.030	0.024	0.062	0.087	0.020	0.082	0.027	0.167	0.141 *	0.073	0.256 *
r2	0.618 ***	0.061 *	0.016	0.603 ***	0.101 ***	0.167 **	.114 ***	-0.017	.100 **	.127 ***	0.012	.076 *

	Y2 Iam Friendly			Y5 Iam Friendly			Y2 I am People-Oriented			Y5 I am People-Oriented		
	ALL	Women	Men	ALL	Women	Men	ALL	Women	Men	ALL	Women	Men
(Constant)	6.101 ***	6.712 ***	5.635 ***	5.666 ***	5.806 ***	5.679 ***	4.291 ***	3.544 **	5.374 ***	5.667 ***	6.183 ***	5.215 **
Female	0.181			0.191 +			-0.148			0.222		
MIT student	-0.090	-0.165	0.051	-0.231	-0.412 +	-0.052	0.242	0.330	0.149	-0.691 *	-1.185 **	-0.242
Olin student	-0.014	0.064	-0.133	0.029	-0.030	-0.011	-0.926 **	-1.414 **	-0.512	-0.303	-0.829 +	0.146
Smith student	-0.221	-0.302		0.077	-0.070		-0.015	-0.089		-0.243	-0.685 +	
Hispanic or Latino	-0.281	-0.540 +	0.039	0.040	0.035	0.129	-0.141	-0.025	-0.355	-0.569	-0.658	-0.329
Black or African American	0.626	0.544		-0.241	-0.439	0.392	-0.207	-0.209		0.069	-0.165	1.388
Asian or Asian-American	0.054	0.013	0.049	0.228 +	0.171	0.242	0.064	0.145	-0.147	0.739 **	0.875 **	0.427
R Was born in US	0.139	0.068	0.293	0.077	0.128	0.021	0.272	0.439	-0.029	0.328	0.459	0.124
Family Income	0.000	0.000 +	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Lesbian, Gay, or Bisexual	0.132	0.419 +	-0.476	-0.342 *	-0.345 *	-0.443	-0.594 +	-0.254	-1.618 *	-0.156	0.015	-0.417
Political Conservatism	-0.014	0.026	-0.089	-0.051	-0.021	-0.082	-0.100	-0.021	-0.185	-0.063	-0.049	-0.025
Religiosity	0.028	0.085	-0.028	0.041	0.075	-0.009	0.168 *	0.163 +	0.186	0.092	0.120	0.060
r2	-0.006	0.024	-0.037	.023 +	0.025	-0.043	.038 **	.052 *	0.015	.019 +	.042 *	0.062

Table A1.2: Gender Category Beliefs Predicted by Demographic Variables

	Y2 SmSex Coop			Y5 SmSex Coop			Y2 SmSex Social			Y5 Sm Sex Social		
	ALL	Women	Men	ALL	Women	Men	ALL	Women	Men	ALL	Women	Men
(Constant)	4.7206 ***	5.2723 ***	5.20433 ***	3.55944 ***	4.9435 ***	2.5638 **	4.88276 ***	5.9952 ***	4.6897 ***	4.93339 ***	5.8486 ***	5.47131 ***
Female	0.7894 ***			0.93461 ***			0.98152 ***			1.00904 ***		
MIT student	0.2705	0.0304	0.4419	0.06433	0.5982 +	-0.2718	-0.2174	-0.359	-0.0728 *	0.1208	0.1461	0.10627
Olin student	0.3599	0.2345	0.41194	-0.3671	-0.0797	-0.5474 +	0.39468 +	-0.094	0.7774	0.06034	0.1592	0.03612
Smith student	-0.611 *	-0.719 *		0.01024	0.4312		-0.5446 ***	-0.722 **		-0.247	-0.243	
Hispanic or Latino	-0.6658 *	-0.446	-1.0201 *	-0.0508	-0.4987	0.5988	-0.2074	-0.195	-0.1795	0.02667	-0.039	0.03603
Black or African American	0.5557	0.783 +	-0.4429	-0.4257	-0.3517	-0.7823	0.45698	0.5463 +	-0.0129	-0.0087	0.2074	-1.05083
Asian or Asian-American	-0.3258 +	-0.216	-0.4177	-0.1608	0.0022	-0.4102	0.05948	-0.065	0.2226	-0.1526	-0.161	-0.07914
R Was born in US	-0.0175	-0.076	0.08353	-0.2429	-0.3812	0.0629	0.35726 *	0.2124	0.6498 *	0.07578	0.2306	-0.26478
Family Income	6E-07	5E-07	1.3E-06	-8E-07	-5E-07	-1E-06	8.7E-08	6E-07	-9E-07	-6E-07	-3E-07	-2E-06
Lesbian, Gay, or Bisexual	0.2206	0.1778	0.29053	-0.1257	0.0314	-0.5038	0.04707	0.1903	-0.3308	-0.3599 *	-0.255	-0.71569 *
Political Conservatism	-0.0307	-0.019	-0.0627	-0.0119	0.0577	-0.1814 *	-0.0105	0.0556	-0.1166	-0.0011	0.0196	-0.05713
Religiosity	0.0753	0.0554	0.10296	0.05327	0.0052	0.1693 +	-0.0076	-0.036	0.0488	-0.0878 +	-0.106 +	-0.05797
r2	.077***	.044*	.053+	101***	.006	.075*	.122***	.042*	.041	.160***	.047*	-.017

	Y2 Sm Sex Less Systematic			Y5 Sm Sex Less Systematic			Y2 SmSex Less Logical			Y5 SmSex Less Logical		
	ALL	Women	Men	ALL	Women	Men	ALL	Women	Men	ALL	Women	Men
(Constant)	2.925 ***	2.4537 ***	3.38465 **	3.69623 ***	3.5903 ***	4.4532 ***	2.17447 ***	2.2963 **	2.505 *	4.162 ***	3.7188 ***	6.05932 ***
Female	0.1613			0.20067			0.54109 ***			0.73561 **		
MIT student	-0.1807	0.1393	-0.3937	0.06018	-0.0146	0.1229	-0.3424 +	-0.169 +	-0.4374	-0.017	0.0212	-0.22358
Olin student	-0.5582	-0.259	-0.7083 *	0.12446	0.0443	0.2965	-0.8969 ***	-0.608	-1.09 **	-0.3327	-0.528 *	-0.24101
Smith student	-0.1031 *	0.1431		-0.25	-0.3905		-0.2951	-0.184 *		-0.5436 *	-0.639 *	
Hispanic or Latino	0.4127	0.6088 *	0.31475	-0.0108	0.237	-0.443	0.6722 **	0.7587	0.6798	-0.4858 +	0.1263	-1.41993 **
Black or African American	0.0011	-0.101	0.66359	0.30162	0.225	0.5305	0.23936	0.074	1.0455	0.45626	0.1934	0.93768
Asian or Asian-American	0.1538	0.1266	0.13506	-0.2131	-0.4342 *	0.2098	0.29563 +	0.1728	0.4205	-0.2347	-0.594 **	0.49653 +
R Was born in US	-0.0736	-0.189	0.09187	-0.1192	-0.3452 +	0.1867	0.1112	0.1259	0.1013	-0.0998	-0.252	0.17959
Family Income	1E-06	3E-06 **	-2E-06	9.2E-07	2E-06 +	-9E-07	8.5E-07	2E-06 +	-1E-06	2.4E-06 **	2E-06 *	2.8E-06 +
Lesbian, Gay, or Bisexual	0.0692	0.0996	-0.1924	0.22112	0.2846	-0.1909	-0.2855	-0.187	-0.6352	0.10371	0.1073	-0.23688
Political Conservatism	-0.1151 *	-0.106 +	-0.1263	-0.0104	-0.0377	0.0317	-0.1042 *	-0.077	-0.1441	0.01947	0.0661	-0.0541
Religiosity	0.0395	0.0095	0.07418	-0.084	-0.0431	-0.1753 +	0.04984	0.0358	0.0665	-0.03	0.0127	-0.11746
r2	.029*	.044*	.004	.001	.031+	-.041	.090***	.015	.067*	.096***	.078**	.072+

	Y2 SmSex Friendly			Y5 SmSex Friendly			Y5 SmSex People-Oriented			Y5 SmSex Feminine		
	ALL	Women	Men	ALL	Women	Men	ALL	Women	Men	ALL	Women	Men
(Constant)	4.011133 ***	4.8255 ***	3.87915 ***	4.51273 ***	4.9158 ***	4.8596 ***	3.4967 ***	5.4344 ***	4.2544 ***	1.8687 ***	4.4755 ***	2.38371 ***
Female	0.6027 ***	**		0.51418 ***			2.06058 ***			3.13896 ***		
MIT student	0.288 +	0.6273 ***	0.03414	0.35789 *	0.4974 *	0.2155	0.09938	0.0864	0.0575	0.1507	0.2724	0.01842
Olin student	1.1279 ***	1.311 +	0.94731 **	0.15616	0.1822	0.1092	0.08052	0.1549	-0.0155	0.19764	0.0538	0.22318
Smith student	0.2308	0.41		0.12215	0.2133		-0.1838	-0.213		-0.1386	-0.034	
Hispanic or Latino	0.0317	-0.177	0.13684	-0.0077	-0.0723	-0.0092	-0.1097	-0.249	-0.0773	0.14435	0.3976 +	-0.09236
Black or African American	0.3703	0.2871	0.22869	0.03847	0.2249	-0.8592	0.37581	0.5528	-0.6953	0.38943 +	0.3672	0.11444
Asian or Asian-American	-0.0451	-3E-04	-0.1968	-0.0497	-0.0056	-0.0623	0.18892	0.2187	0.22	-0.0313	-0.209	0.1654
R Was born in US	0.114	-0.031	0.31131	-0.0511	0.0186	-0.142	0.12107	0.4857 *	-0.5106 +	0.18627	0.1328	0.21401
Family Income	2E-07	-1E-06	2.1E-06	-2E-06 *	-2E-06 *	-1E-06	3.4E-07	-1E-07	3E-07	-5E-07	-6E-08	-8.3E-07
Lesbian, Gay, or Bisexual	0.0418	0.3516	-0.8286 +	-0.0495	0.0285	-0.2587	-0.0893	0.0137	-0.3417	-0.1455	-0.392 **	0.36108
Political Conservatism	0.0352	0.0386	0.02431	0.04581	0.0847 +	-0.0354	0.07775 +	0.1096 *	0.0164	0.04554	0.0815 *	-0.00753
Religiosity	-0.0186	0.0527	-0.0732	-0.0004	-0.0057	0.0131	-0.0867 +	-0.074	-0.1006	0.00964	-0.007	0.03223
r2	.104***	.062*	.127**	.050*	.021	-.068	.458***	.046*	.002	.797***	.113***	-.007

	Y2 SmSex Emotional			Y5 SmSex Emotional		
	ALL	Women	Men	ALL	Women	Men
(Constant)	2.459 ***	5.2319 ***	2.39926 ***	2.79656 ***	5.8628 ***	1.2463
Female	2.6435 ***			2.13189 ***		
MIT student	-0.0116	-0.286	0.20245	0.0229	-0.0439	0.1912
Olin student	0.146	-0.504 +	0.62611 *	-0.1116	-0.376	0.1304
Smith student	0.0199	-0.266		-0.3174 +	-0.3457	
Hispanic or Latino	0.2271	0.2258	0.24729	0.19159	-0.0928	0.6797 +
Black or African American	0.2495	0.2938	0.04646	-0.071	0.1085	-0.5571
Asian or Asian-American	0.1091	0.0321	0.21936	0.00961	-0.0673	-0.0165
R Was born in US	0.1799	0.2365	0.1576	0.1104	-0.0808	0.3892
Family Income	2E-07	3E-07	-5E-08	-2E-07	5E-07	-1E-06
Lesbian, Gay, or Bisexual	-0.252	-0.138	-0.5152	-0.0498	-0.2152	0.3774
Political Conservatism	0.0111	0.0846 +	-0.089	0.06979 +	0.0445	0.0998
Religiosity	-0.0265	-0.06	0.02798	0.01472	-0.0286	0.0941
r2	.603***	-.003	.015	.512***	.013	.036

Table A1.3: Traditional Gender Role Beliefs and Gender Essentialist beliefs Predicted by Demographic Variables

Gender Role Beliefs	Y2 Wifename			Y5 Wifename			Y2 Marry			Y5 Marry		
	ALL	Women	Men	ALL	Women	Men	ALL	Women	Men	ALL	Women	Men
(Constant)	-3.737 ***	-4.255 ***	-3.751 ***	-4.288 ***	-4.384 ***	-4.773 ***	-3.806 ***	-3.708 ***	-4.265 ***	-4.592 ***	-5.115 ***	-4.275 ***
Female	-0.432 ***			-0.555 ***			-0.181			-0.225 *		
MIT student	-0.063	-0.227	0.108	-0.279	-0.745 **	0.141	-0.086	-0.121	-0.089	0.151	0.072	0.148
Olin student	-0.379 +	-0.277	-0.480 +	-0.471 *	-0.950 **	-0.108	-0.829 ***	-0.810 **	-0.864 **	-0.266	-0.204	-0.377
Smith student	-0.245	-0.240		-0.553 **	-0.915 ***		-0.384 *	-0.384 *		-0.091	-0.124	
Hispanic or Latino	0.039	0.054	0.121	0.128	0.017	0.380	-0.011	-0.183	0.250	0.130	0.333 *	-0.086
Black or African American	0.209	0.461	-0.460 *	0.890 **	1.218 ***	-0.322	0.168	0.105	0.565	0.237	0.336	-0.105
Asian or Asian-American	-0.052	0.241	-0.458	-0.179	-0.135	-0.225	0.190	0.376 *	-0.074	0.308 *	0.336	0.327
R Was born in US	0.069	0.077	0.073	0.021	0.163	-0.204	-0.125	0.054	-0.334	-0.272	-0.204	-0.357
Family Income	0.000 *	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Lesbian, Gay, or Bisexual	-0.561 **	-0.596 **	-0.520	-0.559 **	-0.517 **	-0.634 +	-0.284	-0.241	-0.459	-0.327 *	-0.287 +	-0.403
Political Conservatism	0.234 ***	0.248 ***	0.199 **	0.218 ***	0.260 ***	0.132	-0.009	-0.009	-0.007	0.023	0.048	-0.029
Religiosity	0.165 ***	0.147 **	0.181 *	0.141 **	0.095 +	0.230 *	0.103 *	0.066	0.166 *	0.072 +	0.019	0.159 *
r2	.212***	.178**	.150***	.288***	.335***	.072+	.097***	.072**	.078*	.118***	.092**	.090*

Gender Role Beliefs	Y2 Stand in Way			Y5 Stand in Way			Y2 Not Feminist			Y5 Not Feminist		
	ALL	Women	Men	ALL	Women	Men	ALL	Women	Men	ALL	Women	Men
(Constant)	-4.685 ***	-4.539 ***	-5.277 ***	-4.726 ***	-5.251 ***	-4.011 ***	-2.929 ***	-3.223 ***	-2.749 **	-2.781 ***	-3.564 ***	-2.184 *
Female	-0.362 **			-0.342 **			-0.350 **	**		-0.487 **	**	
MIT student	0.206	0.003	0.346	0.122	0.204	-0.021	-0.447 **	-0.665 +	-0.219	-0.486 *	-0.693 +	-0.295
Olin student	-0.141	-0.307	-0.033	-0.179	-0.347	0.060	-0.310	-0.494 ***	-0.105	-0.436 +	-0.621 ***	-0.171
Smith student	-0.181	-0.333		-0.190	-0.189		-1.008 ***	-1.137 +		-1.216 ***	-1.387	
Hispanic or Latino	0.276	0.086	0.512	0.166	0.294	-0.227	0.135	0.103	0.171	0.141	0.342	-0.089
Black or African American	0.190	0.217	0.291	0.149	0.395	-0.823	0.339	0.615	-0.591	0.315	0.422	0.024
Asian or Asian-American	-0.033	0.112	-0.236	-0.007	-0.004	0.038	0.009	0.132	-0.182	0.050	0.060	-0.0178
R Was born in US	0.017	0.132	-0.110	-0.123	-0.147	-0.185	0.028	0.062	-0.092	-0.359 *	-0.298	-0.595 +
Family Income	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000 +	0.000	0.000	0.000 +
Lesbian, Gay, or Bisexual	-0.191	-0.088	-0.525	-0.091	-0.013	-0.437	-0.437 *	-0.493 *	-0.329	-0.409 *	-0.412 *	-0.513
Political Conservatism	0.018	0.009	0.033	0.049	0.023	0.106	0.199 ***	0.180 ***	0.233 **	0.183 ***	0.168 **	0.224 *
Religiosity	0.210 ***	0.189 ***	0.249 ***	0.192 ***	0.176 ***	0.207 *	0.042	0.064	-0.026	0.062	0.047	0.070
r2	.109***	.059*	.069*	.117***	.098*	.056+	.231***	.201***	.047*	.301***	.261***	.083*

Essentialism	Y2 SomeJobs			Y5 SomeJobs			Y5 ActDifferently			Y5 Naturally Talented, Different Things			Y5 Separate but Equal		
	ALL	Women	Men	ALL	Women	Men	ALL	Women	Men	ALL	Women	Men	ALL	Women	Men
(Constant)	-2.646 ***	-3.281 ***	-2.319 **	-3.569 ***	-5.057 ***	-2.031 +	-4.310 ***	-4.594 ***	-3.375 **	-3.626 ***	-3.749 ***	-3.711 **	-2.368 ***	-2.662 *	-2.416 **
Female	-0.536 ***			-0.571 ***			-0.035			-0.177			-0.163		
MIT student	-0.080	-0.287	0.055	0.115	-0.217	0.331	0.140	0.035	0.165	-0.015	-0.142	0.155	0.024	-0.219	0.293
Olin student	-0.358	-0.430	-0.279	0.433 +	-0.876 *	-0.196	0.132	0.142	0.175	0.058	-0.064	0.221	-0.153	-0.523	0.089
Smith student	-0.403 *	-0.496 *		-0.501 *	-0.754 **		0.241	0.110		-0.510 *	-0.574 *		-0.220	-0.362	
Hispanic or Latino	-0.217	-0.054	-0.484	0.316	0.622 +	-0.077	0.092	0.209	-0.219	-0.045	-0.056	0.046	0.120	0.213	0.160
Black or African American	-0.216	-0.005	-0.722	-0.187	-0.019	-1.239	-0.092	0.164	-1.247	-0.489	-0.256	-1.253	-0.530	-0.245	-1.649 *
Asian or Asian-American	0.229	0.382 +	0.036	0.162	0.371	-0.132	0.055	-0.005	0.295	0.392 *	0.529 *	0.128	-0.035	0.159	-0.376
R Was born in US	-0.126	-0.114	-0.184	-0.267	0.021	-0.738 *	-0.343 +	-0.217	-0.615 +	-0.202	-0.166	-0.335	-0.255	-0.304	-0.151
Family Income	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Lesbian, Gay, or Bisexual	-0.137	-0.184	-0.183	-0.498 **	-0.500 *	-0.397	0.030	0.202	-0.552	-0.218	-0.219	-0.190	-0.596 **	-0.631 **	-0.406
Political Conservatism	0.281 ***	0.244 ***	0.341 ***	0.238 ***	0.309 ***	0.153	0.114 *	0.125 *	0.075	0.187 **	0.188 **	0.186 +	0.122 *	0.172 **	0.035
Religiosity	0.024	-0.009	0.052	-0.032	0.024	-0.129	0.126 *	0.105	0.153	0.010	-0.017	0.051	0.018	0.009	0.037
r2	.204***	.097***	.176***	.230***	.246***		.022+	-.003	.054+	.137***	.138***	.001	.084***	.098***	-.007

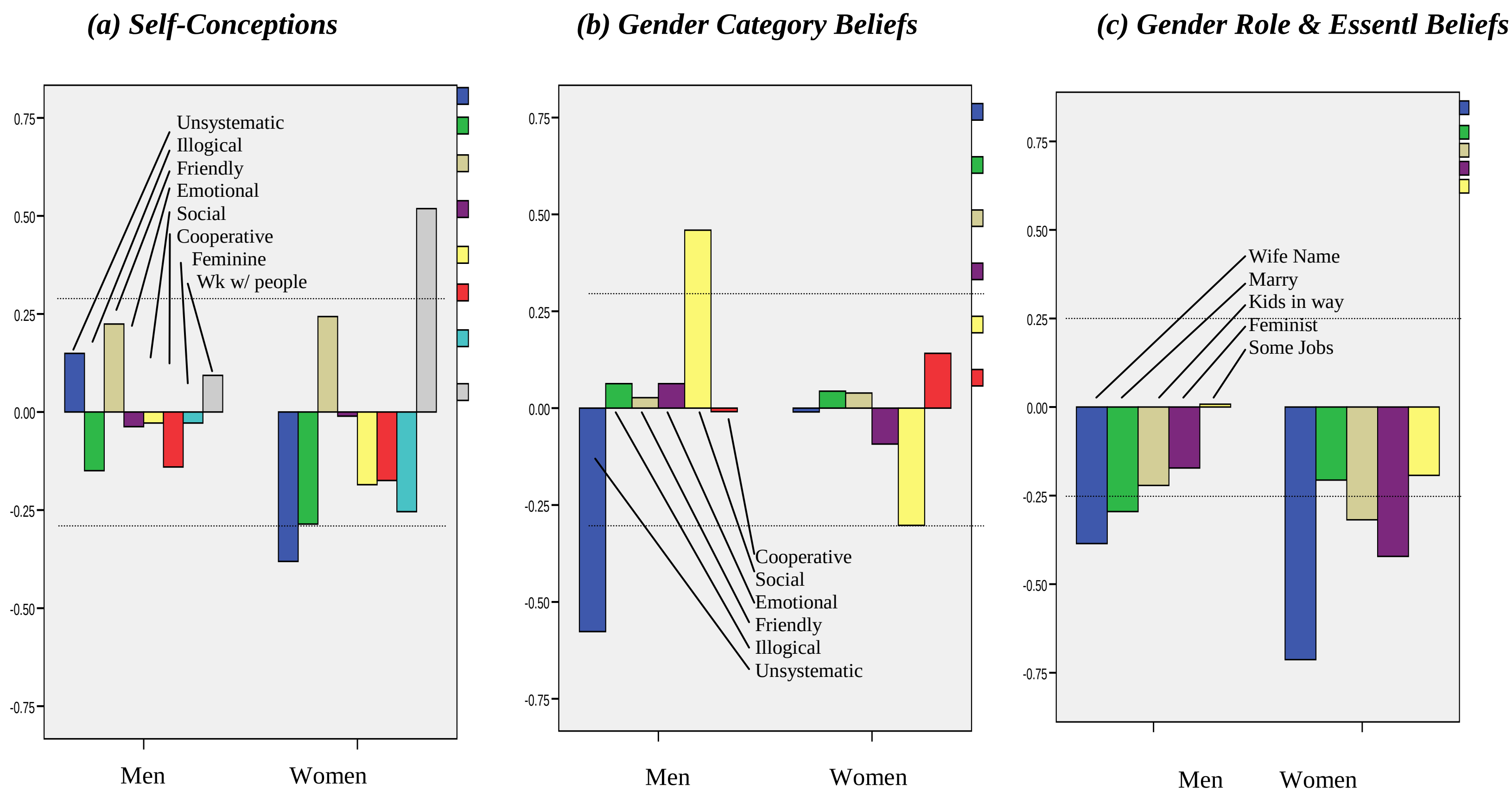

Figure A1.1 Self-Conceptions and Gender Schemas Change Scores

The Self-Expressive Edge of Sex-Segregation: The Role of Gender Schemas and Self-Conceptions in College Major Selection and Career Launch

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Appendix 2: Calculation and Demographic Variation in College Sex Segregation Scores

This appendix provides information on the process I used to calculate the percent women in respondents' degrees (the degree sex segregation score), provides the distribution of the sample across academic measures over time, and the demographic measures that predict individual majors.

Calculation of Percent Women in Respondents' Degrees

The analysis used in chapter 3 and the regressions in the sections below use measures of the percent women in students' year 1 majors, the percent women in their degree field, and the difference (or change) in percent women between students' initial majors and the fields in which they earn their degrees. The primary source of this information was students' transcripts. In the year 5 survey, the FuturePaths team asked respondents' permission to have access to their college transcripts. The registrar at each institution sent the FuturePaths team the transcripts for those student who granted permission. I took students' major and degree information directly from their transcripts. For those who did not grant access to their transcripts (22.1% of the year 5 respondents), I relied on the year 5 question that asked students to name the degree they graduated with. For respondents who did not take the year 5 survey, but did take the year 4 survey (108 respondents), I took their degrees in year 4 as a proxy for the degree they earned. I ran supplemental analyses with a dichotomous indicator of whether year 4 data was used for the degree they earned, and this indicator was never significant. I also found no significant differences between the analyses that used transcript data only and those that used the combined measure.

Many students majored in more than one field or earned more than one undergraduate degree. I do not know which major or degree students think is their "primary" field, nor would it be legitimate to guess at such a distinction in each student's case. For example, a graduate with an industrial engineering degree and a psychology degree is differently qualified than a student with just an industrial engineering degree: he or she shows different interests and has a wider range of career or graduate students available to him or her. It is important to capture students' complete educational portfolio when calculating the percent women measures. Thus, I created a percent women value for each of students' majors and degrees and averaged these values. These averaged values, in turn, populate the percent women in students' majors and degrees in the analyses in chapters 3 and 4. I also ran key analyses with only those with a single major and found no difference in the results.

For the percent women in respondents' year 1 majors and degree fields, I matched the most detailed majors information available in the data (e.g. "ocean engineering" or "molecular biology") with national data on the percent women among graduates in those majors. In most cases, the national data were taken from the National Science Foundation's Division of Science Resource Statistics[70] or the U.S. Department of Education Institute for Education Sciences' National Education Data Resource Center.[71] I matched the statistics on these sites as closely as possible to the specific major or degree for each respondent. Occasionally, I could not located national-level data on certain field (e.g. Classics). In those cases, I used the percent women in the broad category of major (i.e. Humanities for the classics major; general engineering for nuclear engineering).

[70] http://www.nsf.gov/statistics/
[71] http://nces.ed.gov/quicktables/

To calculate the change in percent women from respondents' year 1 major to the field in which they earned their degree, I simply subtracted the latter from the former. Students who did not change majors had a percent women change score of zero.

Demographics of Men and Women Predicting Year 1 Major Selection, College Degree, and Changing Majors

In order to understand which of the demographic factors predict students' choice of majors and the degree the eventually earn, I present pooled OLS regression models predicting the percent women in students' majors and degrees, and their likelihood of choosing individual majors, with the following demographic variables: gender (women=1), school (UMass as comparison category), race/ethnicity (white as comparison category), nativity (respondents born in the US=1), family income, sexual identity (LGB=1), political conservatism (1 =very liberal to 7=very conservative), and religiosity (1=bottom 10% of peers; 5=top 10% of peers).

Table A2.1 predicts the percent women in respondents' major in year 1 with the descriptives listed above, ran pooled and separately by gender. Students at Olin and MIT are more likely to have male-dominated majors than UMass students, and Smith students are more likely than UMass students to be enrolled in female-dominated majors at year 1. As expected, women are more likely than men to be enrolled in a female-dominated major. Running the models separately for men and women, I find that, among men, those who are more religious are more likely to be enrolled in a male-dominated field than those who are less religious.

Table A2.2 presents the regression models used to predict the degrees that respondents earn at the end of their college career with demographic measures. Again, Olin and MIT graduates are more likely than UMass graduates to have a male-dominated degree. The percent women in the fields in which Smith and UMass graduates earn their degree are not significantly different. Women are more likely than men to graduate with a female-dominated degree.

Finally, Table A2.3 predicts the change in percent women between respondents' year 1 majors and the degrees they eventually earn. Interestingly, women are not more likely than men to change into more female-dominated degrees. Smith and Olin students, however, were more likely than UMass students to move into a more male-dominated field between their freshman and senior years. No other demographic measures predict whether students move into more male- or female-dominated majors over time.

Distribution of Sample across Academic Majors over Time

Table A2.4 through A2.9 present the percent of the sample in each academic major category in year 1, year 2, year 3, and the degree they eventually earn. Since Olin students are all engineers, I present these frequencies separately with and without Olin students. A2.4 and A2.5 includes both men and women, A2.6-7 presents the frequencies for men only, and A2.8-9 presents them for women only. The sample sizes are relatively small because I included only those people who took all four years of surveys.

Given the engineering and science emphases of two of the schools, it is not surprising that engineering is the largest group in the sample. (I use this to my advantage in the intra-occupation analysis in chapter 5.) As expected, men are more represented in engineering, physical sciences, and technical fields than women, while women are more represented in humanities, education and social sciences than men. Women are quite well represented in the biological sciences.

Demographic Measures Predicting Likelihood of Choosing Individual Degree Fields

Table A2.10 presents logit models predicting the likelihood of choosing individual majors with gender, race/ethnicity, institution and other demographic variables. Corresponding with the individual majors analyzed in chapter 3, I predict the likelihood of choosing two female-dominated majors (humanities and social sciences), two gender-balanced majors (business and biology) and two male-dominated majors (physical sciences and engineering).

The first set of models in table A2.10 predicts whether students graduate with a humanities degree (vs. any other type of major). Students from Smith are more likely to have a humanities degree than UMass students. Those with high verbal SAT scores, low math SAT scores, and high GPAs also are more likely to graduate with a degree in Humanities. The GPA measure is an important control, but the causal direction is potentially misleading: a “good” GPA depends on the degree field in which it was earned. What is considered an excellent GPA in Humanities and the social sciences is often much higher than what is considered excellent in the sciences, largely assumed to be due to grade inflation. Thus, it is likely that those who are in humanities have higher GPAs because the grading norms are shifted higher than in the sciences. Because of this ambiguous causality, I do not include GPA in the structural equation models.

Among women, those who attend Smith, and those with high verbal SAT scores are more likely to earn a degree in humanities; women with high SAT math scores are more likely to choose other majors in lieu of humanities. Men with high verbal SAT scores are more likely to choose humanities degrees than other fields. The second set of models predicts the likelihood of choosing a social science major. Among women, those who attend MIT and who perceive themselves as highly religious are less likely to earn a degree in the social sciences; women who identify as lesbian or bisexual are marginally more likely to choose a social science degree than other fields.

The next row of models in Table A2.10 predicts the likelihood of earning two gender-neutral degrees: business and biology. Men are less likely to select a business major than other fields of study, and MIT students are more likely to have non-business majors than UMass students. While biology is often considered part of the male-dominated STEM fields, and it is certainly a previously male-dominated field, women have reached gender parity with men in most subfields of biology in the last ten years. Those with high SAT math scores are more likely to choose a field outside of biology, and biology degrees are correlated with lower GPAs than other majors.

The male-dominated fields of physics and engineering are represented in Table A2.10 Students with high verbal SAT scores are likely to choose fields other than physics, and graduating with a degree in physics corresponds to a higher-than-average GPA. African-American women are more likely than non-Hispanic white women to graduate with a degree in physics. It may seem surprising that gender is not a significant predictor of choosing physics or engineering degrees. However, these models predict the likelihood of choosing these fields in lieu of other fields that have both more and less women than that particular field.

Table A2.1: Basic Descriptives Predicting Percent Women in Year 1 Major

	ALL		WOMEN		MEN	
(Constant)	0.368	***	0.506	***	0.395	**
Women	0.099	***				
MIT	-0.106	***	-0.188	***	-0.027	**
Olin	-0.223	***	-0.325	***	-0.131	
Smith	0.092	**	0.020			
Hispanic or Latino	-0.018		-0.018		-0.023	
Black or African American	-0.076		-0.070		-0.113	
Asian or Asian-American	0.030		0.009		0.047	
Born in US	0.002		0.009		-0.027	
Family income	0.000		0.000	+	0.000	
LGB	-0.001		-0.022		0.041	
Conservatism	0.000		-0.007		0.018	
Religiosity	0.001		0.014		-0.025	*

Table A2.2: Basic Descriptives Predicting Percent Women in College Degrees

	ALL		WOMEN		MEN	
(Constant)	0.461	***	0.556	***	0.460	**
Women	0.071	**				
MIT	-0.128	***	-0.183	***	-0.068	***
Olin	-0.295	***	-0.375	***	-0.222	
Smith	0.023		-0.023			
Hispanic or Latino	-0.033	+	-0.034		-0.019	
Black or African American	-0.092		-0.074		-0.174	
Asian or Asian-American	0.010		-0.003		0.013	
Born in US	0.002		0.014		-0.040	
Family income	0.000		0.000	+	0.000	
LGB	0.040		0.017		0.089	+
Conservatism	0.002		0.002		0.008	
Religiosity	-0.007		-0.004		-0.014	

Table A2.3: Basic Descriptives Predicting CHANGE IN Percent women, Year 1 Major to Degree

	ALL		WOMEN		MEN	
(Constant)	0.089		0.044		0.067	
Women	-0.025					
MIT	-0.022		0.005		-0.046	
Olin	-0.070	*	-0.051		-0.095	*
Smith	-0.066	*	-0.039			
Hispanic or Latino	-0.017		-0.015		-0.001	
Black or African American	-0.016		-0.007		-0.053	
Asian or Asian-American	-0.020		-0.013		-0.031	
Born in US	0.004		0.006		0.004	
Family income	0.000		0.000		0.000	
LGB	0.040	+	0.036		0.048	
Conservatism	0.003		0.009		-0.012	
Religiosity	-0.008		-0.018	*	0.010	

Table A2.4: Year 1 through 4 Majors, Only People Who Took All Four Years (with Olin)

	Year 1		Year 2		Year 3		BS Major (Y5)	
	Freq	Valid %	Freq	Valid %	Freq	Valid %	Freq	Valid %
1 Arts and Humanities	37	12.46	33	12.13	26	8.90	29	10.14
2 Biological Science	39	13.13	36	13.24	37	12.67	35	12.24
3 Business	12	4.04	13	4.78	18	6.16	18	6.29
4 Education	4	1.35	2	0.74	2	0.68	1	0.35
5 Engineering	126	42.42	119	43.75	122	41.78	118	41.26
6 Physical Science	41	13.80	28	10.29	46	15.75	46	16.08
7 Professional	1	0.34	1	0.37	3	1.03	1	0.35
8 Social Science	23	7.74	24	8.82	27	9.25	30	10.49
9 Technical	6	2.02	5	1.84	3	1.03	1	0.35
10 Other Fields	8	2.69	11	4.04	8	2.74	7	2.45
TOTAL	297	100.00	272	100.00	292	100.00	286	100.00

Table A2.5: Year 1 through 4 Majors, Only People Who Took All Four Years (without Olin)

	Year 1		Year 2		Year 3		BS Major (Y5)	
	Freq	Valid %	Freq	Valid %	Freq	Valid %	Freq	Valid %
1 Arts and Humanities	37	14.5	33	14.3	26	10.4	29	11.9
2 Biological Science	39	15.3	36	15.7	37	14.8	35	14.3
3 Business	12	4.7	13	5.7	18	7.2	18	7.4
4 Education	4	1.6	2	.9	2	.8	1	.4
5 Engineering	85	33.3	78	33.9	80	32.0	76	31.1
6 Physical Science	41	16.1	28	12.2	46	18.4	46	18.9
7 Professional	1	.4	1	.4	3	1.2	1	.4
8 Social Science	23	9.0	24	10.4	27	10.8	30	12.3
9 Technical	5	2.0	4	1.7	3	1.2	1	.4
10 Other Fields	8	3.1	11	4.8	8	3.2	7	2.9
TOTAL	255	100.00	255	100.00	255	100.00	286	100.00

Table A2.6: Year 1 through 4 Majors, Only People Who Took All Four Years (with Olin)—MEN only

	Year 1		Year 2		Year 3		BS Major (Y5)	
	Freq	Valid %	Freq	Valid %	Freq	Valid %	Freq	Valid %
1 Arts and Humanities	0	0.00	1	1.04	1	0.99	1	1.01
2 Biological Science	8	7.69	12	12.50	9	8.91	8	8.08
3 Business	5	4.81	8	8.33	10	9.90	10	10.10
4 Education	0	0.00	0	0.00	0	0.00	0	0.00
5 Engineering	61	58.65	57	59.38	58	57.43	55	55.56
6 Physical Science	16	15.38	9	9.38	19	18.81	19	19.19
7 Professional	1	0.96	0	0.00	0	0.00	0	0.00
8 Social Science	5	4.81	2	2.08	2	1.98	3	3.03
9 Technical	4	3.85	4	4.17	1	0.99	0	0.00
10 Other Fields	4	3.85	3	3.13	1	0.99	3	3.03
TOTAL	104	100.00	96	100.00	101	100.00	99	100.00

Table A2. 7: Year 1 through 4 Majors, Only People Who Took All Four Years (without Olin)—MEN only

	Year 1		Year 2		Year 3		BS Major (Y5)	
	Freq	Valid %	Freq	Valid %	Freq	Valid %	Freq	Valid %
1 Arts and Humanities	0	0.00	1	1.40	1	1.30	1	1.30
2 Biological Science	8	9.80	12	16.20	9	114.00	8	10.40
3 Business	5	6.40	8	10.80	10	12.70	10	13.00
4 Education	0	0.00	0	0.00	0	0.00	0	0.00
5 Engineering	40	48.80	36	48.60	36	45.60	33	42.90
6 Physical Science	16	19.50	9	12.20	19	24.10	19	24.70
7 Professional	1	1.20	0	0.00	0	0.00	0	0.00
8 Social Science	5	6.10	2	2.70	2	2.50	3	3.90
9 Technical	3	3.70	3	4.10	1	1.30	0	0.00
10 Other Fields	4	4.90	3	4.10	1	1.30	3	3.90
TOTAL	82	100.00	74	100.00	79	100.00	82	100.00

Table A2.8: Year 1 through 4 Majors, Only People Who Took All Four Years (with Olin)—WOMEN only

	Year 1		Year 2		Year 3		BS Major (Y5)	
	Freq	Valid %	Freq	Valid %	Freq	Valid %	Freq	Valid %
1 Arts and Humanities	37	19.17	32	18.18	25	13.09	28	14.97
2 Biological Science	31	16.06	24	13.64	28	14.66	27	14.44
3 Business	7	3.63	5	2.84	8	4.19	8	4.28
4 Education	4	2.07	2	1.14	2	1.05	1	0.53
5 Engineering	65	33.68	62	35.23	64	33.51	63	33.69
6 Physical Science	25	12.95	19	10.80	27	14.14	27	14.44
7 Professional	0	0.00	1	0.57	3	1.57	1	0.53
8 Social Science	18	9.33	22	12.50	25	13.09	27	14.44
9 Technical	2	1.04	1	0.57	2	1.05	1	0.53
10 Other Fields	4	2.07	8	4.55	7	3.66	4	2.14
TOTAL	193	100.00	176	100.00	191	100.00	187	100.00

Table A2.9: Year 1 through 4 Majors, Only People Who Took All Four Years (without Olin)—WOMEN only

	Year 1		Year 2		Year 3		BS Major (Y5)	
	Freq	Valid %	Freq	Valid %	Freq	Valid %	Freq	Valid %
1 Arts and Humanities	37	21.39	32	20.5	25	14.6	28	16.8
2 Biological Science	31	17.92	24	15.4	28	16.4	27	16.2
3 Business	7	4.05	5	3.2	8	4.7	8	4.8
4 Education	4	2.31	2	1.3	2	1.2	1	0.60
5 Engineering	45	26.01	42	26.9	44	25.7	43	25.7
6 Physical Science	25	14.45	19	12.2	27	15.8	27	16.2
7 Professional	0	0.00	1	.6	3	1.8	1	.6
8 Social Science	18	10.40	22	14.1	25	14.6	27	16.2
9 Technical	2	1.16	1	.6	2	1.2	1	.6
10 Other Fields	4	2.31	8	5.1	7	4.1	4	2.4
TOTAL	193	100.00	176	100.00	191	100.00	187	100.00

Table A2.10: Individual Majors Predicted by Demographics

FEMALE-DOMINATED	HUMANITIES						SOCIAL SCIENCES					
	All		WOMEN		MEN		All		WOMEN		MEN	
	Unst. Coeff	Sig	Unst. Coeff	Sig	Unst. Coeff	Sig	Unst. Coeff	Sig	Unst. Coeff	Sig	Unst. Coeff	Sig
Constant	.101		-0.104		-.358		.480	+	.558		.471	
Gender (1=women)	-.006						.086					
MIT Student	.317		.002		-.113		-.186	*	-.274	*	-.092	
Smith Student	-.127	***	.338	**			-.078		-.151			
Hispanic or Latino/a			-.248		.036		-.019		.052		-.024	
Black or African-American	.083		.148		-.008		-.016		.013		.008	
Asian or Asian-American	.065		.015		.075		.048		.114		-.010	
Born in the US	.034		.045		.018		-.042		-.009		-.046	
Family Income	.000		.000		.000		.000		.000		.000	
Lesbian, Gay or Bisexual	.092		-.003		.431		.102		.147	+	-.011	
Political Conservatism	-.007		.000		-.019		.013		.018		.005	
Religiosity	-.002		.003		-.017		-.051	*	-.056	*	-.038	
SAT Verbal	.001	**	.001	*	.001	*	.000		.000		.000	
SAT Math	-.001	***	-.002	**	.000		.000		-.001		.000	
GPA	.128	*	.239	**	-.029		.008		-.037		.025	
R-squared	0.356	***	0.329	***	0.473	***	0.097	**	0.082	*	0.03	

GENDER-NEUTRAL	BUSINESS						BIOLOGY					
	All		WOMEN		MEN		All		WOMEN		MEN	
	Unst. Coeff	Sig	Unst. Coeff	Sig	Unst. Coeff	Sig	Unst. Coeff	Sig	Unst. Coeff	Sig	Unst. Coeff	Sig
Constant	.091		0.242		-.242		.993	**	.831	+	1.252	*
Gender (1=women)	-.125	*					.060					
MIT Student	-.155	+	-.162		-.192		.097		.140		.092	
Smith Student	-.104		-.106				-.075		-.018			
Hispanic or Latino/a	.054		.031		.111		.028		-.052		.045	
Black or African-American	-.047		-.062		.082		-.250		-.296		-.215	
Asian or Asian-American	.064		.078		-.006		-.028		-.075		.004	
Born in the US	.018		.013		-.027		-.103		-.102		-.131	
Family Income	.000		.000		.000		.000		.000		.000	
Lesbian, Gay or Bisexual	.046		.046		.122		-.061		-.100		-.016	
Political Conservatism	.017		.010		.037		.010		.011		-.003	
Religiosity	.004		-.001		.019		.025		.024		.030	
SAT Verbal	.000		.000		.001		.000		.000		.001	
SAT Math	.000		.000		.001		-.001	**	-.001		-.002	
GPA	-.113		-.078		-.216		-.132	*	-.105		-.064	
R-squared	0.024		0.04		0.1		0.038	+	0.02		0.048	

MALE-DOMINATED	PHYSICAL SCIENCES						ENGINEERING					
	All		WOMEN		MEN		All		WOMEN		MEN	
	Unst. Coeff	Sig	Unst. Coeff	Sig	Unst. Coeff	Sig	Unst. Coeff	Sig	Unst. Coeff	Sig	Unst. Coeff	Sig
Constant	-.280		-0.247		-.347		-.299		-.131		-.382	
Gender (1=women)	-.109	+					-.078					
MIT Student	.126		.166		.059		.198		.240		.141	
Smith Student	.074		.099				-.001		.013			
Hispanic or Latino/a	.033		.249		-.217		.057		.050		.106	
Black or African-American	.471	**	.603	***	-.437		-.030		-.190		.815	
Asian or Asian-American	-.096		-.116		-.033		.096		.093		.140	
Born in the US	-.070		-.086		-.089		.101		.084		.157	
Family Income	.000		.000		.000		.000		.000		.000	
Lesbian, Gay or Bisexual	.034		-.055		.319		-.052		-.013		-.091	
Political Conservatism	.018		.017		.010		-.022		-.029		.007	
Religiosity	.009		.003		.007		-.026		-.010		-.057	
SAT Verbal	-.001	**	-.001	*	-.001		.000		.000		-.001	
SAT Math	.001		.000		.001		.001	*	.001	*	.002	
GPA	.197	**	.101		.346	**	-.042		-.085		-.068	
R-squared	0.116	**	0.124	**	0.102		0.151	***	0.146	**	0.018	

Appendix 3: Proposed Outline of Book Manuscript Chapters

Chapter 1: Introduction

Chapter 2: Review of institutional, interactional, and individual-level factors reproducing occupational sex segregation

Chapter 3: Qualitative chapter exploring the self-expressive explanations respondents give for their college major selection and their plans for career launch.

Chapter 4: Co-construction of self-conceptions and gender schemas (same as current chapter 2)*

Chapter 5: College degree decisions (same as current chapter 3)

Chapter 6: Career launch decisions (same as current chapter 4)

Chapter 7: Case study of engineering students (same as current chapter 5)

Chapter 8: Conclusion

*Note: I plan to revise this co-construction chapter and submit as a stand-alone article in late summer or early fall 2011.

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