Going Against the Flow: A Longitudinal Study of the Effects of Cognitive Skills and Gender Beliefs on Occupational Aspirations and Outcomes

Chardie L. Baird

Occupational sex segregation persists in part due to cultural beliefs in the existence of gender differences in skills. This article explores potential resistance to the gender-typical aspirations and outcomes that re-create occupational sex segregation: cognitive skills in gender-atypical areas (i.e., math skills for women and verbal skills for men) and beliefs about women’s prioritization of family over paid work. Using the National Longitudinal Survey of Youth, 1979 cohort, I find that individuals with skills in areas considered gender atypical have less traditional occupational aspirations and outcomes than their otherwise-similar counterparts. This process varies by gender, however. The results reflect the differential valuation of math and verbal skills. I conclude that programs designed to encourage women to pursue gender-atypical occupations that align with their gender-atypical skills are focusing on the least resistant group.

KEY WORDS: aspirations and outcomes; cultural beliefs; gender; occupations; sex segregation; work.

INTRODUCTION

Occupational sex segregation persists despite changes in workplace practices (Reskin and Roos, 1990; Xie and Shauman, 2003) and evidence that many gender differences in cognitive skills are nonexistent (Hyde and Mertz, 2009). Regardless of evidence to the contrary, beliefs about gender differences in skills endure and recreate gender-typical occupation-relevant decisions (Correll, 2001, 2004; Ridgeway and Correll, 2004). This article explores opportunities to “go against the flow”: cognitive skills in gender-atypical areas (i.e., math skills for women and verbal skills for men as measured by test scores and grade point averages) and beliefs about women’s prioritization of family

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over paid work. Test scores and GPAs are not unbiased measures of skill, a point I return to in the measures section, but they are important sources of feedback for individuals as they pursue occupational pathways (Correll, 2001; Wiley, 1979).

Cognitive skills and gender beliefs in early life are important because they influence occupation-relevant decisions, such as course work and college majors, at a time when they are likely to have long-lasting consequences (Correll, 2001, 2004; England, 2010; Gerson, 2009). Directly, gender beliefs affect occupational aspirations and outcomes by influencing what jobs individuals consider viable options. Indirectly, gender beliefs affect occupational sex segregation by influencing how boys and girls filter the feedback they receive about their skills. This article is the first empirical examination of the effects of gender beliefs and cognitive skills on the sex segregation of occupational aspirations and outcomes using nationally representative longitudinal data. Prior research on this topic is either nationally representative, but examines the effect of skills on math coursework and college major (Correll, 2001), or uses a regional sample to examine the effects of skills and gender beliefs on occupational outcomes (Frome et al., 2006). I ask: (1) Do individuals who have skills in gender-atypical areas desire and enter gender-atypical occupations? and (2) Do individuals who believe women should prioritize family over paid work desire and enter gender-typical occupations?

I use the National Longitudinal Survey of Youth, 1979 cohort (NLSY79) because it is best suited to answer my research questions. It is the only nationally representative longitudinal data set with enough detailed information about occupational aspirations and outcomes to determine gender typicality. Although the National Education Longitudinal Study’s 1988 cohort has questions about individuals’ occupational aspirations, they are grouped into 14 categories that include gender-typical occupations for men and gender-typical occupations for women. For example, one category is “service worker,” which includes both janitors and hairstylists. The National Education Longitudinal Study 2002 cohort would be another option, but it will not have occupational outcome information for several years. While the NLSY79 is the best data set to answer my questions, it is not without limitations, a point I return to in the discussion section of this article.

EXPLANATIONS FOR OCCUPATIONAL SEX SEGREGATION

Cultural Beliefs About Gender and Skills

The cultural beliefs about gender (CBG) perspective maintains that occupational sex segregation persists because it is difficult to “go against the flow” of hegemonic cultural beliefs about gender and skills. In the United States, cultural beliefs about gender have a “horizontal” aspect involving a belief that women and men are naturally different, and a “hierarchical” aspect involving
a belief that men are more competent at the skills that are valued in society (Fiske et al., 2002; Ridgeway and Correll, 2004). In particular, women are often considered more nurturing and verbal while men are considered more rational and mathematical (Correll, 2001, 2004; Hyde and Mertz, 2009). These beliefs are not just held by individuals, they are “institutionalized in media representations, in the images of men and women implied by laws and government policies, and in a wide variety of taken-for granted organizational practices” (Ridgeway, 2009:150). Cultural beliefs about gender are so pervasive that even individuals who do not accept them are aware of the dominance of the beliefs and expect to be held accountable to them (Ridgeway, 2009, 2011; Ridgeway and Correll, 2004).

Expectations and accountability vary by context. In settings that are culturally typed as masculine, men receive a positive bias about their abilities. Women tend to receive a slight positive bias about their abilities in areas culturally typed as feminine (Ridgeway, 2009, 2011). Thus, it is much easier, even seemingly natural, for individuals to make occupation-relevant decisions that recreate occupational sex segregation. Women tend to enter occupations assumed to require verbal skills, such as elementary school teacher, and men tend to enter occupations assumed to require math skills, such as engineering.

The CBG perspective suggests two competing predictions about the effect of skills on occupation-relevant decisions. First, individuals tend to make occupational plans that align with cultural expectations about gender, regardless of their cognitive skills. Stated differently, cultural expectations provide “an insulating layer from the constant input of performance feedback common in school and work environments” (Correll, 2001:1701). In particular, since cultural expectations include the assumption that women have verbal skills, women, no matter what their verbal skills, may make gender-typical occupation-relevant decisions. Similarly, men’s math skills may not affect their occupational plans because they assume they are skilled at math as cultural expectations indicate (Correll, 2001; Hamilton, 1981). Even when individuals have skills in areas considered gender-atypical, they may discount those skills because they contradict cultural expectations. Thus, no matter what individuals’ cognitive skills may be, the general trend is to “go with the flow” and desire and enter gender-typical occupations.

Gender-Typical Cognitive Skills

H1: Women, regardless of their verbal skills, will desire and subsequently work in occupations with more women.

H2: Men, regardless of their math skills, will desire and subsequently work in occupations with more men.
Gender-Atypical Cognitive Skills

H3: Women, regardless of their math skills, will desire and subsequently work in occupations with more women.
H4: Men, regardless of their verbal skills, will desire and subsequently work in occupations with more men.

Alternatively, low cultural expectations for a group’s skills may lead members of that group to more closely attend to information about their skills than members of groups about which there are high cultural expectations (Correll, 2001). Since societal expectations for women’s mathematical competence are low, they may pay closer attention to math-relevant feedback than men (Correll, 2001). For men, this means information about verbal skills should be salient. The converse, for men, is also likely, however. Men may not pay attention to test scores and grades indicating verbal talent because verbal skills are devalued. Furthermore, they may assume that pursuing occupations that rely on their verbal skills may lead them to enter female-dominated occupations, which have little material rewards (for a review, see Reskin, 1993).

For occupational sex segregation, this means that individuals’ occupational plans, decisions, and outcomes should be influenced by their cognitive skills in areas considered gender-atypical. Gender-atypical skills are an opportunity to go against the flow of gender-typical occupational aspirations and outcomes. Are individuals who have cognitive skills in a gender-atypical area more likely to pursue careers in gender-atypical occupations than their counterparts who do not have those skills?

H5: Women with math skills will be more likely to desire to and subsequently work in occupations with more men compared to women with less math skill.
H6: Men with verbal skills will be more likely to desire to and subsequently work in occupations with more women compared to men with less verbal skill.

A focus on sex segregation between occupations masks sex segregation within occupations. Even though occupational sex segregation declined between 1983 and 2002, intraoccupational sex segregation increased (Queneau, 2010; Reskin and Roos, 1990). Jobs within previously male-dominated occupations were gender-typed and women who entered these occupations were steered into the jobs with less prestige and fewer material rewards (Boulis and Jacobs, 2008; Reskin and Roos, 1990). For example, more women entered medicine, but they were resegregated into subspecialties with less prestige and lower pay, such as pediatrics, gynecology, and family practice (AMA, 1994; Boulis and Jacobs, 2008). I cannot address this issue because the NLSY does not have information on jobs within occupations. Statistically significant results at the occupation level suggest that the effects of skills and gender
beliefs on aspirations and outcomes would be even more pronounced when examining jobs within occupations. I return to this point in the discussion section of this article.

Beliefs about gender may also be an impetus for entering gender-typical occupations. Women and men are not only expected to have different skills, they are expected to perform different jobs inside and outside the home. Since women are thought to be nurturing and emotional, they are also expected to excel at parenting, especially the parenting style that requires mothers’ constant availability to their children (Hays, 1996). While beliefs about the division of labor and its affect on children have become less traditional over time (Brewster and Padavic, 2000), the General Social Survey shows that in 2010, about one-quarter of individuals believed that it is better if men work outside the home and women care for the home and one-third of individuals believed that women working hurts children.

Are people with traditional beliefs about the desirability of women prioritizing family over paid work more likely to desire and end up in gender-typical occupations? Charles and Bradley (2009) find that “separate but equal” notions about which occupations are better suited to women than men are still prevalent. Women with traditional gender beliefs may be more likely to believe that women should work in different occupations than men. In addition, they may be more likely to enter gender-typical occupations because they believe those occupations to be more family-friendly than gender-atypical occupations (Eccles, 1994; Farmer, 1997). While research shows that male-dominated occupations are, on average, more flexible than female-dominated occupations (Glass, 1990; Glass and Camarigg, 1992), there is evidence that women believe that female-dominated occupations are more family-friendly (Farmer, 1997; Waite and Berryman, 1985). Men with traditional gender beliefs may be more likely to pursue male-dominated occupations because they do not want to work with women who they do not believe should be in the labor force. In addition, they may be less likely to need flexible work arrangements because they expect their wives to be responsible for family labor.

H7: Women with traditional beliefs about the desirability of women prioritizing family over paid work will desire and subsequently work in more occupations with more women compared to women with less traditional beliefs.

H8: Men with traditional beliefs about the desirability of women prioritizing family over paid work will desire and subsequently work in occupations with more men compared to men with less traditional beliefs.

Predictions for individuals with less traditional gender beliefs are less clear. On one hand, they may be willing to enter gender-atypical occupations because they are less tied to notions that women and men should be doing different work. In contrast, beliefs in “separate but equal” occupations for women and men could sit quite comfortably alongside less traditional beliefs.
about the desirability of women prioritizing family over paid work. Stated differently, believing that it is acceptable for women to prioritize paid work over family does not preclude believing that men are better suited for occupations that require math skills, for example, than are women.

Other Influences on the Gender-Typicality of Occupational Plans and Outcomes

I test the hypotheses controlling for early life and later life factors demonstrated by prior research to be important influences on young men’s and women’s occupational aspirations and outcomes. Parents’ employment situations, plans for labor force exits, and race/ethnicity all influence occupational aspirations and outcomes. Parents’ employment situations are likely to be important for two reasons. First, gender socialization theory argues that individuals learn what occupations are appropriate for their gender from their parents, peers, mass media, schools, religious institutions, and teachers (Stockard, 1999). Parents are often considered the most important agent of gender socialization because they are seen as providing many of the gendered messages about occupational plans to their children (Bandura, 1986; Bem, 1991). When mothers are employed, daughters have higher occupational aspirations (Barling, 1990; Lerner, 1994; Rainey and Borders, 1997). Furthermore, boys with parents who work in occupations with more women tend to work in occupations with more women themselves in later life (Okamoto and England, 1999). Another possible determinant of gender typicality of occupational aspirations or outcomes is growing up in a female-headed family. Children, especially girls, who grow up seeing their mothers struggle financially may be more likely to pursue male-dominated occupations in order to better their chances for financial security in later life (Baird, 2008; McManus and DiPrete, 2001).

Second, young people growing up in privileged homes have numerous advantages, such as educational opportunities and financial resources, which often raise occupational aspirations as well as assist in attaining the type of cultural capital that prepares them for acceptance into middle-class occupations (Bettie, 2003; Erikson, 1996). The predictions about the effects of socioeconomic status on the gender typicality of occupational aspirations and outcomes are less clear. It is likely that individuals are tracked into occupations considered gender appropriate for their class background.

Individuals who plan intermittent labor force experiences in order to be primary caregivers to partners and children should be more likely to prepare to work in female-dominated occupations. Female-dominated occupations are expected to be family-friendly because they either minimize the skill atrophy associated with labor force exits with high starting wages and low rates of depreciation (Polachek, 1981) or because they are more flexible (Eccles, 1994). While female-dominated occupations are not more flexible nor do they minimize the costs of skill atrophy (England, 1982, 1984; England et al., 1996; Glass and Camarigg, 1992), there is evidence that people believe female-dominated occupa-
tions are more family-friendly (Eccles, 1994; Farmer, 1997; Waite and Berryman, 1985). Finally, African-American women are more likely to desire more male-dominated careers, such as science, than white women, but often face more barriers to achieving those goals than do white women (Hanson, 2009).

DATA AND METHOD

Data

To answer my questions about the effects of cognitive skills, as measured by test scores and GPAs, and gender beliefs on young women and young men’s occupational aspirations and outcomes, I use the National Longitudinal Survey of Youth (NLSY79). The NLSY is better-suited to answer these questions than other longitudinal data sets, such as Add Health and the NELS, because it is designed to survey the labor market experiences of young men and women who were 14–22 years of age in 1979. Respondents were interviewed every year from 1979 to 1994 and then every other year to the present. The NSLY also has information about respondents’ gender beliefs, verbal skills, and math skills in early life. In addition, the occupational aspiration and outcome data are detailed enough to determine gender typicality.

Sample

I restrict the sample to high-school-aged respondents who answered questions about their employment situation in 1998 (i.e., those that were working or not working in 1998) and those who answered questions about their occupational aspirations in 1982. The choice of 1982 as a base year was necessary to satisfy appropriate causal order. I define high-school-aged individuals as those younger than age 20 in 1982 whose highest grade completed was 10 through 12, n = 2,765. There are 1,420 women and 1,345 men in the sample. Of those, 343 women and 185 men were not working in 1998. I describe how I deal with respondents who were not working in 1998 in the analysis section of this article. All other missing values were imputed using the multiple imputation procedures ICE and MICOMBINE in Stata (Royston, 2004).

I limit the sample by age and education for two reasons. First, the questions about occupational aspirations ask respondents what they would like to be doing when they are 35 years old. To explore outcomes when the respondents are near age 35, they must be in at least 10th grade in 1982. Second, as established by prior research on educational and occupational goals, high school is a time during which occupational goals are likely to be particularly salient (Johnson et al., 2001; Schoon, 2001; but see Cook et al., 1996). In high school, students are preparing to enter the labor market, continue their education, or work in the home.
Measurement: Dependent Variables

Gender Typicality of Occupational Aspirations in Early Life The gender typicality of occupational aspirations is a continuous measure of the percent female in desired occupation in 1982. This measure is based on the question: “What would you like to be doing at age 35?” I used the Census codes in the NSLY and attached percent female in each occupation calculated using CPS data (Hirsch et al., 2001).

Gender Typicality of Occupational Outcomes The gender typicality of occupational outcomes is measured as the percent female in the occupation in which the respondent works in 1998 calculated from CPS data (Hirsch et al., 2001). Since the NLSY has information on the last five jobs the respondent held in 1998, I used the job in which the respondent worked the most hours per week for respondents with more than one job.

Cognitive Skill I measure cognitive skills with two scales: verbal and math skills. To create the scale of verbal skills, I use two measures of the Armed Services Vocational Aptitude Battery (ASVAB) and a measure of the respondent’s English GPA. The ASVAB was administered to all NLSY respondents in 1980. The ASVAB is a battery of 10 tests used to assess skills in 10 areas. I use the word knowledge and paragraph comprehension measures to capture respondents’ verbal skills. English GPA was measured using a standard four-point scale based on transcript data for all English courses completed in the 9th and 10th grades. All measures are converted to z-scores normalized for both men and women together. The factor loadings for each of the items are equal. As a result, I use the average of the responses. The scale has an alpha reliability of .78.

To measure math performance, I use the measures of arithmetic reasoning and mathematical knowledge from the ASVAB and math GPA. The ASVAB arithmetic reasoning questions are word problems. The mathematical knowledge section tests skills in math principles learned in high school, such as algebra and geometry. Math GPA uses the transcript data for all math courses completed in 9th and 10th grade. The math performance measures are also converted to z-scores normalized for both men and women together. The factor loadings for each of the items are equal; thus I take the average of the responses. The scale has an alpha reliability of .81.

Both perception of skills and actual skills affect occupation-relevant decisions; however, the NLSY79 only has measures of skills (Correll, 2001, 2004). This is a limitation of this study, which likely leads to the overestimation of the effect of skills on aspirations and outcomes. However, for the group of interest in this article, individuals with skills in gender-atypical areas, the effect
of skills on occupational aspirations and outcomes is less likely to be overestimated. Individuals in groups for which societal expectations about skills are low appear to more closely attend to feedback in those areas (Correll, 2001). In addition, as feedback in a gender-atypical area indicates more skill, the self-assessment of skill in that area also increases (Correll, 2001). Women who receive feedback that they have math skills assess their math skill at a higher level than women who receive feedback that they have less math skills (Correll, 2001). There is likely to be a smaller gap between self-assessments of skills and feedback about skills among those in groups for which feedback about skills contradicts cultural expectations. Although there is no indication in the *NLSY79 User’s Guide* that respondents were informed of their ASVAB scores, I assume the ASVAB scores are comparable to feedback received from standardized achievement tests because such scores tend to be highly correlated over time. In addition, it is reasonable to assume that the respondents are aware of their GPAs.

GPAs and standardized test scores are not objective measures of individuals’ innate skills; rather, they are susceptible to the gendered perceptions of teachers (Entwisle et al., 2007) and are biased to advantage white, middle-class males (Leonard and Jiang, 1999). Although this is a limitation of measures of cognitive skills, there is evidence that GPAs and standardized tests are important sources of information for students as they develop their academic self-concepts (Wiley, 1979) and make their occupation-relevant plans (Correll, 2001).

**Gender Belief** I create a scale of traditional beliefs by averaging the responses to four statements: (1) a woman’s place is in the home, not in the office or shop; (2) a wife who carries out her full family responsibilities doesn’t have time for outside employment; (3) it is much better for everyone concerned if the man is the achiever outside the home and the woman takes care of the home and family; and (4) women are much happier if they stay at home and take care of their children. Response options include strongly agree, agree, don’t know, disagree, and strongly disagree. The factor loadings for each of the items are equal. As a result, I average the responses. The scale has an alpha reliability of .73 and ranges from 0 to 4, where high values represent more traditional gender beliefs.

**Control Variables**

I control for measures in early life predicted to affect occupational aspirations and outcomes: parents’ employment situations, plans for labor force exits, and race/ethnicity. I also control for family situations in later life.

Following Okamoto and England (1999), to measure parents’ employment situations, I use the percent female in mothers’ and fathers’ occupations in 1978, parents’ education and labor force status, and whether the respondent
lived in a female-headed household. Percent female in parents’ occupations is measured with two variables: percent female in occupation in which mother worked in 1978 and percent female in occupation in which father worked in 1978, calculated from CPS data (Hirsch et al., 2001). Mother’s and father’s education is a continuous measure of the highest grade completed by the parent in 1979. I also have two dichotomous measures of whether the mother and/or father worked outside the home in 1978 (coded 1 = yes). The NLSY only provides information on parents’ occupations in the first year of interview, 1979. It asks about the occupation held in the prior year, 1978. Whether the respondent lived in a female-headed household at age 14 is a dichotomous variable coded 1 if the respondent lived in a household in which he or she lives with his or her mother, but no father or stepfather is present. The reference category is all other living arrangements.

Following Okamoto and England (1999), “plans for labor market exit” is a dummy variable based on respondents’ answers to two questions. Respondents who answered the question “What would you like to be doing at age 35?” by stating they wanted to be “married with a family” were asked the follow-up question: “Would you like to be working in addition to being married/keeping house.raising a family?” If they responded “no,” they were coded 1 on the dummy variable, meaning that they desired not to work for pay in addition to being married and, therefore, planned labor market exits. All other skip patterns indicated plans to continue working and were coded 0. Race/ethnicity is measured with a series of dummy variables coded 1 if the respondent is black, Hispanic, or other. The reference category is white.

I include the following measures in the analyses of occupational outcomes: actual exits, marital status, number of young children, number of children, elderly parent living in the home, and hours worked outside the home in 1998. “Actual exits” is a continuous measure of the number of exits from the labor force that lasted longer than three months since high school. Marital status is measured with one dummy variable that compared married individuals to those who are divorced, separated and widowed, or never married. The number of young children in the home is a continuous measure of the number of children under the age of six living in the home. The number of children in the home is a continuous measure of all the children 18 years of age or younger in the home in 1998, including biological children, stepchildren, and adopted children. I include a dichotomous measure of whether there is an elderly parent in the home, coded 1 if so and 0 if not. Hours worked is measured with a dummy variable coded 1 if the respondent is working 35 hours or more per week in the labor force. The reference category is those employed part time or less than 35 hours per week.

Measures of sociodemographics are respondent’s age, highest grade completed, and living in an urban setting. Respondent’s age is a continuous measure of age in 1998. Respondent’s education level is a continuous measure of the highest grade completed in 1998. Finally, I have added a dichotomous measure of whether the respondent lives in an urban setting in 1998 because
rural areas may contain fewer traditionally female occupations (Baird, 2008; Okamoto and England, 1999).

ANALYSIS

I use OLS regression to predict occupational aspirations and sample selection models to predict occupational outcomes. Sample selection models are appropriate when the data have a form of censoring in which values on a dependent variable are observed or not based on another variable (Breen, 1996). I correct for sample selection in the analyses of occupational outcomes because observing percent female in occupational outcomes in 1998 is contingent on working outside the home. I will provide the results of the binary component of the sample selection models for women and men upon request. I weight the descriptive statistics using the NLSY sampling weights to yield population estimates. I also weight the occupational aspiration analyses using the 1982 sampling weight and the occupational outcomes analyses using the 1998 NLSY sampling weight to correct for potential bias from sample attrition in the NLSY (Frankel et al., 1983). MaCurdy et al. (1998) provide further evidence that attrition is not problematic in the NLSY. I run separate models on men and women because the factors affecting occupational aspirations and occupational outcomes vary by gender.

RESULTS

The descriptive statistics, not reported, show that, on average, the sex segregation of women’s occupational aspirations in 1982 is similar to the sex segregation of their occupational outcomes in 1998. Women work in occupations with approximately 62% women in 1998 and desired to work in occupations with 63% in 1982. Men work in occupations in 1998 with more women than they desired in 1982 (28% and 19%, respectively; test for gender differences in proportions is significant at $p < .001$).

Men’s occupational aspirations and outcomes are more gender typical than women’s. Occupations considered female dominated are those with 70% or more women, sex-integrated occupations are those with 31% to 69% women, and male-dominated ones are occupations with 30% or fewer women. Eighty percent of men desire to work in male-dominated occupations in early life and 56% work in male-dominated occupations, 36% work in sex-integrated occupations, and 7% work in female-dominated occupations in 1998. In contrast, 52% of women desire to work in male-dominated occupations, but in 1998 most, 47%, work in female-dominated occupations. Only 15% of women work in male-dominated occupations in later life.
Gender differences in cognitive skills reflect findings in prior research (Hyde and Mertz, 2009). Women, on average, have higher ASVAB scores in paragraph comprehension than men \( (p < .001) \) and men have higher ASVAB scores in arithmetic reasoning than women \( (i.e., \text{word problems}, p < .001) \). However, there is no significant gender difference in word knowledge or mathematical knowledge \( (i.e., \text{high-school-level algebra and geometry}) \). Women have higher GPAs in math and English than men \( (p < .001) \). In analyses not shown, I find that women’s mean English GPA is statistically significantly higher than their mean math GPA. In contrast, the mean of boys’ English and math GPAs are not statistically significantly different.

Both men and women, on average, tend to hold less traditional beliefs about the desirability of women prioritizing family over paid work, but women hold less traditional beliefs than men \( (\text{test of mean difference is significant at} \ p < .001) \).

Some control variables vary by gender. More women are likely to plan to exit the labor market than men; 7% plan to compared to less than .01% of men. More women grew up in female-headed households than men, 15% and 12%, respectively. On average, women have more children than men in 1998, 1.47 and 1.21, respectively. Men’s parents had more years of completed education in 1979 than women’s, on average, but the average is less than high school for both men’s and women’s parents. Men had more fathers who did not work in early life, were more likely to work full time in 1998, have more children under the age of five, and are more likely to have an elderly parent in the home than women \( (\text{tests for difference in means and proportions significant at} \ p < .001) \).

There were no gender differences in the percent female in mother’s occupation, the percent female in father’s occupation, the percent of mothers who did not work, age, the percent married, the number of exits from the labor force since high school, the percent living in an urban area, or years of completed education in 1998. The respondents’ mothers worked in occupations that were approximately 47% female and their father’s worked in occupations that were approximately 18% female. A little more than one-third of respondents had mothers who did not work outside the home in 1979. Sixty-three percent of women and men were married in 1998 and most had less than one exit from the labor force lasting longer than three months. Sixty-five percent of women and men lived in an urban area in 1998 and, on average, men and women had 13 years of completed education in 1998. The average age of respondents in 1982 was 18 years of age and 35 in 1998.

Table I shows the results of two models testing Hypotheses 1, 3, 5, and 7 about the effects of cognitive skills and gender beliefs on women’s occupational aspirations and the two models testing Hypotheses 2, 4, 6, and 8 for men. Model 1 is the baseline model for women’s aspirations. The adjusted \( R^2 \) indicates that 3% of the variation in women’s occupational aspirations is explained by the baseline model. Model 2 adds the skills measures and gender beliefs to the baseline model. Model 2 explains 10% of the variation in
women’s occupational aspirations. The F-test for the change in $R^2$ is significant at the $p < .10$ level. Models 3 and 4 are the analyses of men’s occupational aspirations. They are the same as Models 1 and 2 for women, with one exception. Since so few men report planning breaks from work for family in later life (e.g., less than .01%), I do not include the measure of planned labor force exits in the analyses.

Table I, Model 2 finds support for Hypotheses 1, 5, and 7, but not for 3. In support of Hypothesis 1, verbal skill does not significantly affect the percent female of young women’s occupational aspirations. In contrast to Hypothesis 3, but in support of Hypothesis 5, women with more math skills desire to work in occupations with fewer women compared to women with lesser math skills. In support of Hypothesis 7, women with more traditional beliefs about women prioritizing family over paid work desire to work in occupations with more women.

To determine if young women’s occupational aspirations become more gender atypical when math performance increases or when gender beliefs are less traditional, I calculated expected values for women’s occupational aspirations across values of gender beliefs and math skills. I hold all other variables constant at the mean or modal categories for women. Women with less traditional gender beliefs desire to work in occupations with 62% women. In contrast, women with above-average math skills desire to work in occupations with 53% women. If math skill is above average and gender beliefs are less traditional, women desire to work in occupations that are 47% female.
The adjusted $R^2$ for the first model analyzing men’s occupational aspirations shows that 1% of the variation in men’s occupational aspiration is explained by this model. Two percent of the variation in men’s occupational aspirations is explained by Model 4, the analyses adding skills and gender beliefs. The $F$-test for the change in $R^2$ shows that Model 4 explains significantly more variation in men’s occupational aspirations than Model 3 ($p < .01$).

I find support for Hypothesis 4, but not for 2, 6, or 8. In support of Hypothesis 4, but not 6, men who have verbal skills are not significantly more likely to desire to work in occupations with more women than men who have less verbal skills. Contrary to Hypothesis 2, math skills affect men’s occupational aspirations; men who have math skills desire to work in occupations with more women. To explore this result, I compared the occupational aspirations of men with math talent (see Table II) and those without (not shown). I find that only one of the 20 occupations desired by men with math talent was blue collar (i.e., machine operatives). In comparison, of the 12 occupations desired by men with low math talent, nine occupations, or 75%, were blue collar. Thus, it appears that men who have math talent desire to work in white-collar occupations, which tend to have more women in them. In contrast, men who have less math talent are more likely to desire to work in blue-collar occupations, which have fewer women in them.

I also find no support for Hypothesis 8. Gender beliefs have no significant effect on men’s occupational aspirations.

Table II shows the bivariate association between math talent and aspirations by listing the occupational aspirations of women and men with math talent. Math talent is operationalized as individuals whose math skills are two standard deviations or higher above the mean. Occupations considered female dominated are those with 70% or more women, sex-integrated occupations are those with 31% to 69% women, and male-dominated occupations are those with 30% or fewer women. The number to the left of the occupation indicates the rank of the aspiration within each gender. The second and fourth columns show the percent female in the occupation. The italicized occupations denote occupational aspirations shared by women and men.

Most women with math talent desire to work in male-dominated occupations, but some desire to work in female-dominated occupations or sex-integrated occupations. When men have math talent, they tend to desire to work in male-dominated occupations or sex-integrated occupations. No men with math talent desire to work in female-dominated occupations. Furthermore, young women with math talent were less likely to desire to work in science occupations than were young men with math talent.

Tables III and IV show the results of models testing the effects of cognitive skills and gender beliefs on occupational outcomes for women and men, respectively. Model 1 is the baseline model, which includes family background information and 1998 sociodemographics. Model 2 adds the cognitive skills and gender beliefs measures. Model 3 adds a measure of occupational aspirations to determine if the effects of skills and gender beliefs on occupa-
Table II. Occupational Aspirations for Women and Men with Math Talent, National Longitudinal Survey of Youth, 1982

<table>
<thead>
<tr>
<th>Women</th>
<th>Men</th>
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<tbody>
<tr>
<td>Occupation</td>
<td>Percent Female</td>
</tr>
<tr>
<td>Male-dominated</td>
<td></td>
</tr>
<tr>
<td>1. physicians, medical and osteopath</td>
<td>13%</td>
</tr>
<tr>
<td>3. lawyers</td>
<td>14%</td>
</tr>
<tr>
<td>4. architects</td>
<td>4%</td>
</tr>
<tr>
<td>6. engineers, n.e.c.</td>
<td>1%</td>
</tr>
<tr>
<td>6. computer specialists, n.e.c.</td>
<td>7%</td>
</tr>
<tr>
<td>6. veterinarians</td>
<td>2%</td>
</tr>
<tr>
<td>6. managers and administrators, n.e.c.</td>
<td>20%</td>
</tr>
<tr>
<td>6. photoengravers and lithographers</td>
<td>17%</td>
</tr>
<tr>
<td>7. geologists</td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>average = 9%</td>
<td></td>
</tr>
<tr>
<td>Female-dominated</td>
<td></td>
</tr>
<tr>
<td>4. dietitians</td>
<td>89%</td>
</tr>
<tr>
<td>6. clinical laboratory technologists and technicians</td>
<td>74%</td>
</tr>
<tr>
<td>8. nursing aides, orderlies, and attendants</td>
<td>86%</td>
</tr>
<tr>
<td>average = 83%</td>
<td></td>
</tr>
</tbody>
</table>

Note: Math-talented is defined as 2.0 standard deviations or higher than the mean of math ability.
Note: Numbers to left of occupation indicate popularity within gender. Repeated numbers share the same number of individuals.
Note: Italicized occupations denote occupations to which both men and women desire to work.
tional outcomes are mediated by occupational aspirations. Model 4 adds the family demands measures. By comparing the coefficients for skills and gender beliefs in Model 2 to those of Model 3, we can determine if the effects of skills and gender beliefs on outcomes are mediated by aspirations. Likewise, comparing the coefficients for skills and gender beliefs in Model 2 to the coefficients in Model 4 allows us to determine if the effects of skills and gender beliefs in early life on outcomes are mediated by current family experiences. Model 5 is the final full model. The adjusted $R^2$ values for Models 1 through 5 progressively increase from less than 1% of the variation in women’s occupational aspirations to 4% in Model 5. The $F$-tests for change in $R^2$ values across models shows that the addition of skills, gender beliefs, occupational aspirations, and family demands to the baseline model explains progressively more variation in occupational outcomes (all significant at $p < .05$ or $p < .01$).

Table III shows that neither skills nor gender beliefs significantly affect the percent female in women’s occupational outcomes in 1998. Occupational aspirations significantly affect women’s occupational outcomes; women who

<p>| Table III. OLS Regression Analysis of the Percent Female of Women’s Occupational Attainments, Adjusted by Sampling Weights, National Longitudinal Survey of Youth, 1998 (n = 1,077) |
|---------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|</p>
<table>
<thead>
<tr>
<th>Cognitive Skills and Gender Beliefs</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verbal skills</td>
<td>3.778</td>
<td>3.596</td>
<td>3.571</td>
<td>3.412</td>
<td></td>
</tr>
<tr>
<td>Math skills</td>
<td>-2.624</td>
<td>-1.811</td>
<td>-2.172</td>
<td>-1.390</td>
<td></td>
</tr>
<tr>
<td>Gender beliefs</td>
<td>.895</td>
<td>.265</td>
<td>.866</td>
<td>.173</td>
<td></td>
</tr>
<tr>
<td>Percent female in desired occupation</td>
<td>.137***</td>
<td>.136***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plans for labor market exits</td>
<td>2.249</td>
<td>1.363</td>
<td>.622</td>
<td>.973</td>
<td>.110</td>
</tr>
<tr>
<td>Percent female in mother’s occ.</td>
<td>.037</td>
<td>.036</td>
<td>.049</td>
<td>.056</td>
<td>.066</td>
</tr>
<tr>
<td>Percent female in father’s occ.</td>
<td>.036</td>
<td>.036</td>
<td>.031</td>
<td>.033</td>
<td>.029</td>
</tr>
<tr>
<td>Lived in female-headed hh when 14</td>
<td>1.062</td>
<td>1.158</td>
<td>1.648</td>
<td>1.623</td>
<td>2.059</td>
</tr>
<tr>
<td>Mother’s education, 1979</td>
<td>-.012</td>
<td>-.023</td>
<td>.075</td>
<td>-.006</td>
<td>.079</td>
</tr>
<tr>
<td>Father’s education, 1979</td>
<td>-.237</td>
<td>-.238</td>
<td>-.242</td>
<td>-.064</td>
<td>-.121</td>
</tr>
<tr>
<td>Mother did not work, 1979</td>
<td>3.521</td>
<td>3.294</td>
<td>3.938</td>
<td>5.566</td>
<td>5.772</td>
</tr>
<tr>
<td>Father did not work, 1979</td>
<td>-2.748</td>
<td>-2.705</td>
<td>-3.337</td>
<td>-.824</td>
<td>-1.899</td>
</tr>
<tr>
<td>Number of children 5 or younger, 1998</td>
<td></td>
<td>-.097</td>
<td>-.518</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of children, 1998</td>
<td>1.208</td>
<td>.905</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elderly parent in the home, 1998</td>
<td>3.734</td>
<td>1.879</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of labor force exits, 1998</td>
<td>.341</td>
<td>.091</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work full-time, 1998</td>
<td>-7.041***</td>
<td>-7.492***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married, 1998</td>
<td>2.729</td>
<td>2.026</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>2.591</td>
<td>3.463</td>
<td>3.757</td>
<td>5.318*</td>
<td>5.398</td>
</tr>
<tr>
<td>Hispanic</td>
<td>7.383**</td>
<td>7.606**</td>
<td>8.87**</td>
<td>7.186**</td>
<td>8.725**</td>
</tr>
<tr>
<td>Other</td>
<td>-3.145</td>
<td>-3.099</td>
<td>-2.382</td>
<td>-1.766</td>
<td>-1.214</td>
</tr>
<tr>
<td>Live in urban setting, 1998</td>
<td>1.613</td>
<td>1.617</td>
<td>1.734</td>
<td>2.102</td>
<td>2.124</td>
</tr>
<tr>
<td>Respondent’s education, 1998</td>
<td>-.276</td>
<td>-.304</td>
<td>.116</td>
<td>-.829</td>
<td>-.279</td>
</tr>
<tr>
<td>Inverse Mills Ratioa</td>
<td>-3.539</td>
<td>-4.072</td>
<td>-4.007</td>
<td>-26.394*</td>
<td>-20.536</td>
</tr>
<tr>
<td>Constant</td>
<td>42.608</td>
<td>46.301</td>
<td>31.553</td>
<td>61.896</td>
<td>44.027</td>
</tr>
<tr>
<td>Adjusted R-squared</td>
<td>.003</td>
<td>.002</td>
<td>.027</td>
<td>.015</td>
<td>.039</td>
</tr>
</tbody>
</table>

*aHazard of working in 1998 versus not working in 1998
legend: * p<.05; ** p<.01; *** p<.001
desire to work in occupations with more women when they are in high school are more likely to be working in occupations with more women in later life, on average. In analyses not shown, I calculated the expected percent female of occupational outcomes across the percent female in occupational aspirations values for math-talented women. All other measures are held constant at the mean and modal categories for all women in the sample. Math-talented women who, in 1982, desire to work in occupations with 9% women work in occupations with 32% women in later life. In contrast, math-talented women who desire to work in occupations with 83% women are predicted to work in occupations with 42% women in later life.

Math skills and gender beliefs affect women’s occupational outcomes indirectly by shaping their aspirations. The coefficients for gender beliefs, math skill, and verbal skill in Table III, Model 2 approach zero when aspirations are added to the regression analyses in Model 3. In addition, gender beliefs and math skill significantly affect women’s occupational aspirations in Table I, Model 2. Verbal skill does not affect occupational aspirations in Table I,
Model 2; there is no evidence that occupational aspirations mediate the relationship between verbal skill and occupational attainment.

Cognitive skills and gender beliefs appear to affect women’s occupational outcomes indirectly by shaping women’s work hours in later life. The coefficients for gender beliefs and skills in Model 2 approach zero when family demand measures are added to the regression analyses in Model 4. The only family demand measure that is statistically significant is work hours, indicating that women’s gender beliefs and skills influence women’s occupational attainment by affecting a reduction in work hours. However, in analyses not shown, math skill and gender beliefs do not have a significant direct effect on work hours; work hours do not mediate the relationship between women’s gender beliefs and academic performance and occupational attainments.

Men’s occupational outcome models follow the same logic as the women’s outcome models in Table IV. As in Table I, plans for labor market exits are not included in the men’s models because so few men plan to leave the labor market. The adjusted $R^2$ values in Models 1 through 5 progressively increase from 9% to 11% ($p < .05$ or $p < .01$).

I do not find support for Hypotheses 2, 4, 6, or 8 in Table IV. In apparent contradiction to Hypothesis 2, math skill does have a significant effect on men’s occupational attainment in Models 2 and 3. Men that had math talent in early life were more likely to end up working in occupations with fewer women in later life than men with less math talent. This relationship ceases to exist in Model 4 when family demands are added to the analyses, however. Since the number of exits men take from the labor force is the only family demands measure that is statistically significant, I explore if it mediates the relationship between math skill and occupational attainment. In analyses not shown, I find that math skill has no significant effect on the number of exits men have taken from the labor force by the time they are in their 30s. There is support for Hypothesis 2. Controlling for later life factors, math skills in early life have no significant effect on men’s occupational attainments in later life.

In contrast to Hypothesis 4, but in support of Hypothesis 6, in Models 2 through 5, men with more verbal skills work in occupations with a higher percent female then men with less verbal skill. The expected values of the percent female in the occupation for an average man in the sample with below-average verbal skills and above-average verbal skills are 14 and 30, respectively.

I find no support for Hypothesis 8, in Models 2 through 5, which predicts men with less traditional gender beliefs will be more likely to work in occupations with more women.

Table IV also indicates that occupational aspirations mediate the relationship between verbal skill and occupational outcomes for men. I put little stock in this result, however, because Table I indicates that verbal skill has no statistically significant effect on men’s occupational aspirations.
DISCUSSION

The persistence of the sex segregation of occupational aspirations and outcomes is attributed to a number of factors ranging from statistical discrimination to workplace cultures to beliefs about gender (Callister, 2006; Correll, 2001, 2004; Reskin and Roos, 1990; Xie and Shauman, 2003). The CBG perspective emphasizes the power of hegemonic cultural beliefs about the gender typicality of skills to shape individuals’ occupational decisions. However, people do behave in ways that resist the social order (Connell, 1987; Crawley et al., 2008; Deutsch, 2007). Women who are scientists, engineers, and mathematicians; heterosexual couples with an egalitarian division of labor in the home (Risman, 1998); and men in nontraditional occupations, such as nurses and elementary school teachers (Williams, 1993) are all resisting cultural beliefs about gender. This article is an empirical test of opportunities to “go against the flow”: cognitive skills in gender-atypical areas and beliefs about women’s prioritization of family over paid work.

The findings of this article suggest that when societal expectations for a group’s abilities in a valued area are low, talented individuals in that group expand their occupational options. I find that women who have math skills desire to work in occupations with more men than their less skilled counterparts. Further, math skills have an indirect effect on women’s occupational outcomes by shaping their aspirations. In contrast, verbal skills do not significantly affect young women’s occupational aspirations or outcomes. Young women do not have to contend with low societal expectations about their verbal skills; rather, they are expected to excel verbally. Thus the findings of this article lend support to CBG’s contention that most women do “go with the flow” and enter gender-typical occupations. Because women are expected to have verbal skills, verbal skill does not seem to modify women’s occupational plans. However, when women have math talent, a talent that is valued and contradicts cultural beliefs about gender, they are more likely to “go against the flow.”

For men, the process is different. I find that math skill is positively associated with young men’s occupational aspirations. Thus, in contrast to CBG’s contention, math skills affect men’s occupational plans, even though math skill is aligned with cultural expectations. However, instead of desiring to work in occupations with more men, they desire to work in occupations with more women. Men with less math skills tend to desire to work in blue-collar occupations, while men who have math skill tend to desire to work in white-collar occupations. The predictions of CBG need to be further refined. Class differences need to be taken into account to fully understand how men filter feedback about their cognitive skills in areas that align with cultural expectations.

When societal expectations for a group’s abilities are low and the skill is devalued, occupational aspirations do not expand. Men with verbal skills are not more likely to desire to work in occupations with more women. There is little incentive for verbally talented men to pursue gender-atypical occupations.
since they face lower material rewards as well as social sanctions for working in a job that women can do (Williams, 1993). These consequences appear to outweigh the “glass elevator” men tend to ride in female-dominated occupations (Williams, 1993).

Verbal talent does not expand young men’s occupational aspirations, but it does influence their occupational outcomes in later life. I find that men with verbal skill are more likely to work in occupations with more women in later life. It is likely that men with verbal skills need feedback over a longer period of time before they are willing to accept the lower pay and social sanctions of entering occupations with more women.

Beliefs about women’s prioritization of family over paid work affect women’s occupational aspirations and outcomes, but not men’s. Women who believe that women should prioritize family over paid work have more gender-typical occupational aspirations than women with less traditional beliefs. They may believe that women should work in occupations that are separate from men and/or they may still believe that female-dominated occupations are more family-friendly, despite evidence to the contrary. In line with research on the relatively low importance of beliefs in early life compared to family and work situations in later life, by the time they are in their mid-30s, gender beliefs do not significantly affect women’s occupational outcomes. Men’s gender beliefs have no statistically significant effect on their occupational aspirations or attainments. It is likely that gender beliefs do not affect men’s occupation-relevant decisions because they expect the women in their lives to be primarily responsible for childcare and homecare (Johnson et al., 2001).

The $R^2$ values for all the models are relatively low. We are not explaining much of the variation in women’s or men’s occupational aspirations and outcomes with cognitive skills, gender beliefs, or any of the control variables. There is much about the process of the development of occupational aspirations and their relationship to outcomes that we still do not understand. Some of the low $R^2$ values can be attributed to the limitations of this study, however.

This article would be strengthened by a measure of individuals’ perceptions of their skills since women tend to underestimate their math skills and men tend to overestimate theirs (Correll, 2001). Unfortunately, the NLSY79 has no questions about perceptions of skills; thus, it is likely that the measure of skills is partially capturing skill perception. Determining how self-assessments of skill can more accurately reflect feedback about skill is an important step for future research. Finding unbiased measures of skill in order to provide individuals with accurate feedback is equally important.

Second, there are limitations to looking at aspirations and gender beliefs in high school because both change as individuals negotiate various occupational, educational, marital, and child-bearing pathways (Gerson, 1985; Gottfredson and Lapan, 1997; Kochhar-Bryant et al., 2009; Shu and Marini, 1998). The NSLY only has questions about occupational aspirations in the early years (i.e., 1979 and 1982) and only recently added measures of gender
beliefs in later life (i.e., 2004), but future research should explore the effects of changes in aspirations and gender beliefs on occupational outcomes. For example, does developing less traditional gender beliefs and less gender-typical aspirations over time lead to more gender-atypical occupational outcomes? Is there a time in one’s educational pathway that developing less traditional beliefs or plans is “too late” for expanding occupational outcomes?

The members of the NLSY79 cohort experienced a number of changes in women’s employment situations, such as decreases in the gender earnings gap and climbing divorce rates (Spain and Bianchi, 1996), that affect the generalizability of these findings. However, the gender beliefs, skills, and gender typicality of occupational aspirations and outcomes of the NLSY79 cohort are comparable to recent cohorts (England and Li, 2006; Hyde and Mertz, 2009).

A further limitation of this study is the NLSY’s lack of measures of sex segregation at the intraoccupational level. As women entered previously male-dominated occupations in the 1980s and 1990s, they tended to enter jobs that had less prestige and fewer material rewards (Boulis and Jacobs, 2008; Reskin and Roos, 1990). This article’s findings that gender beliefs and skills affect the more conservative measure of gender inequality at work, occupational sex segregation, indicates that the relationship between skills and intraoccupational sex segregation should be even more pronounced, an issue that should be explored in future research.

Since men appear more resistant to moving into female-dominated fields than women are to moving into male-dominated fields (England, 2010; England and Li, 2006; Reskin and Roos, 1990), the finding that men who have verbal skills resist gender-typical occupational outcomes by working in occupations with more women seems hopeful. However, the effects of skills on occupational outcomes are not large, especially among men. In the NLSY, 9% of men with verbal talent are in female-dominated occupations in 1998 compared to the 21% of women with math talent in male-dominated occupations. Thus, work to encourage men, not just women, to enter gender-atypical fields that align with their apparent skills does appear to be a useful strategy for reducing occupational sex segregation.

REFERENCES


