HIGH SCHOOL STUDENTS' CAREER ASPIRATIONS: INFLUENCES OF GENDER STEREOTYPES, PARENTS, AND THE SCHOOL ENVIRONMENT

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ABSTRACT

KRISTINE E. COPPING: High school students' career aspirations: Influences of gender stereotypes, parents and the school environment
(Under the direction of Beth Kurtz-Costes)

Gender disparities in STEM-related career fields may be the result of broadly held traditional stereotypes about girls' and boys' academic abilities (i.e., girls are better in English than boys and boys are better in math and science than girls), as well as gender-differentiated experiences in the home and school environment. In line with expectancy-value theory (Eccles & Wigfield, 2002; Wigfield & Eccles, 2000), I examined predictors of youths' domain-specific motivational beliefs and career aspirations. Tenth grade adolescents (182 girls, 136 boys) completed questionnaires about academic gender stereotypes, academic motivation, felt pressure, academic gender discrimination, parental support, intended college majors, and career aspirations regarding the academic domains of math, science, and English. Students' parents (*N* = 160) reported their own academic gender stereotypes and their beliefs about their children's future educational and career choices. Gender differences consistent with traditional stereotypes were found in students' reports of motivational beliefs and academic intentions, primarily in the domains of math and English. Whereas parents of girls reported traditional English stereotypes and egalitarian math and science stereotypes, parents of boys reported traditional beliefs across all three domains. Although youths' reports of academic motivation (i.e., domain-specific self-concept, importance, and interest) were consistently related to future intentions in theoretically consistent ways, the anticipated relations between these motivational beliefs and felt pressure from parents (to behave in gender-traditional ways) were not found. Some of the hypothesized relations linking students' stereotype endorsement, motivational beliefs, and career intentions were found for math and English, but not for science. Across all three academic domains, parent support was indirectly related to students' plans for the future, and these relationships were mediated by the youths' reports of academic motivation. Overall, reports of gender-based academic discrimination were infrequent. Implications for parents and school-based motivational interventions are discussed, as well as suggestions for future research.

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INTRODUCTION

Despite the fact that the gender gap between boys' and girls' math and science test scores has narrowed at the national level in recent decades, gender differences in occupational choices, undergraduate majors, and fields of graduate study remain (National Science Foundation, 2000, 2008). In 2006, 78% of bachelor's degrees in engineering and 77% of bachelor's degrees in computer information sciences went to men (National Science Foundation, 2008). The trends were similar for master's degrees. Women's underrepresentation in STEM (Science, Technology, Engineering, and Math) careers may be detrimental to their life satisfaction and earning potential (Watt & Eccles, 2008). In 2007, women made up only 27% of the science and engineering workforce (National Science Foundation, 2010). Women and men who fully develop and exercise their talents and abilities have the healthiest psychological well-being, and advanced STEM disciplines are disproportionately associated with high-salary careers. As early as high school, women may limit their career options by ending their participation in math- and science-related courses (Farmer, Wardrop, Anderson, & Risinger, 1995; Owens, Smothers, Love, 2003; Watt & Eccles, 2008). Interestingly, even though in recent years researchers have reported that girls believe they are capable of performing these occupations, and that these occupations are appropriate for women, girls nevertheless still seem to avoid such choices for themselves, instead gravitating to careers that have been traditionally labeled female (Wigfield, Battle, Keller, & Eccles, 2002).

Several theories and perspectives have been proposed to explain why women are more likely than men to opt out of a future in STEM domains. Many of these theories and perspectives share an underlying theme concerning individuals' understanding and/or endorsement of gender stereotypes. However, to begin, it is important to consider how these theories and perspectives may fit together in the broader sense of human development. Bronfenbrenner (1977) proposed a model of human development that incorporates the multiple levels of a person's environment, including the individual him or herself, and the relationships between each of the multiple levels. This model richly illustrates how every aspect of a person's surroundings may influence behavior, expectations, self-perceptions, and desires for the future.

Bronfenbrenner's Bioecological Model

Bronfenbrenner (1977, 1986) argued that to best understand human development one must take into account the influence of the individual's immediate environments, the larger social world in which the individual lives, the historical time period in which the individual is situated, and the bidirectional interactions among these contexts. All of these aspects of contextual influence are relevant for the study of gender and gender stereotypes. First, at the most basic level, a person is born with a biologically determined sex, be it male or female. The individual and the people and places that make up his or her immediate surroundings are considered to be at the level of the microsystem (i.e., parents/guardians, teachers, peers).

Researchers have reported that parents convey gendered messages to their children in many ways, such as the specific household chores parents assign to girls versus boys (Grusec, Goodnow, & Cohen, 1996). In relation to the school environment, researchers have found that boys and girls receive differential instruction, feedback, and attention from teachers (Sadker & Sadker, 1994). For example, teachers call on boys more than girls to answer questions, and boys receive more teacher praise than girls for correctly answering questions (Sadker & Sadker, 1994). Thus, ample research has demonstrated the gendered nature of microsystem experiences.

Second, the mesosystem represents the interactions and relationships between members of the microsystem, other than the individual herself, which could influence the individual. An example of a mesosystem interaction is when parents discuss their child's school performance with their child's teachers. Third, the factors that have a more indirect influence on the individual, but may nevertheless shape aspects contained in the mesosytem, are at the level of the exosystem. The exosystem consists of settings such as the local and national government, the parents' workplace, and the media. For example, the daughter of an engineer may notice one day that almost all of her father's co-workers are men. Fourth, exerting its influence on all of the aforementioned systems, which are embedded within it, is the macrosystem. The macrosystem refers to the customs, culture, and ideologies of the social world of the individual. The larger social world in which a child is embedded may exert a strong influence on a child's understanding of what is common for his or her gender. Therefore, because the percentage of female medical doctors in Finland was 51% in 2000, while in the United States the percentage of female medical doctors was only 23%, girls in Finland may have been more likely than girls in the U.S. to foresee a future as a medical doctor (Nation Master, n.d.).

Finally, important to all of the systems is the notion of the *chronosystem,* or time (Bronfenbrenner, 1986). Time plays a role in development in many ways. It is important not only to consider the time period during which an individual develops and its related historical features, but also the fact that individuals themselves change over time. Within the domain of gender, the nature and strength of gender stereotypes have changed over time and may depend on what is happening in the world at a specific point in time, such as the Women's Rights Movement. In the subsections that follow, references will be made to Bronfenbrenner's Bioecological Model with the purpose of providing an integrative context for the theories and perspectives that will guide the hypotheses and research questions of the present study.

Social Identity Theory

As noted above, at the levels of the microsystem and mesosystem, early in childhood children learn their gender and that other people also fit into categories of boys, girls, men, and women (Ruble, Martin, & Berenbaum, 2006). As children age, they may come to consider their biological sex as a defining aspect of their identity (Ruble, et al., 2006). They begin to think of other members of their same sex as their in-group (Tajfel, 1982). Thus, women and girls view other women and girls as members of their in-group and men and boys as members of the out-group. Because people are less likely to spend time with members of the out-group than in-group members, they are less familiar with them (Brewer & Gaertner, 1999). Sometimes this ingroup-outgroup distinction is accompanied by prejudice, such as gender stereotyping (Tajfel, 1982).

One way that gender distinctions are established is by the solo condition, which occurs when, for example, a single girl in a room full of boys makes a "stronger impression" so that both positive and negative characteristics are seen as more extreme (Tajfel, 1982). When individuals are categorized according to their group membership, in-group differences are minimized compared to between-group differences, and the out-group is also viewed as having greater homogeneity. This perceived homogeneity leads people to ignore individual differences and increases the likelihood of stereotyping of out-group members (Tajfel, 1982).

The Function of Stereotypes and the Development of Gendered Beliefs

At the level of the macrosystem, members of a society may hold shared beliefs, or stereotypes, about certain subgroups of people that influence the relationships that exist across each of the other systems that are contained within Bronfenbrenner's Bioecological Model (Bronfenbrenner, 1977; 1986). More specifically, stereotypes are culturally based, simplified mental representations of a particular group (Hilton & von Hippel, 1996). Humans are prone to see the world in categories. Stereotypes are viewed as a form of social categorization which serves to decrease cognitive demands in a complex social world, thereby improving cognitive processing (Hilton & von Hippel, 1996). Thus, stereotypes are energy savers because individuals are evaluated generically on the basis of group membership rather than individual attributes (McGarty, Yzerbyt, & Spears, 2002).

Stereotype activation is often automatic and outside a person's conscious awareness (Hilton & von Hippel, 1996). Furthermore, many aspects of our social world maintain our stereotypes. For example, priming is the idea that social conventions like the media constantly bombard us with stereotypical images that make stereotypes ever present in our minds. The depictions of men and women in TV shows, commercials, movies, music videos, magazines, and books are just some of the ways that stereotypes may be reinforced and perpetuated. Additionally, memory retrieval is better for more extreme individuals (i.e., those who strongly exhibit stereotyped behavior) than more average ones. As a result, people are more likely to remember and talk about stereotype-consistent versus stereotype-inconsistent behaviors. For example, a boy may be more likely to remember that his brother did well in his math classes than his sister doing well her math classes. Furthermore, cognitively, it is faster and easier to view others' behaviors as consistent with stereotypes than it is to view others' behaviors as inconsistent with stereotypes (Hilton & von Hippel, 1996). Thus, if a boy struggles with reading and writing, a teacher may justify his performance by relying on her stereotypical belief that boys are not as good as girls on verbal tasks.

Starting at around two years of age children demonstrate some understanding of traditional gender stereotypes, and by the end of preschool many are able to categorize common occupations as male or female (Ruble et al., 2006). Researchers have provided evidence suggesting that gender stereotype knowledge continues to increase with age and that it becomes more detailed and specific. For example, Rowley, Kurtz-Costes, Mistry, and Feagans (2007) suggest that by early adolescence youth are becoming aware of and may personally endorse the stereotype that boys and girls have different abilities in specific academic domains. Pubertal maturation may be one reason why adolescents experience a growing need to adopt gender roles and align their beliefs with traditional gender stereotypes (Kessels, 2005). Furthermore, it is around this age that schools typically more strongly emphasize grades and social comparisons (Eccles, Lord, & Midgley, 1991), which could lead students to make assumptions about their abilities and the abilities of peers. As children age, their exposure to various aspects of the microsystem, mesosytem, exosystem, and macrosystem broadens, and thus they will be more likely to learn about and possibly adopt the views of those around them (Bronfenbrenner, 1977; Rowley et al., 2007; Ruble et al., 2006). Their beliefs about the traits of social groups are likely to be influenced by the macrosystem – prevailing cultural norms and ideologies – as well as gender norms within more proximal systems.

In spite of the ubiquity of cultural beliefs, intergenerational changes in stereotypical beliefs are likely to occur, and therefore the study of gender stereotypes and the influence they have on children's developmental outcomes should be an ongoing enterprise. For instance, just over a century ago in the United States, the concept of "true womanhood" emphasized submissiveness, purity, and domesticity in women, suggesting that a woman's place was in the home, and her primary roles in life were to be wife and mother (Welter, 1966). These beliefs seemed to persist into the 1950's and beyond. Given attempts in recent decades to work toward gender equity and to make math and science more accessible to girls, it is important to examine whether attitudes and beliefs have changed.

The current study was designed to assess adolescents' academic gender stereotype endorsement and the influence stereotypes might have on academic achievement motivation in the domains of math, science, and English. Drawing from Bronfenbrenner's (1977) conceptions of the microsystem and mesosystem, youths' perceptions of their own abilities, interests, and values in each of the three domains are shaped by parental beliefs and values. Youths' values and interests are also probably shaped by factors in the school setting such as gender discrimination. At the level of the macrosystem, our data are collected in the United States, where traditional gender stereotypes are prevalent favoring boys in math and science and girls in English. These cultural beliefs may impact each of the aforementioned levels. The notion of the chronosystem is also relevant to this study, as cultural ideologies may shift or change over time, suggesting that what has been found in the past regarding gender differences may not apply today. I expect that through interactions among the systems, gender differences will emerge in adolescents' course-taking choices, intended college majors, and career aspirations.

Endorsement of Gender Academic Stereotypes and Relationships between Parent and Child Gendered Attitudes

A few recent studies in the United States show that American youth do, to some degree, endorse some domain-specific academic gender stereotypes (Copping, Kurtz-Costes, & Rowley, 2010; Evans, Copping, Rowley, & Kurtz-Costes, 2011; Rowley et al., 2007). Using different stereotype measures, Rowley et al. (2007) and Copping, et al. (2010) found that middle-school aged White children endorsed the traditional stereotype that girls are better than boys in the verbal domain, but did not endorse the stereotype that boys are better than girls in math and science. These authors suggested that children's failure to report gender differences in math and science may reflect their real-life experience in that girls are achieving the same or higher grades than boys across domains, on average, at this point in their schooling. In the current study, stereotypes will be measured in high school aged youth. As youth move closer toward making college major and career choices, they might be more likely to endorse traditional gender stereotypes about math and science.

Even though children may not endorse the full range of traditional gender stereotypes, there is evidence to suggest that their self-competence beliefs are in line with traditional stereotypes such that girls have lower perceptions of their own competence in math and science than in English, and boys have lower self-competence perceptions in English than in math and science (Eccles, Wigfield, Harold, & Blumenfeld, 1993; Evans et al., 2011; Herbert & Stipek, 2005). Eccles et al. (1993) found that among children in elementary school, boys reported higher self-concept in math than girls, and girls reported higher verbal self-concept than boys. One strong area of influence on children's own self-competence beliefs is what their parents think about their abilities. Herbert and Stipek (2005) found that parents rated their sons' math and science abilities more positively than those of their daughters, even though there were no gender differences in children's math/science achievement or in teacher ratings of students' abilities. In addition, parents rated girls and boys equally on literacy ability, even though girls actually outperformed boys on literacy tests (Herbert & Stipek, 2005). As Bronfenbrenner's Bioecological Model (1977) illustrates, at the level of the microsystem, interactions between children and their parents have important implications for human development.

It has been well documented that parents' beliefs about gender differences in math ability are linked to youth's beliefs about their own abilities and their academic outcomes (Bhanot & Jovanovi, 2005; Bleeker & Jacobs, 2004; Jacobs, 1991; Tiedemann, 2000). Parents' gender stereotypes can be conveyed to their children in subtle and overt ways. Bhanot and Jovanovic (2005) reported that girls were more sensitive to their parents' intrusiveness during math homework time than boys, and that girls' competence in math was undermined in relation to these intrusions. Jacobs (1991) found that parents who endorsed traditional gender stereotypes had greater confidence in sons' math ability than daughters' math ability with children's actual ability controlled. Parent perceptions, in turn, were related to girls having lower math expectancies than boys, even though girls had higher math achievement than boys. Bleeker and Jacobs (2004) continued this line of research on the relationship between mothers' math/science gender stereotype endorsement and beliefs about their own children, and found that mothers' beliefs about their sons' and daughters' sixth-grade abilities in math/science predicted their children's math/science self-efficacy two years after high school, and this relationship was mediated by the children's perceptions of their math abilities in tenth grade. Even though no gender differences were found in the authors' regression analyses, the earlier work (Jacobs, 1991) suggests that parents' beliefs about their children's math/science abilities are gender-differentiated. Other researchers have found no gender difference in parents' beliefs about boys' and girls' natural math talent; however, these same parents believe that, even when controlling for performance, math is harder for girls to do and that boys will have an easier time than girls with math-related careers (Parsons, Adler, Kaczala, 1982; Wigfield et al., 2002).

Researchers have also examined whether parents' gendered academic beliefs influence youths' own gendered academic beliefs (Copping et al., 2010; Kurtz-Costes, Rowley, Harris-Britt, & Woods, 2008). Kurtz-Costes and colleagues (2008) found that compared to boys who perceived adults to have egalitarian beliefs, boys who perceived adults to have traditional gender stereotypes rated boys' abilities in math and science as higher. Copping et al. (2010) also found that children's perceptions of adults' academic gender stereotypes are correlated with their own gender stereotype endorsement. As Bleeker and Jacobs (2004) argue, it is evident that researchers should continue to include parental beliefs in studies concerning adolescent academic and occupational choices.

Expectancy-Value Theory and Academic Motivation

As mentioned above, at the level of the macrosystem, traditional gender stereotypes in the United States are that girls are better in English than boys, and boys are better at math and science than girls (Kiefer & Sekaquaptewa, 2007; Schmader, Johns, & Barquissau, 2004). Expectancy-value theory holds that expectancies are the beliefs one has that he/she can successfully accomplish a task (i.e., "I am good at basketball"), and values are the reasons one has for doing the task (i.e., "I enjoy playing basketball") (Eccles & Wigfield, 2002; Wigfield & Eccles, 2000). Self-concept influences motivation in that youth who believe that they are capable of succeeding at a task are more likely to persist at the task in the face of obstacles and to select more challenging tasks in the future (Wigfield et al., 2002). According to expectancy-value theory, in addition to expecting that they might succeed on a task, youth must value the task and have set goals to accomplish it, in order for them to engage in it (Eccles & Wigfield, 2002; Wigfield & Eccles, 2000). Youths' expectations regarding their own future achievement and their task values are probably shaped in part by traditional gender stereotypes. Thus, girls who endorse these traditional stereotypes might not expect to do well in math and science, but have high expectations for their abilities in English. As a result, girls could choose to value their English performance over their math and science performance.

Evidence suggests that youth who endorse traditional academic gender stereotypes rate their self-concept and expectancies in academic domains in line with those stereotypes (Chatard, Guimond, Selimbegovic, 2007; Evans et al., 2010; Herbert & Stipek, 2005; Kurtz-Costes et al., 2008; Wigfield et al., 2002). For girls whose self-concept in English is higher than it is in math, there may be a tendency to focus on perceived verbal talent rather than math talent. As a result, these girls may be more likely to take advanced-level English and foreign language courses over advanced-level math courses and consequently be less likely to pursue a future in a STEM domain (Copping et al., 2010). Compared to boys, girls are less likely to enroll in advanced level math and science courses in high school (Farmer et al., 1995; Leahy & Guo, 2001), which then leads to substantial gender differences in employment in STEM-related fields (National Science Foundation, 2010).

In line with gender differences in self-concept, during high school girls report stronger valuing of English compared to boys, whereas valuing of math appears to be more equal for boys and girls (Eccles et al., 1993; Jacobs, Lanza, Osgood, Eccles, & Wigfield, 2002; Wigfield et al., 2002). Eccles et al. (1993) found that subjective task value is a separate concept from perceived competence. In their study, the authors included measures of task value that assessed domain usefulness, importance, and likeability (e.g., "For me, being good at math is not at all important/very important)" (Eccles et al., 1993, p. 834). Despite Eccles et al.'s (1993, p. 834) findings that likeability items (i.e., "How much do you like doing math? [not at all, very much]") loaded onto the factor they labeled "subjective task values" (which did not differ by gender in their sample), other researchers have found gender differences in youths' math interest. For example, Owens, Smothers, and Love (2003) argue that girls seem to lose interest in math, science, and computer technology at some point in middle or high school. Schmader and her colleagues (2004) found that among college women with math-related majors, those who endorsed traditional math gender stereotypes had the lowest math competence and had the least interest in continuing in the field of math. Because two of the key predictors of high school students' math class enrollment are math self-concept and interest in math (Nagy, Garrett, Trautwein, Cortina, Baumert, & Eccles, 2008; Watt, 2008), it is evident from this set of findings that more research is needed to tease apart the influences of domain-specific self-concept, importance, and interest on youths' academic decisions. In the current study, all three motivational variables (i.e., self-concept, importance, and interest) were assessed.

Parents as Gender Socializers and Youths' Experiences of Gendered Felt Pressure

Beyond the influence that parents have on their children's academic self-concept, as described above, parents typically also play a large role in other aspects of their children's gender socialization (Fagot & Leinbach, 1989; Parsons et al., 1982) which may contribute to their children's educational and career choices (Chhin, Bleeker, & Jacobs, 2008; Wigfield et al., 2002). Parents' gender stereotypes may be associated with the amount of encouragement they give their children to participate in different domains and the degree to which they think it is important that their child acquire the skills necessary for those domains (Wigfield et al., 2002). Parents may transmit gendered messages about values and the importance of specific domains to their children both explicitly and implicitly, via direct statements or through the type of feedback they give their children. For example, parents may make clear suggestions as to the careers they expect their children to pursue, or they may simply act as models for their children (Wigfield et al., 2002). Children of parents who endorse traditional gender stereotypes may feel pressure to conform to those stereotypes.

Egan and Perry (2001, p. 451) suggest that at an early age children probably begin asking themselves questions such as, "How well do I fit with my gender category? Must I adhere to the stereotypes for my sex or am I free to explore cross-sex options? Is my sex superior or inferior to the other?" Egan and Perry argue that these types of questions and their answers represent aspects of a youth's gender identity. Of interest in the current study is a construct that Egan and Perry (2001) have named "felt pressure." When children perceive strong pressure from their parents (as well as broader society) to behave in gender-congruent ways, they may be more likely to internalize gendered messages and believe that they will be judged negatively by others if they do not behave accordingly. Youth who experience high degrees of felt pressure may be less likely to want to build on their natural talents and to explore a variety of career options, and instead may choose to focus on what is considered to be gender appropriate by their socializers. Such pressures may leave the young people feeling unsatisfied and unfulfilled. Egan and Perry (2001) found that girls who reported high felt pressure also had lower global self-worth reports than girls who reported low felt pressure. The authors point out that because male-typed attributes and careers are more valued in our society, high levels of felt pressure is probably not as detrimental for boys as it may be for girls (Egan & Perry, 2001).

In the current study, I hypothesized that youths' reports of felt pressure and domain-specific gender stereotype endorsement would each separately predict domain-specific intended college major/ career aspirations and that these relations would be mediated by domain-specific self-concept, importance, and interest. I also hypothesized that gender would moderate these relationships. That is, I predicted that the levels of reported felt pressure and traditional stereotype endorsement would predict different outcomes for boys and girls, in line with traditional stereotypes (i.e., higher felt pressure would predict higher math self-concept for boys and lower math self-concept for girls). For each academic domain, I will test separate models for each predictor and mediator. As an example, these relations are portrayed in Figure 1 for the domain of math, with felt pressure as the predictor variable and self-concept as the mediator.

Gender-Based Academic Discrimination

In addition to the home environment, where youth are likely to spend their time in the company of their parents, youth also spend much of their time in schools, where they spend their time in the company of peers and teachers. Thus, at the level of the microsytem, the interactions and experiences that children and adolescents have in the school environment are likely to further influence their academic self-concepts, course-taking decisions, and career aspirations (Bronfenbrenner, 1977). Researchers have indicated that teachers are susceptible to stereotypes in the classroom (Gray & Leith, 2004; Jussim & Eccles, 1992; Tiedemann, 2000). For example, Jussim and Eccles (1992) found that teachers erroneously viewed boys as more capable than girls in math, and that teachers over-attributed girls' success in math to effort rather than ability. Interestingly, it has been argued that stereotype activation is increased when a person's self-esteem is threatened (Hilton & von Hippel, 1996). If a teacher is having a difficult time teaching girls a mathematical procedure, for example, and the teacher's self-esteem is tied to instructional efficacy, the teacher may attribute students' failure to negative stereotypes about women's mathematical abilities rather than something about his or her teaching strategies. This sequence of events could lead to gender discrimination in the classroom, because instead of changing a teaching approach, the teacher may endorse and act on gender stereotypes.

Considering that stereotypes are both descriptive and explanatory, people may use stereotypes to guide them in making attributions about performance and behaviors (Reyna, 2000; Rouland, Rowley, Kurtz-Costes, DeSousa, & Wachtel, 2011; Swinton, Kurtz-Costes, Rowley, & Adeyanju, in press). Because stereotypes convey attributional information, there is a stereotype-attribution link. The three dimensions of attributions are: 1) locus of causality (internal or external), 2) controllability (i.e., events are controllable or not, laziness and hard work vs. innate ability), and 3) stability (long-term or short-term). Reyna (2000) applied the principles of attribution theory to understanding teacher expectations. For example, if a teacher endorses the stereotype that girls are not good at math, this belief would convey an internal, uncontrollable, and stable attribution (Reyna, 2000). In this case, stable attributions may lead teachers to have low expectations for their female students in math because they believe that nothing can be done to improve girls' mathematics abilities given the stability of gender (Reyna, 2000). Because high school teachers see so many students throughout the day, it is difficult for them to form individual impressions of each student. Thus, some teachers may be likely to rely on stereotypes to influence their perceptions of students and to guide their attributions (Reyna, 2000). The attributions a teacher makes about student performance will affect how he or she treats the student (Reyna, 2000).

Parents' attributions for their children's domain-specific failures and successes may also be influenced by gender stereotypes. These success/failure parent attributions have been linked with gender-differentiated children's self-perceptions. For example, Rouland et al. (2011) found a negative relationship between parents' attributions for ability-based literacy failures and sons' literacy self-concepts and a positive relationship between parents' ability-based math/science successes and girls' math/science self-concepts. In the current study, I explored whether or not students perceived academic-related domain-specific experiences as gender biased.

While the combined impact of teacher and parent expectations on children's expectations for themselves has rarely been addressed in previous literature, a study conducted by Benner and Mistry (2007) is one exception. The authors found that among children whose teachers and parents both held high expectations for them, the children also reported high expectations for themselves. Similarly, children whose teachers and parents both held low expectations for them also reported low expectations for themselves. The authors further found that high parental expectations may buffer low teacher expectations.

Thus, it is important to consider the impact of other significant adults in a child's life when considering formation of the child's academic expectations and values.

For the current study, I predicted that parental support in a particular domain would buffer adolescents from gender-based and domain-specific academic discrimination experiences. Parental support of a domain includes parental encouragement to take classes in that domain, the youth's perception that the domain is important to the parent, and parental stereotypes that either favor the child's gender in the domain or are neutral. Gender discrimination is operationalized as the youths' perceptions of others' unfair assumptions about their academic abilities or actions toward them based solely on their gender. The items were chosen because they represent domain-specific academic discrimination experiences, but they do not specify the source of the discrimination (i.e., teachers, school counselors, parents, or peers). As an example, these relations are portrayed in Figure 2 for the domain of math.

The Present Study

The purpose of this study was to better understand gender differences between adolescent girls and adolescent boys in their reports of beliefs about and attitudes toward math, science and English. The particular attitudes and beliefs I measured are academic gender stereotypes, importance, self-concept, and interest. Furthermore, I explored the relations between these variables and associated academic outcomes. The academic outcomes of interest for this study included course taking choices, expected college major, and future career domain. I also examined the influence of parents' beliefs, adolescent felt pressure, and perceptions of gender-based discrimination experiences on these relationships. I explored these relations in youth who were in Grade 10—a time when youth are making choices about academic courses that will shape their subsequent pursuit of higher education. In this project, I sought to apply Bronfenbrenner's model to further our understanding of gender stereotypes and their outcomes and to address gaps in the existing literature.

The hypotheses were as follows:

(1) The first set of hypotheses concerned gender differences in microsystem variables. First, I predicted gender differences in girls' and boys' reports of domain-specific interests, importance, self-concept, course taking, intended major, and career aspirations that mirror traditional stereotypes (i.e., on average, boys will favor math and science, whereas girls will favor English). In addition, girls and boys were both expected to report traditional gender stereotype beliefs. Also pertaining to the microsystem, on average, it was predicted that parent reports would reflect traditional stereotypes. That is, parents of girls would be more likely to report that their daughter has future plans for English and is more likely to major in English than math or science, and these reports for English would be greater than that of reports provided by parents of boys. The opposite was expected to be the case for parents of boys. Parents of girls and parents of boys were both also expected to report traditional gender stereotype beliefs.

(2) The second set of hypotheses had to do with connections between microsystem variables and various outcome measures. In particular, it was predicted that domain-specific interests, importance, and self-concept would be positively related to domain-specific course taking, intended major, and career aspirations. In addition, I predicted that felt pressure and endorsement of gender stereotypes would each be related to domain-specific intended major/career aspirations. Domain-specific self-concept,

importance, and interest were expected to mediate these relationships in gender stereotyped ways (see Figure 1).

(3) The third set of hypotheses had to do with relations between the parents' gender-traditionality (i.e., student reports of felt pressure and parents' gender stereotypes) and parental encouragement to take domain-specific advanced courses.

(a) I expected that student-reported felt pressure would be related to domain-specific encouragement. For example, if a girl reported high felt pressure, she would be less likely to report that her parent encourages her to take advanced level math classes. Boys who reported high felt pressure were expected to report less parental encouragement to take English courses and greater encouragement to take advanced math and science courses.

(b) Controlling for youths' academic ability, parents' stereotypes were expected to be related to their encouragement of their children's domain-specific course taking. That is, stereotyped parents of boys were expected to be more likely to encourage their sons to take advanced math and science classes than advanced English classes. Stereotyped parents of girls were expected to be more likely to encourage their daughters to take advanced English classes than advanced math or science classes.

(4) I predicted that girls would differ from boys in their reports of domain-specific gender discrimination, and discrimination reports would be related to domain-specific outcomes.

(a) I expected that girls would report greater discrimination in math and science than in English, and girls' reports of math/science discrimination would be greater than that of boys. The opposite was expected to be the case for boys.

(b) Students' reports of gender discrimination within the domains of math, science, and English were expected to be related to students' intentions to: (1) take advanced level classes; (2) pursue careers; and (3) major in those respective domains.

(c) Gender-based domain-specific discrimination was predicted to be negatively related to domain-specific motivational beliefs (i.e., interests, importance, and self-concept). However, domain-specific parental support (i.e., encouragement to take <domain> classes and domain-specific beliefs that favored their child's gender or were neutral) was expected to moderate this relationship. That is, for youth who had experienced high levels of parental support in a domain, gender-based discrimination in that domain was expected be unrelated to beliefs regarding that domain (interest in, importance of, and self-concept) and future orientation (see Figure 2).

Method

Participants

Participants for this study were part of a larger study called the Youth Identity Project (YIP). YIP is longitudinal study that has followed a sample of African American students from 5th grade to 10th grade; its purpose is to investigate the factors that help youth succeed in school. During a recent phase of the study (2008-2009), a new sample of racially diverse participants was recruited from the math and English classrooms of the longitudinal participants. In the last two years of data collection for this study (2009-2011), participants were recruited from tenth-grade English classrooms in the same school district as the longitudinal sample, as well as from one additional nearby school district. Longitudinal participants were not included in the analyses for the present study because many of the analyses reported here include measures that were added specifically for this new wave of data collection. Familiarity with the repeated measures could also bias the longitudinal participants' responses.

A total of 318 tenth-grade students (182 girls and 136 boys) participated in the study (*M* age = 15.8). Youth were asked to indicate their race on their consent forms. Race and gender demographic information is displayed in Table 1. These students were recruited from three different high schools within one urban school district and one high school within a rural school district. Both school districts are located in a southeastern region of the United States. Within the urban school district, the percentage of students who were eligible for free or reduced lunch ranged from 21% to 32%, and the majority of students were White (34%-39%) and African American (44%-57%). As for the rural high school, 24% qualified for free or reduced lunch and 82% of the student population was White. In addition to the youth participants, 160 of their parents/guardians (127 mothers, 30 fathers, and 3 "others") also returned parent surveys. The median parent-reported household income before taxes was between $90,000 and $99,000, and the median parent education level was "College graduate." It is important to note, however, that only about half of the youth participants' parents returned a survey, and therefore parent income and parent education for the whole sample may be different.

Student Measures

Self-Concept. To assess youths' self-concept in the domains of math, science, and English, a modified version of Nicholls (1978) measure was used. Participants were presented with a column of 25 stick figures with the words "worst in <domain>" at the bottom and "best in <domain>" at the top of each column, and for each item they circled the stick figure that they thought best represented how they compared to students in their grade. Two 5-point Likert items were also used to assess competence in each of the three domains; the scale ranged from *1* (strongly disagree) to *5* (strongly agree). The first was, "I feel very competent in <domain>," and the second was, "When I am in <domain> class, I often do not feel very capable," which was reverse coded. Z-scores were computed for these three items for each domain and were averaged to create self-concept scores for math, science, and English, α = .77, .68, and .69, respectively.

Importance. Two items assessed student reported importance of each of the three academic domains ("It is important to me that I am good in <domain>" and "Being a good <domain> student is an important part of who I am"). These items were averaged to create importance scores for math, science, and English, α = .77, .74, and .65, respectively. Youth also reported how important each of the three academic domains is to their parent in a single item ("It is important to my parent that I am good in <domain>"). Agreement was rated on a 5-point Likert scale ranging from *1* (strongly disagree) to *5* (strongly agree).

Interest. In order to gauge academic interest in the three academic domains (math, science, and English) participants were asked the following questions: "How interested are you in the material you learn in your <domain> class?"; "In general, how do you find working on <domain> assignments?"; and "Overall, how much do you typically enjoy taking

<domain> classes?" Students responded on a 5-point Likert scale which ranged from *1* (not at all interested) to *5* (very interested). These three items were averaged to create interest scores for math, science, and English (α = .90, .88, and .92, respectively).

Future plans. Two 5-point Likert items were used to assess students' plans to take advanced courses in or pursue a career in each of the three academic domains. The scales ranged from *1* (not at all likely) to *5* (very likely). The questions were, "In the future, how likely are you to enroll in an Honors or AP class in <domain>?" and "How likely are you to pursue a career in <domain>?" Students reported their intentions to major in a variety of academic fields by responding to a list of options using a 5-point Likert scale. Again, the scales ranged from *1* (not at all likely) to *5* (very likely). The prompt read, "If you plan on going to college, please circle the number that best represents how likely you are to major in each category." See Appendix A for the list of response options. For some analyses, the average score for these three items was used to capture the students' future plans in regards to each of the three domains (α = .78, .81, and .72, for math, science, and English, respectively).

Gender stereotypes. Adolescents' beliefs about the competence of boys and girls in math, science, and English were measured using visual analog scales (VAS) (Rowley et al., 2007). VAS are 100-millimeter lines with anchors set at *0* (not at all well or very hard) and *100* (very well or very easy). Adolescents were asked to describe girls and boys on separate pages, and the presentation order was counterbalanced across forms. Students made a mark on the 100-mm line for each item to indicate their beliefs about boys and girls for each domain (e.g., "I think that in math girls do this well."). Each VAS line was measured from the left end of the line to the mark the participant made on the line. Scores could range from zero to 100. The scores for the two items assessing the same academic subject were averaged to form one score for each domain for each gender, for ratings of girls α = .72, .77, and .75, for ratings of boys α = .76, .82, and .83, for math, science, and English, respectively. From these scores, difference scores may be calculated. For example, in line with traditional stereotypes, the score a participant gave for girls in math may be subtracted from the participant's math rating for boys. A difference score of zero represents egalitarian beliefs, a positive score represents traditional stereotypes, and a negative score reflects nontraditional beliefs.

Felt pressure. Adapted from Egan and Perry (2001), adolescents' perceptions of pressure from parents to behave in gender-consistent ways were assessed by six 5-point Likert items (*1* = strongly disagree; *5* = strongly agree). An example item for girls was, "My parents would be upset if I acted like a boy." See the Appendix for a complete list of items. Items were worded differently for girls and boys, in line with traditional gender stereotypes. For both female and male participants, item two was reverse coded. All items were averaged to form a composite felt pressure score, α = .82.

Perceived Parental Encouragement. To measure the degree to which youth perceived that their parents encouraged them to take advanced courses in each domain, the youth were asked to respond to the item, "My parent encourages me to take advanced level <domain> classes," followed by a 5-point Likert scale (*1* = strongly disagree; *5* = strongly agree).

Gender Discrimination. Youth reported their experiences with gender-based discrimination in school by responding to 9 items adapted from Fisher, Wallace, and Fenton's (2000) Adolescent Discrimination Distress Index. The initial prompt read, "Sometimes people are treated badly because of a group to which they belong. For example, sometimes girls aren't allowed to play football with boys in their neighborhood just because they're girls. The questions below are about times you may have been treated badly because you are female (male, for boys). After each statement, tell us how often that event happened because of your gender. Remember, we are only interested in times when you felt you were treated a certain way because you are a girl (boy)." Three items were asked for each of the three academic domains (e.g., "Because you are a girl/boy, you were given a lower grade than you deserved in science.") See Appendix A for a complete list of items. The items were followed by a five-point scale ranging from *1* (Never) to *5* (More than ten times). The three domain-specific items were averaged to form one composite discrimination score for each domain.

Grades and Test Scores. Students' math, science, and English grades from the 9th grade were obtained from school record data. Youth were also asked to report their letter grade in each subject from the previous year's report card. Student-reported grades were used in place of record data if record data were not obtained (i.e., if parent permission was not given for access to school records).

Parent Measures

Parents' Beliefs about Their Children's Future Plans. Parents' beliefs about their children were measured using many of the same, slightly reworded, items as were used for the adolescent participants. For future plans in each of the three domains, parents were asked, "My child is likely to take honors or advanced placement courses in <domain>." In addition, for the domains of mathematics and science, parents rated the item "My child is likely to have a career in a <domain>-related field" followed by a 5-point Likert scale, ranging from *1* (not at all likely) to *5* (very likely).

Parent Encouragement. To measure the degree to which parents encourage their child to take advanced courses in each domain, they were asked to respond to the item, "I would encourage my child to take advanced level <domain> classes," followed by a 5-point Likert scale (*1* = strongly disagree; *5* = strongly agree).

Parents' Beliefs about Their Children's College Major. In order to capture parents' perceptions of their child's intended major, parents were prompted with the statement, "If your child plans on going to college, please circle the number that best represents how likely he/she is to major in each category," followed by the same list of categories and response options listed for the youth participants. Also, in line with the procedure used for student data, parents were asked about the likelihood that their child would pursue a career in the domains of math or science. The importance that parents place on each domain was evaluated by their response to the 5-point Likert item, "It is important to me that my child is good in <domain>," with the scale ranging from 1 (strongly disagree) to 5 (strongly agree).

Parents' Gender Stereotypes. Parents' gender stereotypes were measured in the same way described above for youth participants. Reliabilities for parents' perceptions of the competence of girls in the domains of math, science, and English, respectively, were α = .74, .74, and .76. Reliabilities for parents' ratings of the competence of boys were α = .76, .75, and .79.

Parent Education and Income. Parents' education and income were obtained from parent reports. The scale for education ranged from *1* (less than high school) to *10* (doctoral or professional degree). The scale for yearly household income ranged from *1* (under $10,000) to *11* (over $100,000).

Procedure

Graduate research assistants visited tenth-grade math and English classrooms, described the study, and distributed consent documents to students. Those students who were interested in participating in the study provided their demographic information and contact information for their guardians. Guardians of the consenting students were mailed information about the study and were invited to participate themselves. Research assistants, who were predominantly women, subsequently met with small groups of students in a quiet space in the high schools to distribute the surveys, which took approximately 30 minutes to complete. After finishing the survey, students received either a $10 gift card or a $10 check as a thank you. Parents were then mailed a similar survey and asked to complete it at a time and place that was convenient for them. Parents who returned their surveys received a $25 gift card or a $25 check as a thank you. Because of blocked schedules, some students were not taking all three subjects (math, science, and English) during the semester that students completed surveys. Therefore, for students who had only partial data from the fall semester, graduate students returned to the high schools in the spring to have participants complete their surveys.

Results

Preliminary analyses were conducted prior to testing study hypotheses. No univariate outliers were found, and all variables were roughly normally distributed. Controlling for the youths' previous year's domain-specific academic achievement, means and standard errors for all study variables, by adolescent gender, can be found in Table 2 for youth variables and

Table 3 for parent variables. Two separate factor analyses were also run, one for boys and one for girls, on the six felt pressure items that were adapted from Egan and Perry (2001) to determine if the items should be used together. For both boys and girls, all items loaded onto one factor. A reliability analysis was also conducted on the six items and adequate reliability was found, $\alpha = .71$ and .79, for girls and boys, respectively.

Gender Differences in Motivational Variables and Domain-Specific Outcomes

Univariate analyses of covariance (ANCOVA) – for each academic domain – were used to examine gender differences as discussed in Hypothesis 1. With the previous year's domain-specific academic achievement covaried, the dependent variables entered into the separate ANCOVAs were domain-specific interest, importance, self-concept, course taking, intended major/career aspirations, and gender stereotypes. In order to increase statistical power that was lost because of missing achievement data, sample means were used to replace missing achievement scores for these analyses. I expected to find gender differences consistent with traditional stereotypes (that is, boys would favor math and science and girls would favor English on all variables). This analysis was a conservative test of Hypothesis 1 because prior domain-specific achievement was controlled.

For the domain of math, gender differences were found in youths' reports of math self-concept and plans to major/pursue a career in math, $F(1, 315) = 6.42$ and 4.46, respectively, $p < .05$. Girls reported lower math self-concept than boys ($M_G = -.09$, $SE = .06$; $M_B = .13$, $SE = .07$), $d = .26$. Compared to girls, boys reported greater likelihood for plans to major/pursue a career in math ($M_G = 2.62$, $SE = .09$; $M_B = 2.91$, $SE = .11$), $d = .23$. For all other math-related variables, gender differences were nonsignificant, all p's > .05. Thus, only math self-concept and plans to major/pursue a career in math confirmed Hypothesis 1.

Despite the differences in boys' and girls' math self-concepts, both boys and girls reported egalitarian beliefs in their reports of group competence ratings in math. As can be seen in Table 2, boys' and girls' scores for the traditional math stereotype are negative and close to zero, suggesting that they are roughly egalitarian or slightly nontraditional. This finding is counter to Hypothesis 1. Furthermore, girls' and boys' grades in math did not differ significantly (see Table 2).

For the domain of science, counter to the first hypothesis, there were no significant gender differences in the univariate tests, all p's > .05. Both boys and girls reported roughly egalitarian science gender stereotypes.

For the domain of English, gender differences were reported for importance, interest, self-concept, and plans to major/pursue a career in English, $F(1, 290) = 13.05$; $F(1, 314) = 4.09$; $F(1, 315) = 3.98$ and 6.42, respectively, all p's < .05. Girls rated English as more important ($M_G = 4.05$, $SE = .06$; $M_B = 3.70$, $SE = .08$) and interesting than boys rated English ($M_G = 3.35$, $SE = .08$; $M_B = 3.09$, $SE = .10$), d's = .45 and .27, respectively. Boys rated their English self-concept lower than girls, ($M_G = .06$, $SE = .06$; $M_B = -.11$, $SE = .06$), $d = .26$. Finally, girls reported that they were more likely to major/pursue a career in English than boys ($M_G = 2.64$, $SE = .09$; $M_B = 2.31$, $SE = .10$), $d = .32$. For all of these variables, as predicted, gender differences mirrored traditional stereotypes. However, for plans to take advanced courses in English and English stereotypes, no significant gender differences were found, all p's > .05. Nevertheless, as predicted, both girls and boys gave girls the advantage in English (i.e., higher group competence ratings), as indicated by their traditional stereotype scores (see Table 2).

In order to compare the reports of parents of girls to the reports of parents of boys, additional ANCOVAs were run to assess parent data. Dependent variables in those ANCOVAs were parents' reports of their children's likelihood of taking domain-specific courses and selecting domain-specific majors/pursuing domain-specific careers, and gender stereotypes, again covarying the student's previous year's domain-specific academic achievement. Means and standard errors for these and other key study variables for parents of girls and parents of boys are reported in Table 3.

For the domain of math, differences were found in parent reports for the likelihood that their child would major/pursue a career in math and gender math stereotypes, $F(1, 153) = 5.61$ and $F(1, 147) = 5.78$, respectively, $p < .05$. As predicted, parents of boys reported that their sons were more likely to major/pursue a career in math than parents of girls ($M_G = 2.99$, $SE = .12$; $M_B = 3.42$, $SE = .14$), $d = .30$. Parents of boys reported stronger traditional math stereotypes than parents of girls ($M_G = 3.73$, $SE = 2.01$; $M_B = 11.21$, $SE = 2.36$), $d = .39$. Counter to Hypothesis 1, parents' reports of children's likelihood of taking advanced math classes did not differ for parents of boys and parents of girls, $p > .05$.

Counter to my hypotheses, for the domains of science and English, no significant univariate differences were found between the reports of parents of girls and parents of boys, all p's > .05, with one exception. A difference was found in parents' reports of science stereotypes, $F(1, 145) = 4.50$, $p < .05$. Parents of boys reported stronger traditional science stereotypes than parents of girls, who reported egalitarian beliefs ($M_G = 3.24$, $SE = 1.63$; $M_B = 8.63$, $SE = 1.94$), $d = .33$. Parents of girls and parents of boys reported gender stereotypes favoring girls in English (see Table 3). Therefore, whereas English stereotypes were traditional for both parents of daughters and parents of sons, parents of girls reported egalitarian beliefs about math and science, whereas parents of boys reported traditional gender stereotypes favoring boys in math and science.

Relationships between Motivational Variables, Felt Pressure, Youths' Gender Stereotypes and Domain-specific Outcomes

In the second hypothesis, I predicted that domain-specific interests, importance, and self-concept would each be positively related to domain-specific course taking, intended major, and career aspirations. I also expected that felt pressure and gender stereotypes would be related to domain-specific outcomes, and that the three motivational beliefs (i.e., interests, importance, and self-concept) would mediate these relations. Pearson bivariate correlations are reported separately for math, science, and English and appear in Tables 4, 5, and 6, respectively. For both girls and boys, within each academic domain, all of these variables were positively related with one another: all r's > 0.20, $p < .05$, and 67 of the 90 correlations exceeded 0.40 (see Tables 4-6).

Regression models were used to test the two parts of Hypothesis 2: namely, that felt pressure, gender stereotypes, and motivational beliefs (i.e., interests, importance, and self-concept) would be related to outcome variables, and that the relations between felt pressure and gender stereotypes on adolescents' plans to major/pursue a career in all three domains would be mediated by motivational beliefs. Regression models were run using full information maximum likelihood estimation (FIML) in M-Plus version 5.2. FIML was selected because it is better suited than other analytic options to handle datasets with missing data. Unlike the Baron and Kenny (1986) approach to test for mediation, which involves several steps, M-Plus is able to test all aspects of the mediation model simultaneously (i.e., the predictor, the mediator, and all covariates are entered in the same "step").

Figure 1 shows the analysis that I planned to conduct on the adolescent's plans to major/pursue a career in each of the domains, with the domain of math as an example. Because of the range of parent income and education levels in the sample, and because these variables are known to correlate with educational attainment goals, I controlled for both factors in all of the regression analyses. Figure 3 reflects the additions to the original model. For each academic domain, felt pressure and endorsement of domain-specific gender stereotypes were tested separately to predict intended major/career aspirations (these two variables were aggregated because they were so strongly correlated with one another). In addition to parent income and education, the adolescent's previous year's domain-specific academic achievement was controlled in each analysis. Domain-specific self-concept, importance, and interest were also each tested separately as hypothesized mediators of this relationship. Because I predicted that the regression of domain-specific self-concept, importance, and interest on felt pressure and stereotypes would depend on gender, gender was included as a moderating variable in these analyses. For example, it was hypothesized that stronger endorsement of the stereotype that boys are better than girls in math would be related to a lower math self-concept for girls but a higher math self-concept for boys, and math self-concept would be related to math career intentions.

The results of these meditational models appear in Table 7 for the predictor variable *felt pressure* and Table 9 for the predictor variable *stereotype endorsement*. Because these models are completely saturated, as all paths are estimated, they have perfect model fit statistics. The first set of columns in the tables refers to the domain of math, the second set refers to science, and the last set of columns refers to English. Within each domain, results are presented separately for each mediator (i.e., importance, self-concept, and interest). The indirect effects of these mediators are listed in Table 8 (for the felt pressure model) and Table 10 (for the stereotype endorsement model). The indirect effects tested whether the individual mediators explained the relationship between felt pressure and plans to major/pursue a career in each domain, and the relationship between stereotype endorsement and plans to major/pursue a career in each domain. Because gender traditionality would lead to different choices for girls and boys, all indirect effects were expected to be moderated by gender. Significant interactions were probed using Preacher's Interaction Calculator (Preacher, Curran, & Bauer, 2006). Results of these analyses are summarized below.

Felt Pressure and Students' Major and Career Intentions

Results are summarized first for the mediation model with felt pressure as the focal predictor (see Tables 7 and 8). Given the complexity of these analyses, only the primary effects (i.e., those central to the study hypotheses) are summarized here. Readers are referred to the respective tables to see which control variables were significant predictors. An alpha level of $p < .05$ was used throughout. For the three analyses predicting students' plans to major/pursue a career in math, math importance, math self-concept, and math interest each predicted the adolescent's plan to major/pursue a career in math, $B = .58$, $SE = .07$; $B = .48$, $SE = .09$; $B = .65$, $SE = .05$, respectively. Counter to Hypothesis 2, the indirect effects of felt pressure influencing major/career through math importance and math self-concept were nonsignificant. However, felt pressure indirectly influenced plans to major/pursue a math career through its impact on math interest, $B = .18$, $SE = .08$, $p < .05$ (see Table 8). Thus, irrespective of gender, students who felt pressure from parents to conform to traditional gender roles were more likely to plan to major/pursue a career in math.

For the three analyses predicting students' plans to major/pursue a career in science, science importance, science self-concept, and science interest each predicted the adolescents' plan to major/pursue a career in science, *B* = .71, *SE* = .07, *B* = .63, *SE* = .08, *B* = .70, *SE* = .05, respectively. In the model with science importance as the mediator, the felt pressure X gender interaction was also significant, *B* = -.33, *SE* = .16. The plot of this interaction is portrayed in Figure 4. Counter to Hypothesis 2, the slope for boys was negative and the slope for girls was nonsignificant, indicating that at higher levels of student-reported felt pressure, boys were less likely to plan to major/pursue a career in science, whereas for girls, felt pressure was not related to plans to major/pursue a career in science. Counter to Hypothesis 2, the indirect effects of science importance and science interest were nonsignificant. However, felt pressure and felt pressure X gender indirectly influenced plans to major/pursue a career in science through the impact they had on science self-concept, *B* = .14, *SE* = .07; *B* = -.20, *SE* = .10, respectively. The plot of this interaction is portrayed in Figure 5. Counter to Hypothesis 2, the slope for girls was positive and the slope for boys was nonsignificant, indicating that at higher levels of student-reported felt pressure, girls had higher science self-concept, whereas for boys, felt pressure was not related to science self-concept. Science self-concept was in turn positively related to plans to major/pursue a career in science.

For the three analyses predicting students' plans to major/pursue a career in English, English importance, English self-concept, and English interest each predicted the adolescent's plan to major/pursue a career in English, *B* = .47, *SE* = .08; *B* = .52, *SE* = .08; *B* = .49, *SE* = .05, respectively. Counter to Hypothesis 2, felt pressure was unrelated to the three motivational beliefs and was also unrelated to major/career intentions in all three equations.

Academic Stereotypes and Students' Major and Career Intentions

Next, the results are summarized for the mediation model with students' stereotype endorsement as the focal predictor (see Tables 9 and 10). As noted above, math importance, math self-concept, and math interest each predicted the adolescents' plan to major/pursue a career in math, $B = .59$, $SE = .08$, $B = .48$, $SE = .09$, $B = .65$, $SE = .05$, respectively. Counter to Hypothesis 2, the paths between students' math stereotypes and the two motivational beliefs math importance and math interest were nonsignificant. However, students' math stereotype endorsement indirectly influenced plans to major/pursue a career in math through its impact on math importance and math self-concept, and as expected, these relations were moderated by gender, $B = .01$, $SE = .01$; $B = .01$, $SE = .01$ (see Table 10). The plots of these interactions are portrayed in Figures 6 and 7, respectively. For the first interaction, consistent with Hypothesis 2, the slope for boys was positive and the slope for girls was negative (at the trend level, $p < .10$), indicating that at greater endorsement of the traditional math stereotype, boys rated math as more important, whereas girls rated math as less important. For the second interaction, the slope for girls was negative and the slope for boys was nonsignificant, indicating that at greater endorsement of the traditional math stereotype, girls had lower math self-concept, whereas for boys, math stereotype endorsement was not related to math self-concept. Math importance and math self-concept were in turn positively related to plans to major/pursue a career in math.

As reported above, science importance, science self-concept, and science interest each predicted the adolescent's plan to major/pursue a career in science. However, counter to

Hypothesis 2, students' science gender stereotypes were unrelated to the three motivational beliefs and were also unrelated to science major/career intentions (see Table 9). Thus, the indirect effects of science importance, science self-concept, and science interest were nonsignificant (see Table 10).

In the domain of English, the English stereotype X gender interaction predicted English importance, B = -.01, SE = .01. The plot of this interaction is portrayed in Figure 8. Consistent with Hypothesis 2, the slope for boys was negative. The slope for girls was nonsignificant. At greater endorsement of the traditional English stereotype, boys rated English as less important, whereas for girls, endorsement of the English stereotype was not related to English importance. The English stereotype X gender interaction was also significant in predicting English self-concept, and this path mediated the relation between English stereotypes and major/career intentions, B = -.01, SE = .004. The plot of this interaction is portrayed in Figure 9. Partially in line with Hypothesis 2, the slope for girls was positive and the slope for boys was nonsignificant, indicating that at greater endorsement of the traditional English stereotype, girls had higher English self-concept, whereas for boys, endorsement of the English stereotype was not related to English self-concept. English self-concept was in turn positively related to plans to major/pursue a career in English. Counter to Hypothesis 2, English importance and English interest did not mediate the relation between English stereotypes and English career intentions.

In general, for both focal predictors (i.e., felt pressure and stereotype endorsement), and across academic domains, the selected mediating variables did not mediate the relationships between the predictors and the adolescent's plan to major/pursue a career in the specific domains. However, all three motivational variables were significantly related to major/career plans, and in some cases there was evidence to support mediation. Moreover, gender stereotypes about math and English predicted motivational beliefs in theoretically-hypothesized ways. I will return to these points in the discussion.

Felt Pressure, Parents' Stereotypes, and Parental Encouragement to take Advanced Courses

As described in Hypotheses 3a and 3b, I predicted positive relationships between student-reported felt pressure and parent-reported domain-specific gender stereotype endorsement and parents' encouragement (as reported by both youth and parents) to take advanced coursework. Pearson correlations are reported in Tables 11-13, for math, science, and English, respectively. A univariate ANOVA revealed a gender difference in boys' and girls' reports of felt pressure, $F(1, 293) = 120.15$, $p < .001$. Boys, on average, reported more felt pressure than girls ($M_G = 2.40$, $SE = .06$; $M_B = 3.40$, $SE = .07$), $d = 1.29$. I predicted that the relation between felt pressure (3a)/parent gender stereotype endorsement (3b) and youth-reported (3a)/parent-reported (3b) encouragement to take advanced level domain-specific classes would be moderated by gender, such that, controlling for domain-specific ability, the slope for girls would be negative for math and science and positive for English, and the slope for boys would be positive for math and science and negative for English. Again, FIML in M-Plus was used to test each regression model. The results of these regression models appear in Tables 14 (for youth reports of parental encouragement) and 15 (for parent-reported encouragement). Counter to Hypotheses 3a and 3b, across all three academic domains, the felt pressure X gender and parent stereotype endorsement X gender interactions were nonsignificant for both student and parent reports. Instead, the control variables (adolescent's prior domain-specific grades, parent income, and parent education) predicted youth-reported parental encouragement to take advanced classes. Only course grades were related to parents' reports of encouragement (see Table 15).

Gender Discrimination, Parent Support, and Domain-specific Outcomes

A repeated-measures ANOVA was used to test the predictions of Hypothesis 4a, that is girls' reports of discrimination in math and science would be greater than their reports of discrimination in English and than boys' discrimination reports for math and science. Conversely, I predicted that boys' reports of discrimination in English would be greater than their reports of discrimination in math and science and than girls' reports for English. Gender (girls, boys) was entered as the between-subjects variable and Discrimination Experiences (in math, science, and English) was the within-subjects (repeated) variable, resulting in a 2(Gender) x 3(Discrimination Experiences) repeated-measures ANOVA design. Because multiple comparisons were made, the alpha level was set at .01.

The main effects of Gender and Discrimination Experiences were both significant, $F(1, 316) = 7.57$ and $F(2, 632) = 15.33$, respectively, p's < .01, and were qualified by a Gender x Discrimination Experiences interaction, $F(2, 632) = 12.58$, $p < .01$. Partially consistent with Hypothesis 4a, on average, girls reported more discrimination experiences in math than in science or English ($M_M = 1.26$ $SE = .04$; $M_S = 1.15$, $SE = .03$; $M_E = 1.15$, $SE = .04$), and boys reported fewer discrimination experiences in science than in math and English ($M_M = 1.33$, $SE = .04$; $M_S = 1.21$, $SE = .04$; $M_E = 1.41$, $SE = .04$). Counter to Hypothesis 4a, boys and girls did not differ in their reports of discrimination experiences in math or science. However, consistent with Hypothesis 4a, boys reported more discrimination experiences in English than girls, $d = .49$.

In Hypothesis 4b I predicted that greater experiences of domain-specific discrimination would lead youth to be less likely to plan to enroll in and major/pursue a career in those specific domains, in line with traditional stereotypes. That is, for girls, reports of discrimination in math and science would predict that girls would be less likely to plan to enroll in and major/pursue a career in math and science, whereas reports of discrimination in English would predict that boys would be less likely to plan to enroll in and major/pursue a career in English. Therefore, gender was entered in each model as a moderator of discrimination experiences. Previous domain-specific academic achievement ("course grade") was also controlled in each analysis. In order to address the predictions made in Hypothesis 4b, regression models were run using FIML in M-Plus. Results of these regression models are presented in Table 16, by outcome and domain.

Support for Hypothesis 4b would come from a significant discrimination experiences x gender interaction in predicting each of the dependent variables. Across all three academic domains and both dependent variables (enroll in advanced courses and major/pursue a career) the discrimination x gender interaction was nonsignificant (see Table 16). However, discrimination experiences predicted adolescents' plans to major/pursue a career in English, $B = .18$, $SE = .06$; $R^2 = .33$, $p < .05$. Nevertheless, the beta weight was in the opposite direction than would be predicted based on Hypothesis 4b. Because the beta weight was positive, rather than negative, this finding indicates that with increasing discrimination experiences in English, adolescents are more likely to plan to major/pursue a career in English. As would be expected, domain-specific course grade was also a significant predictor of each of the dependent variables, across all three domains (see Table 16). Additionally, parent education was a significant predictor of adolescents' plans to enroll in advanced English classes and plans to major/pursue a career in English, and parent income was a significant predictor of adolescents' plans to enroll in advanced science classes (see Table 16).

FIML in M-Plus was also used to test the predicted model from Hypothesis 4c: that domain-specific discrimination experiences would predict adolescents' plans for a future in those respective domains and that motivational beliefs (i.e., domain-specific importance, self-concept, and interest) would mediate this relationship. I also predicted that parents' domain-specific support would moderate these relationships, with a weaker relation between discrimination and outcome variables in families with high parental support. Parental support was defined as encouragement to take coursework, student perceptions that the domain was important to the parent, and parent gender stereotypes that favor the child's gender or are neutral within each domain. These hypothesized relationships are portrayed in Figure 2. Gender and domain-specific previous academic achievement (i.e., course grades) were entered into the model as covariates.

As a first step, I tested the factor structure of the Parent Support construct by regressing "Parent Support of <Domain>" on student-reported parental encouragement to take <domain> classes, student-reported "my parent thinks <domain> is important," and parental endorsement of domain-specific gender stereotypes. For these analyses, the parents' stereotype score was computed by taking the parents' domain-specific scores for their child's gender and subtracting the domain-specific scores for the opposite gender group. Thus, higher scores indicated that the parents favored their child's gender in each of the domains. This allowed me to include boys and girls in the same analyses. Because the parent-reported indicator variable *endorsement of domain-specific gender stereotypes* did not load onto the latent variable significantly for any of the academic domains, I dropped that variable. As a result, I aggregated the other two variables (i.e., student-reported parental encouragement to take <domain> classes and student-reported "my parent thinks <domain> is important") and called that variable "support." Thus, the latent variable was removed from the model, because latent variables require at least three indicators. Additionally, as was the case in my previous analyses, I controlled for parent education and income. All of these changes were made to the original model and are reflected in Figure 10, with the domain of math as an example.

Next, I tested the factor structure of the "Future" latent variable by regressing "Future in <Domain>" on domain-specific course taking, intended college major, and career aspirations. The factor loadings for this latent variable are presented in Table 17. The first indicator of the latent variable, *plans to take <domain> classes,* set the scale for the latent variable. All indicator variables for "Future in Domain" were significant (see Table 17), and therefore all were retained as indicators of that latent construct. Finally, I ran the new model for each of the academic domains and each of the mediators (see Figure 10). Because all paths were estimated, these models are completely saturated, and thus had perfect model fit statistics. The results of these models are presented in Table 18. The first set of columns is for math, the second for science, and the third for English. Within each domain, results for each individual mediator (i.e., importance, self-concept, and interest) are presented. The indirect effects of each of these mediators are displayed in Table 19. The indirect effects tested whether the individual mediators explained the relationship between support and future in <domain>, discrimination and future in <domain>, and support X discrimination and future in <domain>. Again, given the complexity of these analyses, only the primary effects are summarized here. Readers are referred to the respective tables to see which control variables were significant predictors. An alpha level of $p < .05$ was used throughout.

Within the domain of math, parent support of math predicted all mediating variables (i.e., math importance, math self-concept, and math interest), *B* = .55, *SE* = .17; *B* = .42, *SE* = .18; *B* = .49, *SE* = .24, respectively, and those three variables all significantly predicted adolescents' future in math, *B* = .38, *SE* = .06; *B* = .34, *SE* = .08; *B* = .44, *SE* = .05, respectively. Parent support of math indirectly influenced adolescents' future in math through its influence on math importance and math self-concept, *B* = .21, *SE* = .07; *B* = .14, *SE* = .07, respectively. The indirect effects were nonsignificant for math interest. In spite of these significant effects, neither discrimination nor the discrimination X support interaction predicted future in math or any of the math mediators. Thus, Hypothesis 4c was not fully supported within the domain of math. However, there was evidence that students' motivational beliefs mediated the relation between *parent support of math* and *future in math*.

Within the domain of science, parent support of science predicted the mediating variables science importance and science self-concept, *B* = .68, *SE* = .22; *B* = .57, *SE* = .23, respectively, and those two variables and science interest all significantly predicted adolescents' future in science, *B* = .43, *SE* = .07; *B* = .42, *SE* = .07; *B* = .41, *SE* = .04, respectively. Parent support of science indirectly influenced adolescents' future in science through its influence on science importance and science self-concept, *B* = .29, *SE* = .11; *B* = .24, *SE* = .10, respectively. The indirect effects were nonsignificant for science interest, but parent support of science did predict adolescents' future in science directly, *B* = .38, *SE* = .16. In spite of these significant effects, neither discrimination nor the discrimination X support interaction predicted future in science or any of the science mediators. Thus, Hypothesis 4c was also not fully supported within the domain of science. However, there was evidence that motivational beliefs (science importance and science self-concept) mediated the relation between *parent support of science* and *future in science*.

Within the domain of English, parent support of English predicted all mediating variables (i.e., English importance, English self-concept, and English interest), $B = .61$, $SE = .19$; $B = .61$, $SE = .14$; $B = .70$, $SE = .31$, respectively, and those three variables all significantly predicted adolescents' future in English, $B = .32$, $SE = .08$; $B = .38$, $SE = .14$; $B = .40$, $SE = .08$, respectively. Parent support of English indirectly influenced adolescents' future in English through its influence on English importance and English self-concept, $B = .19$, $SE = .08$; $B = .23$, $SE = .10$, respectively. The indirect effects were nonsignificant for English interest. In spite of these significant effects, neither discrimination nor the discrimination X support interaction predicted future in English or English importance or English interest. However, the English discrimination X parent support of English interaction did predict English self-concept, $B = -.26$, $SE = .11$. The interaction was probed using Preacher's Interaction Calculator (Preacher, Curran, & Bauer, 2006). The plot of this interaction is portrayed in Figure 11. Counter to Hypothesis 4c, the slopes for mean-level and high (one standard deviation above the mean) parent support were negative and the slope for low (one standard deviation below the mean) support was nonsignificant, indicating that at higher levels of discrimination, youth who reported high and mean levels of parent support of English had lower English self-concept, whereas for youth who reported low parent support of English, English discrimination was not related to English self-concept. Thus, for the domain of English, Hypothesis 4c was also not fully supported, but there was evidence of mediation and moderation for the predictor variable *parent support of English*.

Summary of Results

Gender differences predicted in Hypothesis 1 were found for some of the microsystem variables within the domains of math and English, but not science. Controlling for the previous year's domain-specific grades, compared to boys, girls reported lower math self-concept and less likelihood of majoring/pursuing a career in math, greater English importance, interest, and self-concept, and greater likelihood of majoring/pursuing a career in English. Surprisingly, both boys and girls reported traditional gender stereotypes only for the domain of English. As for parent reports, parents of sons were more likely than parents of daughters to report that their child would major/pursue a career in math. Parents of sons also reported stronger traditional gender stereotypes for the domains of math and science than parents of daughters. All other parent reports did not differ by child gender.

As predicted in Hypothesis 2, positive correlations between domain-specific interests, importance, and self-concept and domain-specific course taking, intended major, and career aspirations were all found, within each academic domain (see Tables 4-6). Math interest mediated the relationship between felt pressure and plans to major/pursue a career in math (see Table 8). Students who reported greater felt pressure had greater interest in math, and greater interest in math was related to a greater likelihood of majoring/pursuing a career in math. For the domains of science and English, the proposed mediation models with felt pressure were not supported. Both math self-concept and math importance mediated the relationships between math stereotype endorsement and plans to major/pursue a career in math in gender-specific ways (see Table 10). In other words, boys who endorsed the math stereotype had higher math importance and girls who did *not* endorse the stereotype had higher math importance and math-self-concept, and in turn, students who had higher math importance and math self-concept were more likely to have plans to major/pursue a career in math. There was no evidence of mediation in the science stereotype endorsement model (see Table 10). However, English self-concept mediated the relationship between stereotype endorsement and plans to major/pursue a career in English in gender-specific ways (see Table 10). For example, girls who reported greater endorsement of the English stereotype had higher English self-concept, and in turn, students with higher English self-concepts reported greater likelihood for plans to major/pursue a career in English.

Counter to Hypothesis 3, controlling for the student's previous domain-specific academic achievement, neither felt pressure nor parent-reported stereotypes predicted parents' encouragement of their children's domain-specific course taking (see Tables 16 and 17). Consistent with Hypothesis 4a, boys reported more discrimination than girls in English. Boys' and girls' reports of discrimination did not differ in math or science. Counter to Hypothesis 4b, discrimination reports were unrelated to course enrollment intentions and majors/careers in the anticipated directions (see Table 16).

Finally, little support was found for the role of discrimination as described in Hypothesis 4c and depicted in Figure 10. Parental support did not moderate the effects of discrimination on future in <domains>, with one exception. For students who reported higher parent support in English, English discrimination was related to lower English self-concept. Both direct and indirect effects of parent support were consistent with the model. *Parent support* of math, science, and English indirectly influenced adolescents' *plans to major/pursue a career* in math, science, and English, through the predictors' influence on math, science, and English *importance* and *self-concept*, respectively. For example, students who reported greater parent support of math rated math as more important and had higher math self-concept; math importance and math self-concept each, in turn, predicted the likelihood that the student would major/pursue a career in math.

Discussion

Because girls' math and science achievement is equal to or superior to that of boys in the elementary and middle school years, it is surprising that gender disparities remain in STEM-related majors and careers (National Science Foundation, 2000, 2008). Gender differences in occupational choices could be explained by domain-specific gender stereotypes and/or gender differences in youths' academic motivation (Eccles & Wigfield, 2002; Wigfield & Eccles, 2000). While a number of studies have addressed gender stereotypes in the domains of math and science (Bhanot & Jovanovi, 2005; Bleeker & Jacobs, 2004; Jacobs, 1991; Schmader et al., 2004; Tiedemann, 2000), fewer have examined gender stereotypes in the domain of English (Copping et al., 2010; Evans et al., 2011; Rowley et al., 2007). Furthermore, many researchers have explored the influence of parents' endorsement of academic gender stereotypes on child outcomes, but less attention has been paid to youths' endorsement of gender stereotypes, particularly when youth are in high school, or the specific mechanisms by which parents' beliefs might influence youth outcomes. The current study was designed to contribute to some of these gaps and inconsistencies in the research literature.

While I did not find strong evidence to support my hypotheses about youths' endorsement of math and science gender stereotypes, parents of adolescents endorsed traditional math and science stereotypes. Furthermore, both parents and youth endorsed the traditional stereotype that girls are better than boys in English, and youths' English and math stereotypes were related to youths' domain-specific motivation. As predicted, domain-specific motivational beliefs were related to domain-specific outcomes.   Parents' support of all three domains was directly related to children's motivational beliefs and indirectly related to child outcomes. I found little support for my hypotheses concerning felt pressure and gender-based academic discrimination.

Gender Differences in Domain-specific Self-Concept, Importance, and Intended Majors/Career Aspirations

Controlling for prior domain-specific grades, there were fewer gender differences between girls' and boys' reports of motivational beliefs and plans for the future than expected. While I expected to find gendered patterns that mirror traditional stereotypes across all three academic domains, I found gender differences only in the domains of math and English. For the domain of math, boys reported higher math self-concept than girls, even though girls' and boys' grades in math did not differ, and both boys and girls, on average, did not endorse the traditional stereotype that boys are better than girls in math. The finding that, compared to boys, girls were less likely to have plans to major/pursue a career in math is in line with reports that indicate ongoing gender disparities in STEM-related fields (National Science Foundation, 2000, 2008).

The findings that boys reported higher math self-concept than girls and that boys and girls "value" math equally (i.e., math importance) are in line with previous research (Eccles et al., 1993; Jacobs et al., 2002; Wigfield et al., 2002). While some researchers suggest that girls may lose interest in math during high school (Owens et al., 2003), in the current study, girls and boys did not differ in reports of math interest. Boys and girls were also equally likely to report that they plan to take advanced level math and science classes in high school. This finding is in opposition to national data showing that girls are less likely than boys to enroll in advanced level math and science courses in high school. However, in our survey, we ask how likely it is that participants *will enroll* in domain-specific courses, whereas prior research reported gender differences in actual course enrollment. It could be that the girls in the current sample, who were partway through their second year of high school, planned to enroll in advanced math and science classes, but might make alternate course selections later in their high school careers.

On the other hand, it could also be the case that boys in our sample are less interested in math, and less likely to plan for a future in math, as compared to boys in other samples. Thus, the lack of gender differences in the current sample could be due to a variety of factors, including the possibility that girls and boys really do not differ. Because several years have passed since some of the research on gender differences in the domains of math and science was published, as Bronfenbrenner (1977, 1986) theorized, changes over time could explain differences across studies. For example, recent interventions have been tested in high school settings with the goal of maintaining and increasing girls' achievement, interest, persistence, and aspirations in math and science (Kerr & Robinson Kurpius, 2004; Shapka & Keating, 2003).

Gender differences were also found in the domain of English. Compared to boys, girls reported greater English importance, interest, and self-concept, and girls indicated greater likelihood of majoring/pursuing a career in English. These findings are consistent with previous research that has indicated that girls value English more than boys (Eccles et al., 1993; Jacobs et al., 2002; Wigfield et al., 2002). Furthermore, in line with previous studies that drew from younger populations, both boys and girls reported that girls are better than boys in English (Copping et al., 2010; Rowley et al., 2007). While these findings reflect traditional stereotypes, it was surprising that boys and girls did not differ in their reports of plans to enroll in advanced English classes. It could be the case that boys see the merit of taking advanced coursework and the skills they would acquire, but nevertheless, they are still less likely than girls to foresee a career in English.

Whereas no gender differences appeared in adolescents' plans to major/pursue a career in math or science, it is noteworthy that girls, compared to boys, did report a greater likelihood of majoring/pursuing a career in English. This difference across domains could lead to differences in eventual STEM-related career choices for these youth. That is, if girls ultimately decided to focus on their perceived verbal/humanities talent, as further indicated by their traditional stereotype scores for English, they may be more likely than boys to opt out of math and science in college or beyond (Copping et al., 2010).

The lack of gender differences in the domain of science may be due to several factors. First, whereas men have traditionally dominated the biological sciences and still dominate heavily in the physical sciences, more recently, women have been overrepresented in the social sciences, and are reaching parity in many of the biological science fields (National Science Foundation, 2011). The items in our survey did not distinguish among different types of sciences; thus, in the future, researchers should make this distinction more evident in their measures. Second, the way that science is taught may lend itself to the stereotypical strengths of both boys and girls. That is, unlike math, science may require more written explanations. Finally, researchers often combine participants' reports related to math and science as if they are one domain, which could explain why gender differences related to science have been reported elsewhere. Another recent study found no gender differences among high school valedictorians' interests in majoring in science (York, 2008). That is, majoring in science was popular for both male and female valedictorians. Compared to the opposite gender, more girls planned on pursuing the humanities and social sciences, whereas more boys planned to pursue math, computer science, and engineering. The results of York's (2008) study and the current study suggest that math and science should be treated as separate domains.

Parent reports varied somewhat from youth reports. Although parents of girls and parents of boys did not differ in their reports concerning the domains of science and English, compared to parents of girls, parents of boys reported that their sons would be more likely to major/pursue a career in math. Interestingly, unlike youths' reports of gender stereotypes, parents of boys reported traditional stereotypes across all three domains. Parents of girls, on the other hand, reported egalitarian beliefs for math and science and traditional English stereotypes. Gender stereotypes held by parents of boys may have guided their belief that their sons would be likely to major/pursue a career in math. Parent beliefs, in turn, may have shaped the gender differences found in youths' reports of math self-concept and plans to major/pursue a career in math. Even subtle comments or interactions shared between parents and sons versus daughters about academic performance could explain the gender differences in math self-concept and math career intentions found in the current sample (Bhanot & Jovanovi, 2005; Bleeker & Jacobs, 2004; Jacobs, 1991; Tiedemann, 2000). Parent behaviors may contribute to gender differences even very early in development; for example, the toys that parents select for children or the activities they choose for their children could influence girls' and boy's later competencies and interests (Chhin et al., 2008; Fagot & Leinbach, 1989; Parsons et al., 1982). Longitudinal data would help to determine causal relationships between parents' behaviors and beliefs and youth outcomes.

As Rouland and colleagues (2011) point out, few studies have examined parents' endorsement of gender stereotypes about verbal skills. The current results show that both parents of girls and parents of boys endorse the traditional stereotype that girls are better than boys in verbal domains. The finding that both parents and youth in the current study reported relatively strong traditional English stereotypes could actually have negative implications for girls and boys. First, boys with natural talent and interest in English may shy away from a future in English for fear that they will be discriminated against. Parents may also encourage/push boys to pursue traditionally male-typed careers because those careers will be more lucrative than female-typed careers, such as those related to English. Second, girls with natural talent and interest in math and science may avoid math and science because the majority of students in those classes are boys. Thus, girls might be more comfortable in English classes than in math or science. In this way, "positive" stereotypes about girls may actually work against girls who are leaning toward pursuing a future in math or science. We as a society will suffer if talented youth feel limited from pursuing their natural talents and interests.

Academic Motivation and Future Plans for Math, Science, and English

Across the domains of math, science, and English, adolescents' domain-specific interests, importance, and self-concept were positively related to their plans to take advanced classes, to major in, and to pursue a career in the respective domains. In both groups of regression analyses (i.e., with the focal predictors *felt pressure* and *gender stereotypes*), as predicted, these positive relationships continued to hold even when controlling for previous domain-specific course grades, parent education, and parent income. According to expectancy-value theory (Eccles & Wigfield, 2002; Wigfield & Eccles, 2000), youth who have a higher domain-specific self-concept are more likely to persist in the face of challenges in that domain, because they believe they are capable of overcoming those challenges. Thus, it is fitting that youth who have a higher math self-concept, for example, would be more likely than peers with lower math self-concept to report that they plan to take advanced coursework in math, and that they would be more likely to plan for a future in math (i.e., to major/pursue a career in math).

However, according to expectancy-value theory, in order to become engaged in a particular domain or task, youth must also value the domain or task. Again, the results of the current study supported this theory, because students who reported greater importance of a particular domain were more likely to see themselves engaged in that domain in the future. While Eccles and her colleagues (1993) found that likeability (i.e., interest) items and importance items both load onto one “task values” factor, I assessed importance and interest as separate factors. Given that other researchers have theorized that girls may lose interest in math in high school, I thought it was important to distinguish between interest and importance (Owens et al., 2003). For example, it is likely that a person can see the importance of a domain without being interested in it, or conversely, a student could be interested in domain and yet not believe it to be important. I expected that interest would be more likely than importance to be related to outcome variables. Nevertheless, in the current study, both importance and interest were linked with academic outcomes. The fact that domain-specific interests were associated with domain-specific outcomes also supports expectancy-value theory (Eccles & Wigfield, 2002; Wigfield & Eccles, 2000).

These findings indicate the importance of youths' motivational beliefs for their choices about what advanced courses to take during high school and their early plans for their college majors and career aspirations. In addition, domain-specific prior grades were a significant predictor of each of the domain-specific motivational variables. Thus, it is evident from this set of findings that prior grades are strongly tied to adolescents' academic motivation and plans for the future, but it is unclear whether motivation influences achievement or if achievement influences motivation. It is likely that these two factors work in a bidirectional manner. Longitudinal data would help researchers explore these processes. Because my data were only collected at one time point, I cannot make any assumptions about causality. Furthermore, by the tenth grade, most youth have been in academic settings for a full decade; thus these relationships were likely established before the high school years.

Felt Pressure, Academic Stereotypes, and Adolescents' Major/Career Intentions

Felt pressure, or perceived pressure from parents to behave in a gender-congruent fashion, was expected to be related to adolescents' plans to major/pursue a career in domains that are common, stereotypically, for their gender. Counter to my hypotheses, across all three domains, felt pressure was typically not related to domain-specific majors/career plans. However, in the domain of math, adolescent reports of math interest explained the relationship between felt pressure and plans to major/pursue a career in math. Students who reported higher felt pressure had stronger interest in math, and in turn, students who had stronger interest in math were more likely to plan to major/pursue a career in math. While I predicted this relationship for boys, I predicted that when girls reported higher felt pressure, they would be less likely to plan to major/pursue a career in math. However, the felt pressure X gender interaction was nonsignificant.

Although the interaction was nonsignificant, boys, on average, did report higher felt pressure than girls. The finding that boys reported more felt pressure than girls is consistent with previous research by Egan and Perry (2001). The authors argue that boys are expected to report more felt pressure than girls because boys are often more sex-typed than girls. That is, it is more acceptable for girls than for boys to show traits that are considered stereotypical of both genders. However, because sex-typed competencies and behaviors associated with masculinity are valued in our society, felt pressure may be less damaging for boys than it is for girls. Egan and Perry (2001) found a stronger negative relationship between felt pressure and psychological adjustment for girls as compared to boys.

In the domain of science, science self-concept mediated the relationship between felt pressure and plans to major/pursue a career in science in gender-dependent ways. Specifically, at high levels of felt pressure, girls had higher science self-concept, which in turn, was associated with greater likelihood of majoring/pursuing a career in science. Although this finding is counter to my hypothesis, it might be that girls who exhibit stereotypically "masculine" competencies are more likely than "feminine girls" to experience felt pressure. That is, whether or not their parents exert pressure on them to be feminine, these girls might perceive such pressure because of their "masculine" interests.

The felt pressure X gender interaction also directly influenced adolescents' plans to major/pursue a career in science. Counter to predictions, and in opposition to traditional stereotypes, at higher levels of felt pressure, boys were less likely to report that they plan to major/pursue a career in science. One explanation for this finding could be that high levels of felt pressure are detrimental in general for boys, resulting in lower achievement striving in general. Another explanation, as suggested above for girls, might be that boys who are interested in female-typed domains and careers experience more felt pressure than other boys *because* of their stereotypically "feminine" interests. These surprising findings for girls and boys may suggest that these variables actually work in the opposite direction than predicted. That is, youth who have academic interests that are inconsistent with traditional stereotypes may elicit more felt pressure messages, or these youth may perceive more felt pressure messages than youth who are more traditional.

Finally, felt pressure was not directly or indirectly related to plans to major/pursue a career in English. This set of findings does not support Egan and Perry's (2001) theory that boys who report more felt pressure would be more likely to pursue traditionally labeled male-typed occupations, and girls who report more felt pressure would be more likely to pursue traditionally labeled female-typed occupations. However, by the tenth grade the direction of these relationships may be reversed. Data would need to be collected at multiple time points to determine the direction of effects.

Considering that the majority of findings related to felt pressure did not support my hypotheses, either because of a lack of significant findings or relationships in the opposite direction from what was predicted, it is likely that either the hypothesized relationships do not exist for my sample (perhaps because the direction of effects was inaccurate as discussed above), or that measurement problems obscured the true relations. It is possible that boys who experience high levels of felt pressure from parents to conform to gender stereotypes may choose to do the opposite of what their gender socializers are pressuring them to do, and instead steer away from a future in math and science. On the other hand, it could also be the case that the items in the felt pressure scale actually measured something other than felt pressure. For example, the item for girls that asks about hunting and fishing may have less to with what parents deem appropriate for girls and boys, and more to do with parents' beliefs about animals' rights. Because the items I chose were *adapted* from Egan and Perry's (2001) items, they have never been validated in previous research. More research is needed on the concept of felt pressure, and scales should be created and validated for use with adolescent populations. It may also be the case that youth would reveal more instances of felt pressure via qualitative interviews, versus survey data collection. Furthermore, Leaper and Brown (2008) found that youth reported more discouraging gender-related comments about domain-specific abilities and experiences with felt pressure from peers than from mothers or fathers. Future research should consider peer gender socialization in conjunction with parent gender socialization. It could be that parents play a more significant role earlier in development, but as youth age, peers' influence becomes much stronger, as youth spend more time with peers and begin to worry about "fitting in" and conforming to what is "appropriate" for their gender (Galambos, Almeida, & Petersen, 1990).

In contrast to findings regarding felt pressure, the hypotheses about stereotypes and future plans were confirmed in the domains of math and English. The relationship between youths' traditional stereotype endorsement and their plans to major/pursue a career in math was explained by math importance and math self-concept. However, this relationship depended on gender. That is, boys who more strongly endorsed traditional math stereotypes viewed math as more important, and in turn, were more likely to have plans to major/pursue a career in math. On the other hand, girls who more strongly endorsed traditional math stereotypes had lower math self-concept and math importance, and in turn, were less likely to have plans to major/pursue a career in math. These findings are in line with previous research that found a connection between parents' endorsement of traditional math/science gender stereotypes and children's math/science self-efficacy (Jacobs, 1991; Bleeker & Jacobs, 2004). Evans et al. (2001) also found a positive relationship between African American boys' ratings of boys' competence in math/science and the boys' math/science self-concept. As indicated by expectancy-value theory (Eccles & Wigfield, 2002; Wigfield & Eccles, 2000), youth who endorse favorable domain-specific stereotypes about their social group are likely to have higher self-perceptions (i.e., expectations) of ability in those domains.

Similarly, with prior English achievement controlled, English self-concept explained the relationship between English stereotype endorsement and plans to major/pursue a career in English in gender-specific ways. That is, girls who perceived girls as more competent than boys in English had higher English self-concept, and in turn, were more likely to report that they plan to major/pursue a career in English. On the one hand, it should be noted that the relations between individual self-perceptions and perceptions of the social group are probably bi-directional (Ames, 2004). Thus, the relations found in this study might have emerged because youths' career intentions and self-concept influenced their perceptions of their gender group. Nonetheless, this result is consistent with Evans and colleagues' (2011) finding that African American girls' ratings of girls' reading/writing competence predicted the girls' reading/writing self-concept. This finding also fits with expectancy-value theory as explained for boys in the domain of math (Eccles & Wigfield, 2002; Wigfield & Eccles, 2000).

As a whole, this set of findings suggests that traditional math and English gender stereotype endorsement does play a role in girls' views about their own abilities. While Evans et al. (2011) assessed in-group and out-group competency ratings as predictors of

African American students' self-concept, I computed difference scores to determine the degree to which adolescents' ratings of their in-group and their out-group differed. These difference scores captured the degree to which adolescents were traditional, egalitarian, or nontraditional in their reports of gender stereotypes. When girls reported more of an advantage for their gender in math or English, they also viewed their own abilities in that domain more favorably. The current study also found that with prior achievement controlled, students' perceptions of their own abilities are related to the domain-specific classes they plan to take and to their plans for their future majors/careers. Thus, in order to reduce gender disparities in occupational outcomes, one strategy for interventionists should be to research ways to reduce stereotypical ideation in children's homes and classrooms and ways to boost academic self-concept, especially girls' math self-concept and boys' English self-concept. These interventions should target youth of all ages, as the current study and previous research have demonstrated that these gendered beliefs about the self are common in elementary school and persist through high school (Eccles et al., 1993). As York (2008) points out, in addition to increasing the number of girls who pursue STEM-related careers, another way to reduce gender disparities in occupations is to encourage boys to enroll in English and social sciences classes and to pursue careers that have been traditionally female-dominated. Greater social acceptance of men who pursue non-traditional careers will likely benefit both boys and girls, as children will ultimately feel less restricted by social norms.

Felt Pressure, Parents' Gender Stereotypes, and Domain-Specific Encouragement

Results did not support hypotheses that student-reported felt pressure and parent-reported gender stereotype endorsement would predict student- and parent-reported parental encouragement to take domain-specific advanced classes. In addition, these relationships did not differ by child gender. Instead the students' prior domain-specific course grades predicted both parent and student reports of parental encouragement. Parent education and income were also positive predictors of student-reported parental encouragement. The first set of findings is not consistent with previous research showing a connection between parents' traditional stereotype endorsement and parents' subtle and overt gendered "messages" that children seem to perceive, and in turn, use to shape their own academic beliefs (Bhanot & Jovanovi, 2005; Bleeker & Jacobs, 2004; Jacobs, 1991, Tiedemann, 2000; Wigfield et al., 2002).

Some measurement issues might account for the lack of significant findings. First, it may be the case that the selected felt pressure items did not adequately assess students' experiences of felt pressure as intended. Furthermore, only one item was used to assess youth and parent reports of parental encouragement. That item did not indicate frequency of encouragement. That is, the hypothesis might have been supported had the measure captured the number of times the parent had encouraged the child to enroll in domain-specific advanced classes. Moreover, the reasons that parents give for why they think their children should enroll in domain-specific advanced classes would likely be an important factor to consider in this line of research. For example, the parent-directed statement that, "you should enroll in advanced math classes because that will impress the colleges to which you are applying," would probably have a different impact then the statement, "you should enroll in advanced math classes in high school because you are a very strong math student and it's clear to me that you enjoy math" (Wigfield et al., 2002). Qualitative or observational research may be needed to obtain this level of detail. Importantly, it is at that level of detail that gender differences would likely emerge, not only between girls and boys, but perhaps also between mothers and fathers.

While it is not surprising that youths' domain-specific grades predicted parent and student reports of domain-specific encouragement, it could also be the case that previous encouragement predicts students' grades. That is, the level of support an adolescent receives to do well in and pursue advanced study in a particular domain would be expected to influence the youth's domain-specific self-concept, importance, and interest. I will discuss those relationships in the next section. Whereas parent education and income predicted youths' reports of parental encouragement, they did not predict parents' reports of encouragement. It is probably not surprising that parent education would be related to parental encouragement to take advanced coursework, as was found with student reports. Nevertheless, in general, it appears that parents in the current sample might base their domain-specific encouragement on how well their child has previously performed in that domain, and not on the gender of their child, their gender stereotypes, or their own education. Perhaps parental encouragement to take advanced coursework is more salient to children whose parents have obtained higher levels of education, and thus they are more likely to remember and report that encouragement than children whose parents are less educated.

Gender Discrimination, Parent Support, and Youth Outcomes

Most recent studies of academic discrimination have focused on race and ethnicity rather than gender (Brown, Alabi, Huynh, & Masten, 2011). In a recent qualitative study, Brown et al. (2011) reported that early adolescent girls were more aware of gender bias than boys. The majority of reports of gender bias concerned sports and home life; however, when school was mentioned, most students indicated that teachers seem to trust girls more than boys, and teachers are more lenient with girls than with boys. In another recent study, Leaper and Brown (2008, p. 692) reported that 52% of adolescent girls in their sample reported at least one experience with discrimination related to math, science, or computer abilities. The most common perpetrators were male friends, brothers, and other boys. While the discrimination measures in the current study did not assess the perpetrator of the discriminatory act, it can be assumed that responses to the item referring to lower grades were related to teachers.

Very few girls or boys in the current sample reported gender discrimination in any of the domains. In general, the means scores across academic domains reflected the number of discrimination experiences somewhere between “never” and “once or twice.” Counter to my hypothesis, there were no gender differences in reports of math and science gender discrimination. However, as predicted, boys reported more discrimination than girls in English. In addition, girls reported more discrimination in math than in science or English, and boys reported less discrimination in science than math or English. Unlike previous studies that have focused on girls’ experiences of discrimination in math and science (Brown et al., 2011; Leaper & Brown, 2008), it is interesting that in the current sample I found that boys reported feeling discriminated against in English.

It is possible that boys’ behavior in the classroom influences teachers’ interactions with male students in a way that makes boys perceive those interactions as discriminatory against their gender. Thus, these findings may reflect differences in teachers’ beliefs about girls’ and boys’ behavior and teachers’ methods for handling behavior problems versus teachers’ beliefs about girls’ and boys’ academic abilities. This may be more likely in the domain of English, because English teachers are more likely to be female, as compared to the domains of math and science in which teacher gender demographics are more equal. That is, boys may be more likely to assume teacher bias when their teachers are female, and in a domain that traditionally favors girls. As Brown et al. (2011) reported, youth seemed to think that teachers were more lenient with and trusting of girls over boys. However, it could also be the case that if teachers endorse gender stereotypes that favor girls in English, they may act in biased ways towards boys in English. Similarly, because girls reported more discrimination in math than English or Science, they may have had interactions with teachers or others who were biased against girls in math. As noted previously, the current study does not directly assess the source of academic discrimination. In the future, as Leaper and Brown (2008) did, researchers should continue to consider the source of discriminatory acts. Furthermore, researchers should assess the degree to which the sources of discrimination differentially influence related adolescent outcomes. For example, girls who hear discouraging comments from boys about gender differences in math and science may downplay their academic abilities in math and science in order to appear more attractive to boys, and thereby harm their later achievement (Eccles & Wigfield, 2002; Leaper & Brown, 2008).

Because the mean scores for academic gender discrimination were relatively low in the current sample, it is not that surprising that, counter to my hypothesis, adolescent reports of discrimination experiences did not predict adolescents' plans to enroll in or major/pursue a career in any of the domains except English. Youth gender also did not moderate these relationships. In opposition to my predictions, discrimination experiences in English were related to *increased* likelihood that adolescents' had plans to major/pursue a career in English. Perhaps students who foresee a future in English are more likely to perceive discrimination in English because they care more about their performance in English. That is, youth who do not care about English may ignore or discount the feedback they receive regarding their own or their gender's performance in English. Because some students may perceive math and science to be more respected fields in our society, it is possible that these processes differ by academic domain. It is also not surprising that higher prior domain-specific grades were the strongest predictor of adolescents' domain-specific plans for the future. According to expectancy-value theory, if adolescents have higher expectancies for their abilities in a particular domain, they will value it more, and be more motivated to continue their efforts in that domain (Eccles & Wigfield, 2002; Wigfield & Eccles, 2000).

When parent support of academic domains was included in the models, it did not appear to moderate the relationship between discrimination and the adolescents' future in any of the domains; however, domain-specific parent support was positively associated with domain-specific motivational variables (i.e., domain-specific importance, self-concept, and interest) with prior achievement controlled. Domain-specific motivational variables were positively associated with adolescents' domain-specific plans for the future. In addition, the relationship between domain-specific parent support and youths' domain-specific plans for the future was explained by student reports of domain-specific importance and self-concept. Therefore, even though discrimination was not linked with adolescents' plans, parent support was positively related to plans for the future in all three domains. This finding is consistent with previous research that suggests that parents play a pivotal role in children's beliefs about their own abilities, values, and their subsequent career goals (Bahnot & Jovanovi, 2005; Bleeker & Jacobs, 2004; Chhin et al., 2008; Jacobs, 1991; Tiedemann, 2000; Wigfield et al., 2002). Nevertheless, this relationship could also work in the reverse direction. That is, parents may be more supportive of youth who express an interest in and talent for particular domains. It could also be the case that parents' domain-specific support and children's domain-specific academic motivation and aspirations influence each other in a bidirectional manner. Again, longitudinal data would help clarify the direction of these relationships.

Two explanations may account for this set of findings. First, classroom-based gender discrimination does not play a significant role in adolescents' plans for the future (i.e., coursework and major/career choices). Alternatively, the way discrimination was measured in the current study does not adequately address adolescents' experiences of academic gender discrimination. If the latter is true, then researchers should consider other methods for studying academic gender discrimination. Brown et al. (2011) and Leaper and Brown (2008) both offer promising approaches to studying gender discrimination. In particular, I would recommend more qualitative studies. Researchers should also consider adolescents' experiences witnessing discriminatory acts in contrast to discrimination that is personally experienced. Furthermore, the current study's measure of discrimination relies on retrospective accounts of discrimination experiences. Daily diary or observational studies are some strategies to avoid the problems of retrospective reports (Brown et al., 2011).

Finally, because I did not find support for the hypothesis that parent support of academic domains buffers the impact of discrimination in those domains, researchers should continue to examine other possible buffers of academic gender discrimination. Of course, given the low frequency of discrimination reported in the current study and the lack of relationship between academic gender discrimination and adolescents' plans for the future, buffering effects could not be found from a statistical perspective in the current study. However, gender identity, gender centrality, supportive peers or teachers/mentors, and possibly even one's own gender stereotype endorsement (or lack thereof) could buffer youth from the negative impact of discrimination experiences.

Future Directions

An important limitation of the current study is that data were only collected at one time point. Given the developmental nature of the study hypotheses, it would have been more appropriate to have collected data at several time points. For example, youths' domain-specific experiences in fifth grade may have contributed to some of the gender differences found in tenth grade students' reports of academic self-concept and plans for the future. Furthermore, because the current study used retrospective and prospective reports, it is not certain that the relationships (or lack thereof) reported here actually exist. Moreover, some of the relationships reported here may actually operate in the opposite direction.

For example, children who adopt nontraditional attitudes and aspirations may be more likely to experience felt pressure from their parents and the broader social world. Therefore, perceived felt pressure may be an outcome of youth endorsing nontraditional beliefs, rather than a predictor of traditional aspirations. As another example, in the current set of hypotheses, I predicted that domain-specific stereotype endorsement would be related to domain-specific self-concept in gendered ways. Indeed, I found that girls who more strongly endorsed the traditional math stereotype had lower math self-concept and girls who more strongly endorsed the English stereotype had higher English self-concept. However, it could simply be that girls who think they are bad at math and good at English assume that all girls are bad at math and good at English (Ames, 2004). Thus, it is not clear which belief was held first. Understanding these relationships will be important for knowing how and when to intervene. Longitudinal data, spanning from youths' early experiences in school and in the home until post-college graduation, is needed to better understand the causal pathways among variables examined in the current study.

Future researchers should also consider the influence of the school context in relation to the types of research questions this study explored. For example, research on the differences between single-sex and co-ed schools have found positive influences of single-sex education on girls' self-concept in math and science and an increased likelihood of girls aspiring to non-traditional careers (Sullivan, 2009; Sullivan, Joshi, Leonard, 2010; Watson, Quatman, & Edler, 2002). As mentioned above, girls may be less likely than boys to take advanced coursework in math and science because they feel less comfortable in classrooms that may be dominated by a male presence. If girls attended single-sex schools, this predicament would no longer be an issue; girls would be less likely and less able to make social comparisons with boys, which could protect their math and science self-concepts. Importantly, girls in single-sex schools would also be less likely to hear discouraging sentiments from boys about their math and science abilities (Leaper & Brown, 2008). In addition, girls in single-sex schools would be less negatively influenced by potential teacher gender bias with regards to math and science. Researchers should also consider the possible advantages to boys of single-sex schooling, such as boys' attitudes about English and whether they are more likely to have nontraditional plans for the future.

The racial composition of schools may also influence adolescents' endorsement of gender stereotypes. Researchers have noted that academic gender stereotypes may be endorsed differently across racial groups (Hudley & Graham, 2002; Lee, 2007). Thus the percentage of minority students in a school or a particular classroom may influence gender stereotype awareness and endorsement. Previous research has also demonstrated that the gender and race of the teacher may influence student-teacher interactions, teacher expectations, and students' perceptions of teachers' beliefs (Beilock, Gunderson, Ramirez, & Levine, 2010; Duffy, Warren, & Walsh, 2001; Oates, 2003; Skelton, Carrington, Francis, Hutchings, Read, & Hall, 2009). While elementary and high school teachers in general are more often women than men, women are more likely to be overrepresented as teachers in English classrooms compared to math and science classrooms. Youth are probably aware of this difference and may make assumptions about their own futures based on these gender disparities. Furthermore, these gender disparities could lead to girls having fewer same-sex role models in math and science and boys having fewer same-sex role models in English.

Girls may also assume that male math and science teachers are more likely than female math and science teachers to be biased against girls, which could further discourage girls from taking advanced math and science classes taught by men. Future researchers should consider how teacher demographics influence students' perceptions of stereotypes and discrimination in the school context. Importantly, Sax and Bryant (2006) found that the college environment may serve to reinforce traditional sex roles. Whereas several of their participants switched from a neutral to a traditional career path during college, very few participants moved into a nontraditional career path. Thus, intervening during college or even during high school may be too late. Interventions should occur before girls and boys, consciously or otherwise, put themselves on traditional career trajectories if those trajectories are in opposition to their natural talents and interests.

While the current study focused on parents and teachers as gender socializers, future research should continue to explore the role of peers in gender socialization. Previous research indicates that from a young age peers encourage each other to adhere to traditional gender roles (Leaper & Brown, 2008; Witt, 2000). While girls in Leaper and Brown's (2008) study reported opposite-sex discouragement in math and science, they also experienced same-sex discouragement, only to a lesser degree. Researchers should continue to investigate the ways that peers influence youths' gendered academic motivation and plans for the future. Previous research has already indicated that peer groups play a role in children's educational expectations and aspirations in general (Ide, Parkerson, Haertel, & Walberg, 1981); however less is known about how peers and friends may shape domain-specific academic interests and goals for the future. In addition, it is interesting that girls' endorsement of social stereotypes, but not boys', was related to their academic self-concept. Perhaps there is something unique about girls' social relationships or propensity to make social comparisons that could help explain this gender difference.

Nevertheless, the responses to the stereotype measure used in the current study may have been influenced by social desirability. When asked to report their beliefs about social groups, many adults and adolescents probably have the tendency to want to appear politically correct. That is, they may report egalitarian beliefs so that they do not appear biased. Beyond social desirability concerns with the stereotype measures, it is also difficult to know for sure what participants were thinking when they put their mark on the VAS line. The prompt "I think girls do this well" may mean different things to different people. That is, some people may think this statement refers to specific performance outcomes, such as grades, which would be a more objective assessment of ability, whereas others may think this statement refers to their subjective opinions regarding girls' ability to perform well in a particular domain.

In the future, researchers may want to either specifically question participants' thinking when filling out the VAS lines, or perhaps consider carefully wording the prompts to elicit the type of responses they are seeking. For example, it might have been a better choice for the current study to have the prompt, "When it comes to math, I think girls have this much natural talent." It is possible that some people may respond differently to prompts concerning "natural talent" as opposed to prompts that could infer beliefs about objective performance. For example an individual could think, "well, I know most of the girls in my class got an A on the last math test, and a lot of the boys got C's, but that's only because the boys don't care about studying or doing well in school, not because they couldn't do well if they tried harder." If that were the case, it would be unclear what stereotype a participant actually endorses.

More of my hypotheses might have been supported had I collected data from a larger sample of participants. In particular, the current study would be more informative had a larger percentage of parents returned their surveys. In some instances, insufficient power may explain the lack of significant findings. It may also be the case that parents who returned the surveys are somehow different from parents who did not return the surveys. Perhaps parents who are more involved in their children's lives would be more likely to fill out a survey about their children. These same parents may be more likely to encourage their children academically, or they may just spend more time with their children. Spending more time with one's parents could make children more or less likely to adopt their parents' views and beliefs. Similarly, students also participated on a voluntary basis and not all students agreed to participate. It is difficult to know how the responses of nonparticipants may have differed, but more highly engaged and motivated students might be more likely to participate in a research study about school than less motivated and engaged students. Furthermore, students who attend school regularly would have had a greater likelihood of participating in the study. Thus, it is possible that gender differences would be more or less likely amongst less motivated and lower-achieving students (who may have been less represented in the current study); nevertheless, attempts were made to encourage all students to participate and recruitment took place in classes of all skill levels. Future researchers should consider ways of ensuring recruitment of participants that would represent the full range of high school students.

In addition to these and the other suggestions for future researchers noted throughout the discussion section, the results of this study also have implications for parents. In particular, parents' support of math, science, and English was related to children's motivational beliefs in math, science, and English, and motivational beliefs were in turn related to greater likelihood that adolescents planned to pursue a future in math, science, and English, respectively. Even though there were no gender differences in parent- or child-reported parental encouragement to take math and science classes, parents of boys endorsed traditional gender stereotypes across all three domains. Therefore, given the powerful nature of stereotypes, it may be the case that parents socialize their children in gendered ways that were not measured in our surveys. Nevertheless, these findings indicate the importance of parents' academic support for adolescents' academic motivation and career aspirations.

Table 1

Race/Ethnicity of Study Participants

	Girls	Boys	Parents
White	106	89	121
African American	31	20	17
Latino	26	13	9
Asian	8	6	7
Bi-racial	6	3	4
“Other”	5	5	2
Total	182	136	160

Table 2

Means and Standard Errors for Youth-Reported Study Variables, by Gender.

	Girls (*N* = 182) *M (SE)*	Boys (*N* = 136) *M (SE)*	Range
Future Math Course Taking[a]	3.89 (.08)	4.10 (.10)	1-5
Future Science Course Taking[a]	3.90 (.08)	4.15 (.10)	1-5
Future English Course Taking[a]	3.98 (.09)	3.89 (.10)	1-5
Major/Career in Math[a]	**2.62 (.09)**	**2.91 (.11)**	1-5
Major/Career in Science[a]	3.27 (.10)	3.40 (.11)	1-5
Major/Career in English[a]	**2.64 (.09)**	**2.31 (.10)**	1-5
Self-concept Math[a]	**-.09 (.06)**	**.13 (.07)**	z-score
Self-concept Science[a]	-.05 (.06)	.05 (.07)	z-score
Self-concept English[a]	**.06 (.06)**	**-.11 (.06)**	z-score
Importance of Math[a]	3.97 (.07)	3.85 (.08)	1-5
Importance of Science[a]	3.95 (.07)	3.88 (.08)	1-5
Importance of English[a]	**4.05 (.06)**	**3.70 (.08)**	1-5
Interest in Math[a]	3.25 (.08)	3.31 (.10)	1-5
Interest in Science[a]	3.60 (.08)	3.84 (.09)	1-5
Interest in English[a]	**3.35 (.08)**	**3.09 (.10)**	1-5
Discrimination in Math[a]	1.26 (.04)	1.35 (.05)	1-5
Discrimination in Science[a]	1.16 (.03)	1.21 (.04)	1-5
Discrimination in English[a]	**1.17 (.04)**	**1.41 (.05)**	1-5
Grade in Math	4.05 (.09)	4.05 (.10)	1-5
Grade in Science	4.18 (.08)	4.19 (.09)	1-5
Grade in English	4.33 (.08)	4.15 (.09)	1-5

Note. **Bold** = Means for girls and boys differed at $p < .05$. [a] = Domain-specific grade was entered as a covariate.

Table 2 cont.

Means and Standard Errors for Youths' Study Variables, by Gender.

	Girls (*N* = 182) *M (SE)*	Boys (*N* = 136) *M (SE)*	Range
Felt Pressure	**2.40 (.06)**	**3.40 (.07)**	1-5
My Parent Encourages Math[a]	4.02 (.08)	4.25 (.10)	1-5
My Parent Encourages Science[a]	4.09 (.08)	4.20 (.09)	1-5
My Parent Encourages English[a]	4.10 (.08)	4.18 (.10)	1-5
Math is Important to My Parent[a]	4.41 (.07)	4.27 (.08)	1-5
Science is Important to My Parent[a]	4.39 (.07)	4.22 (.08)	1-5
English is Important to My Parent[a]	4.38 (.07)	4.26 (.08)	1-5
Math Stereotype[a]	-5.82 (1.46)	-1.47 (1.71)	(-100)-(100)
Science Stereotype[a]	-3.94 (1.43)	-.52 (1.67)	(-100)-(100)
English Stereotype[a]	11.87 (1.39)	11.29 (1.62)	(-100)-(100)

Note. **Bold** = Means for girls and boys differed at $p < .05$. [a] = Domain-specific grade was entered as a covariate.

Table 3

Means and Standard Errors for Parents' Study Variables, by Gender of Child

	Parents of girls (*N* = 90) *M (SE)*	Parents of boys (*N* = 70) *M (SE)*	Range
Future Math Course Taking	4.30 (.11)	4.26 (.13)	1-5
Future Science Course Taking	4.29 (.10)	4.17 (.12)	1-5
Future English Course Taking	4.25 (.10)	4.29 (.13)	1-5
I Encourage Math Classes[a]	4.36 (.09)	4.43 (.11)	1-5
I Encourage Science Classes[a]	4.23 (.08)	4.34 (.10)	1-5
I Encourage English Classes[a]	4.14 (.09)	4.24 (.11)	1-5
Math Stereotype[a]	**3.73 (2.01)**	**11.21 (2.36)**	(-100)-(100)
Science Stereotype[a]	**3.24 (1.36)**	**8.63 (1.94)**	(-100)-(100)
English Stereotype[a]	13.63 (2.04)	17.89 (2.44)	(-100)-(100)
Major/Career in Math[a]	**2.99 (.12)**	**3.42 (.14)**	1-5
Major/Career in Science[a]	3.39 (.11)	3.21 (.13)	1-5
Major in English[a]	2.66 (.13)	2.51 (.16)	1-5

Note. **Bold** = Means for parents of girls and parents of boys differed at $p < .05$. [a] = Child's domain-specific prior grade was entered as a covariate.

Table 4

Bivariate Correlations between Math-related Variables.

	1	2	3	4	5	6	7	8	9
1. Interest in Math	–	**.63**	**.60**	**.40**	**.63**	**.62**	**.28**	.14	-.08
2. Importance of Math	**.57**	–	**.59**	**.41**	**.47**	**.46**	**.32**	.01	.00
3. Self-concept in Math	**.55**	**.51**	–	**.31**	**.31**	**.31**	**.34**	.16	.09
4. Math Course Taking	**.48**	**.45**	**.48**	–	**.50**	**.40**	**.56**	.17	.18
5. Intend to Major in Math	**.48**	**.37**	**.30**	**.38**	–	**.72**	**.35**	.18	.03
6. Pursue a Career in Math	**.65**	**.50**	**.48**	**.50**	**.69**	–	**.30**	**.24**	-.02
7. Prior Math Grade	**.40**	**.48**	**.44**	**.66**	**.30**	**.32**	–	**.29**	**.45**
8. Parent Education	-.01	.10	.03	**.25**	.06	-.02	.21	–	**.37**
9. Parent Income	.11	.19	.12	**.40**	**.22**	.19	**.30**	**.54**	–

Note. **Bold** = $p < .05$. Correlations for girls are below the diagonal, correlations for boys are above the diagonal.

Table 5

Bivariate Correlations between Science-related Variables.

	1	2	3	4	5	6	7	8	9
1. Interest in Science	–	**.69**	**.61**	**.41**	**.63**	**.58**	**.30**	-.03	-.06
2. Importance of Science	**.60**	–	**.60**	**.44**	**.53**	**.57**	**.31**	-.01	-.00
3. Self-concept in Science	**.54**	**.50**	–	**.52**	**.58**	**.49**	**.33**	.14	.09
4. Science Course Taking	**.36**	**.54**	**.47**	–	**.57**	**.57**	**.46**	.20	**.28**
5. Intend to Major in Science	**.50**	**.46**	**.34**	**.41**	–	**.76**	**.41**	.21	.13
6. Pursue a Career in Science	**.61**	**.58**	**.48**	**.50**	**.70**	–	**.38**	.18	.12
7. Prior Science Grade	**.24**	**.36**	**.35**	**.63**	**.36**	**.34**	–	.13	**.40**
8. Parent Education	-.09	.12	-.05	**.36**	.10	.08	**.28**	–	**.37**
9. Parent Income	-.00	.15	.07	**.56**	.18	**.21**	**.31**	**.54**	–

Note. **Bold** = $p < .05$. Correlations for girls are below the diagonal, correlations for boys are above the diagonal.

Table 6

Bivariate Correlations between English-related Variables.

	1	2	3	4	5	6	7	8	9
1. Interest in English	−	**.46**	**.38**	**.45**	**.50**	**.47**	**.27**	.15	.15
2. Importance of English	**.54**	−	**.40**	**.41**	**.37**	**.32**	**.26**	.19	.23
3. Self-concept in English	**.55**	**.39**	−	**.44**	**.23**	**.21**	**.44**	**.27**	.20
4. English Course Taking	**.51**	**.43**	**.54**	−	**.33**	**.37**	**.40**	**.26**	**.27**
5. Intend to Major in English	**.49**	**.33**	**.41**	**.31**	−	**.61**	.06	.09	.04
6. Pursue a Career in English	**.56**	**.40**	**.43**	**.42**	**.68**	−	.08	.15	-.03
7. Prior English Grade	**.32**	**.32**	**.36**	**.49**	**.22**	**.27**	−	.07	**.31**
8. Parent Education	**.21**	**.21**	.16	**.32**	.19	**.29**	**.27**	−	**.37**
9. Parent Income	.11	.15	.10	**.35**	**.22**	**.29**	**.31**	**.54**	−

Note. **Bold** = $p < .05$. Correlations for girls are below the diagonal, correlations for boys are above the diagonal.

Table 7

Maximum Likelihood Mediation Models Predicting Plans to Major/Career Aspirations in Math, Science, and English from Felt Pressure, with Importance of Domain, Self-Concept in Domain, and Interest in Domain as Individual Mediators, Gender as a Moderator of Felt Pressure, and Course Grade, Parent Education, and Parent Income as Covariates (N = 318)

	Math			Science			English		
	Imp	Self-Con.	Interest	Imp	Self-Con	Interest	Imp	Self-Con	Interest
	B (SE)	*B (SE)*	*B (SE)*	*B (SE)*	*B (SE)*	*B (SE)*	*B (SE)*	*B (SE)*	*B (SE)*
Felt Pressure → Major/Career	.07 (.14)	.08 (.13)	-.05 (.12)	.04 (.12)	-.08 (.14)	-.04 (.12)	-.08 (.15)	-.10 (.15)	-.12 (.14)
Gender → Major/Career	**1.23 (.55)**	**1.15 (.57)**	.74 (.48)	**1.26(.48)**	.83 (.50)	.87 (.46)	-.37 (.52)	-.58 (.55)	-.42 (.51)
FP X Gender → Major/Career	-.27 (.18)	-.31(.19)	-.13 (.16)	**-.33 (.16)**	-.21 (.17)	-.26 (.15)	.08 (.18)	.13 (.18)	.10 (.17)
Course Grade → Major/Career	.14 (.09)	**.21 (.10)**	.07 (.08)	**.27 (.08)**	**.30 (.08)**	**.26 (.08)**	.08 (.08)	.03 (.09)	-.02 (.07)
Parent Education → Major/Career	.01 (.05)	.00 (.06)	-.00 (.04)	.00 (.05)	.01 (.05)	.04 (.05)	.08 (.05)	.07 (.05)	.06 (.05)
Parent Income → Major/Career	.01 (.03)	.01 (.03)	.03 (.03)	.03 (.03)	.02 (.03)	.03 (.03)	.00 (.03)	.02 (.03)	.02 (.03)
Mediator → Major/Career	**.58 (.07)**	**.48 (.09)**	**.65 (.05)**	**.71 (.07)**	**.63 (.08)**	**.70 (.05)**	**.47 (.08)**	**.47 (.09)**	**.53 (.05)**
Felt Pressure → Mediator	.09 (.09)	.05 (.08)	.28 (.12)	.04 (.10)	**.22 (.10)**	.18 (.12)	-.08 (.09)	-.02 (.08)	-.01 (.13)
Gender → Mediator	-.09 (.46)	.02 (.41)	.65 (.56)	.26 (.45)	**.93 (.45)**	.72 (.49)	-.12 (.41)	.32 (.34)	.01 (.53)
FP X Gender → Mediator	-.04 (.15)	.04 (.13)	-.26 (.18)	-.11 (.15)	**-.31 (.15)**	-.20 (.16)	-.04 (.13)	-.13 (.11)	-.08 (.18)
Course Grade → Mediator	**.37 (.06)**	**.33 (.05)**	**.43 (.07)**	**.33 (.07)**	**.33 (.06)**	**.33 (.08)**	**.25 (.06)**	**.31 (.05)**	**.37 (.08)**

Note. **Bold** = $p < .05$. FP = Felt pressure; Imp = Importance; Self-Con = Self-Concept.

Table 8

Indirect Effects for Maximum Likelihood Mediation Models Predicting Plans to Major/Career Aspirations in Math, Science, and English from Felt Pressure, with Importance of Domain, Self-Concept in Domain, and Interest in Domain as Individual Mediators, Gender as a Moderator of Felt Pressure, and Course Grade, Parent Education, and Parent Income as Covariates (N = 318)

	Mediators for Math Model			Mediators for Science Model			Mediators for English Model		
	Important	Self-Con	Interest	Important	Self-Con	Interest	Imp	Self-Con	Interest
	B (SE)	*B (SE)*	*B (SE)*	*B (SE)*	*B (SE)*	*B (SE)*	*B (SE)*	*B (SE)*	*B (SE)*
Predictor Variables									
Felt Pressure	.05 (.05)	.02 (.04)	**.18 (.08)**	.02 (.07)	**.14 (.07)**	.13 (.08)	-.04 (.04)	-.01 (.04)	-.00 (.06)
Felt Pressure X Gender	-.02 (.09)	.02 (.07)	-.17 (.12)	-.08 (.11)	**-.20 (.10)**	-.14 (.12)	-.02 (.06)	-.06 (.06)	-.04 (.09)

Note. **Bold** = $p < .05$. Self-Con = Self-concept. Indirect effect = (predictor → mediator) * (mediator → major/career in <domain>).

Table 9

Maximum Likelihood Mediation Models Predicting Plans to Major/Career Aspirations in Math, Science, and English from Traditional Stereotype Endorsement, with Importance of Domain, Self-Concept in Domain, and Interest in Domain as Individual Mediators, Gender as a Moderator of Stereotype Endorsement, and Course Grade, Parent Education, and Parent Income as Covariates (*N* = 318)

	Mediators for Math Model			Mediators for Science Model			Mediators for English Model		
	Important	Self-Con	Interest	Important	Self-Con	Interest	Imp	Self-Con	Interest
	B (*SE*)	*B* (*SE*)	*B* (*SE*)	*B* (*SE*)	*B* (*SE*)	*B* (*SE*)	*B* (*SE*)	*B* (*SE*)	*B* (*SE*)
Stereotype → Major/Career	.00 (.01)	.00 (.01)	-.00 (.00)	.00 (.01)	.01 (.01)	.00 (.01)	.00 (.01)	-.00 (.01)	.00 (.01)
Gender → Major/Career	**.36 (.13)**	.19 (.14)	**.26 (.12)**	-.04 (.12)	.02 (.13)	-.04 (.12)	-.06 (.16)	-.14 (.15)	-.10 (.14)
Stereotype X Gen → Major/Career	.00 (.01)	.00 (.01)	.00 (.01)	.01 (.01)	.00 (.01)	.01 (.01)	-.01 (.01)	-.01 (.01)	-.01 (.01)
Course Grade → Major/Career	.13 (.09)	**.20 (.10)**	.07 (.08)	**.27 (.08)**	**.31 (.08)**	**.27 (.08)**	.06 (.08)	.01 (.01)	-.03 (.07)
Parent Education → Major/Career	.02 (.05)	.02 (.06)	.01 (.04)	.05 (.05)	.02 (.05)	.05 (.05)	.07 (.05)	.07 (.05)	.05 (.04)
Parent Income → Major/Career	.01 (.03)	.00 (.03)	.03 (.03)	.03 (.03)	.02 (.04)	.03 (.03)	.02 (.03)	.03 (.03)	.03 (.03)
Mediator → Major/Career	**.59 (.08)**	**.48 (.09)**	**.65 (.05)**	**.69 (.06)**	**.63 (.08)**	**.69 (.06)**	**.46 (.08)**	**.47 (.09)**	**.52 (.05)**
Stereotype → Mediator	-.01 (.00)	**-.01 (.00)**	-.00 (.00)	.00 (.01)	-.00 (.00)	.00 (.01)	.00 (.00)	**.01 (.00)**	.01 (.01)
Gender → Mediator	-.08 (.11)	**.26 (.09)**	.08 (.13)	.21 (.12)	.10 (.10)	.21 (.12)	-.21 (.12)	-.01 (.09)	-.12 (.16)
Stereotype X Gen → Mediator	**.01 (.01)**	**.01 (.00)**	.01 (.01)	.00 (.01)	.01 (.01)	.00 (.01)	**-.01 (.01)**	**-.01 (.01)**	-.01 (.01)
Course Grade → Mediator	**.33 (.06)**	**.31 (.05)**	**.37 (.07)**	**.29 (.07)**	**.31 (.06)**	**.29 (.07)**	**.27 (.06)**	**.34 (.05)**	**.38 (.08)**

Note. **Bold** = *p* < .05. Self-Con = Self-Concept; Gen = Gender.

Table 10

Indirect Effects for Maximum Likelihood Mediation Models Predicting Plans to Major/Career Aspirations in Math, Science, and English from Traditional Stereotype Endorsement, with Importance of Domain, Self-Concept in Domain, and Interest in Domain as Individual Mediators, Gender as a Moderator of Stereotype Endorsement, and Course Grade, Parent Education, and Parent Income as Covariates (*N* = 318)

	Mediators for Math Model			Mediators for Science Model			Mediators for English Model		
	Important	Self-Con	Interest	Important	Self-Con	Interest	Imp	Self-Con	Interest
	B (SE)	*B (SE)*	*B (SE)*	*B (SE)*	*B (SE)*	*B (SE)*	*B (SE)*	*B (SE)*	*B (SE)*
<u>Predictor Variables</u>									
Stereotype	-.00 (00)	**-.01 (00)**	-.00 (.00)	.00 (.00)	-00 (.00)	.00 (.00)	.00 (.00)	**.01 (.00)**	.00 (.00)
Stereotype X Gender	**.01 (.01)**	**.01 (.01)**	.01 (.00)	.00 (.01)	.00 (.00)	.00 (.01)	.00 (.00)	**-.01 (.00)**	-.01 (.00)

Note. **Bold** = $p < .05$. Self-Con = Self-concept. Indirect effect = (predictor → mediator) * (mediator → major/career in <domain>).

Table 11

Bivariate Correlations among Felt Pressure, Math Stereotypes, Child- and Parent-Reported Parent Encouragement to Enroll in Advanced Math Classes, Prior Math Grade, and Parent Education and Income.

	1	2	3	4	5	6	7	8
1. Felt Pressure	–	.02	**.29**	**-.31**	-.22	**-.40**	**-.48**	**-.31**
2. Child's Math Stereotype	-.08	–	-.01	**.29**	-.06	**.43**	-.02	.09
3. Parent's Math Stereotype	-.05	**.32**	–	.09	.25	.05	-.08	.15
4. YR Parent Encourages Math	-.09	**.22**	-.03	–	**.32**	**.37**	**.28**	**.40**
5. PR Parent Encourages Math	-.08	-.09	.05	**.45**	–	**.51**	.10	**.34**
6. Prior Math Grade	**-.28**	.01	-.08	**.38**	**.47**	–	**.29**	**.45**
7. Parent Education	**-.23**	.15	.11	**.34**	.16	.21	–	**.37**
8. Parent Income	**-.30**	**.21**	.04	**.39**	.18	**.30**	**.54**	–

Note. **Bold** = $p < .05$. YR = Youth-reported; and PR = Parent-reported. Correlations for girls are below the diagonal, correlations for boys are above the diagonal.

Table 12

Bivariate Correlations among Felt Pressure, Science Stereotypes, Child- and Parent-Reported Parent Encouragement to Enroll in Advanced Science Classes, Prior Science Grade, and Parent Education and Income.

	1	2	3	4	5	6	7	8
1. Felt Pressure	–	.09	**.31**	**-.34**	**-.32**	**-.22**	**-.48**	**-.31**
2. Child's Science Stereotype	-.02	–	.07	.14	-.07	**.22**	-.09	.09
3. Parent's Science Stereotype	-.12	.20	–	.13	.09	.17	-.12	.17
4. YR Parent Encourages Science	-.09	**.26**	.14	–	**.31**	**.45**	**.33**	**.52**
5. PR Parent Encourages Science	-.18	.01	.02	**.56**	–	**.26**	.16	.21
6. Prior Science Grade	**-.29**	-.04	.10	**.36**	**.57**	–	.13	**.40**
7. Parent Education	**-.23**	**.32**	.11	**.50**	**.24**	**.28**	–	**.37**
8. Parent Income	**-.30**	**.38**	.10	**.38**	**.30**	**.31**	**.54**	–

Note. **Bold** = p < .05. YR = Youth-reported; and PR = Parent-reported. Correlations for girls are below the diagonal, correlations for boys are above the diagonal.

Table 13

Bivariate Correlations among Felt Pressure, English Stereotypes, Child- and Parent-Reported Parent Encouragement to Enroll in Advanced English Classes, Prior English Grade, and Parent Education and Income.

	1	2	3	4	5	6	7	8
1. Felt Pressure	–	.12	**.29**	**-.26**	**-.25**	**.31**	**-.48**	**-.31**
2. Child's English Stereotype	.02	–	**.37**	-.01	.14	-.05	.02	.14
3. Parent's English Stereotype	.02	.10	–	.11	-.01	-.11	.01	.06
4. YR Parent Encourages English	-.09	**-.16**	.14	–	.15	**.31**	.14	**.32**
5. PR Parent Encourages English	-.15	-.04	.16	**.39**	–	**.43**	.13	.21
6. Prior English Grade	**-.26**	-.07	.08	**.26**	**.42**	–	.07	**.31**
7. Parent Education	**-.23**	-.12	-.06	**.35**	.20	**.27**	–	**.37**
8. Parent Income	**-.30**	**-.24**	-.05	**.27**	**.25**	**.31**	**.54**	–

Note. **Bold** = $p < .05$. YR = Youth-reported; and PR = Parent-reported. Correlations for girls are below the diagonal, correlations for boys are above the diagonal.

Table 14

Maximum Likelihood Regression Models Predicting Child-Reported Parent Encouragement to Take Advanced/Honors Classes in Math, Science, and English from Felt Pressure, with Gender as a Moderator of Felt Pressure, and Course Grade, Parent Education, and Parent Income as Covariates (*N* = 318)

	Encourage Math	Encourage Science	Encourage English
	B (SE)	*B (SE)*	*B (SE)*
Felt Pressure	.10 (.09)	.15 (.11)	.06 (.11)
Gender	.27 (.21)	.62 (.46)	.37 (.49)
FP X Gender	-.27 (.24)	-.21 (.15)	-.13 (.16)
Course Grade	**.27 (.07)**	**.32 (.07)**	**.26 (.08)**
Parent Education	.18 (.09)	**.18 (.04)**	**.10 (.05)**
Parent Income	**.21 (.09)**	**.07 (.03)**	.04 (.03)
R^2	**.25**	**.35**	**.16**

Note. **Bold** = p < .05. FP = Felt pressure.

Table 15

Maximum Likelihood Regression Models Predicting Parent-Reported Parent Encouragement to Take Advanced/Honors Classes in Math, Science, and English from Parent-Reported Domain-specific Traditional Stereotypes, with Student Gender as a Moderator of Stereotype Endorsement, and Course Grade, Parent Education, and Parent Income as Covariates (*N* = 160)

	Encourage Math	Encourage Science	Encourage English
	B (SE)	*B (SE)*	*B (SE)*
Stereotypes	.00 (.00)	-.00 (.01)	.01 (.01)
Gender	-.04 (.15)	.10 (.14)	.18 (.18)
Stereotypes X Gender	.01 (.01)	.00 (.01)	-.01 (.01)
Course Grade	**.45 (.08)**	**.32 (.07)**	**.40 (.09)**
Parent Education	-.02 (.04)	.03 (.04)	.02 (.04)
Parent Income	.03 (.02)	.03 (.02)	.03 (.03)
R^2	**.32**	**.20**	**.24**

Note. **Bold** = $p < .05$.

Table 16

Maximum Likelihood Regression Models Predicting Plans to Enroll in Advanced/Honors Classes in and Plans to Major/Pursue a Career in Math, Science, and English from Domain-specific Discrimination Experiences, with Gender as a Moderator of Discrimination Experiences, and Course Grade, Parent Education, and Parent Income as Covariates (*N* = 318)

	Enroll in Math	Enroll in Science	Enroll in English	Math Major/Car	Science Major/Car	English Major/Car
	B (SE)	*B (SE)*	*B (SE)*	*B (SE)*	*B (SE)*	*B (SE)*
Discrimination	.14 (.19)	-.04 (.23)	-.10 (.26)	.41 (.22)	.56 (.29)	**.18 (.06)**
Gender	.38 (.34)	.48 (.37)	-.27 (.39)	**.82 (.39)**	.68 (.45)	-.14 (.34)
Disc X Gender	-.13 (.25)	-.17 (.30)	.17 (.30)	-.43 (.28)	-.51 (.36)	-.08 (.08)
Course Grade	**.70 (.07)**	**.56 (.07)**	**.50 (.08)**	**.39 (.08)**	**.54 (.09)**	**.26 (.05)**
Parent Education	.03 (.05)	.07 (.05)	**.10 (.05)**	.01 (.05)	.02 (.06)	**.09 (.05)**
Parent Income	.04 (.03)	**.10 (.03)**	.06 (.03)	-.00 (.04)	.02 (.04)	-.00 (.11)
R^2	**.40**	**.41**	**.27**	**.12**	**.17**	**.33**

Note. **Bold** = *p* < .05. Disc = Discrimination; and Major/Car = Major/Career.

Table 17

Factor Loadings for Maximum Likelihood Structural Equation Models Predicting Future in Math, Science, and English from Domain-Specific Discrimination, with Importance of Domain, Self-Concept in Domain, and Interest in Domain as Individual Mediators, Parent Support of Domain as a Moderator of Discrimination Experiences, and Gender, Course Grade, Parent Education, and Parent Income as Covariates (*N* = 318)

	Mediators for Math Model			Mediators for Science Model			Mediators for English Model		
	Important	Self-Con	Interest	Important	Self-Con	Interest	Imp	Self-Con	Interest
	B (SE)	*B (SE)*	*B (SE)*	*B (SE)*	*B (SE)*	*B (SE)*	*B (SE)*	*B (SE)*	*B (SE)*
Future in Domain									
Plans to Take Domain Classes	1.00 (--)	1.00 (--)	1.00 (--)	1.00 (--)	1.00 (--)	1.00 (--)	1.00 (--)	1.00 (--)	1.00 (--)
Plans to Major in Domain	**1.38 (.29)**	**1.32 (.32)**	**1.35 (.22)**	**1.34 (.22)**	**1.26 (.24)**	**1.38 (.19)**	**1.45 (.30)**	**1.36 (.40)**	**1.28 (.31)**
Career Aspirations in Domain	**1.37 (.29)**	**1.31 (.32)**	**1.40 (.23)**	**1.48 (.24)**	**1.37 (.25)**	**1.55 (.21)**	**1.56 (.32)**	**1.41 (.40)**	**1.33 (.31)**

Note. **Bold** = p < .05. Self-Con = Self-Concept.

Table 18

Maximum Likelihood Structural Equation Models Predicting Future in Math, Science, and English from Domain-Specific Discrimination, with Importance of Domain, Self-Concept in Domain, and Interest in Domain as Individual Mediators, Parent Support of Domain as a Moderator of Discrimination Experiences, and Gender, Course Grade, Parent Education, and Parent Income as Covariates (*N* = 318)

	Mediators for Math Model			Mediators for Science Model			Mediators for English Model		
	Important	Self-Con	Interest	Important	Self-Con	Interest	Imp	Self-Con	Interest
	B (SE)	*B (SE)*	*B (SE)*	*B (SE)*	*B (SE)*	*B (SE)*	*B (SE)*	*B (SE)*	*B (SE)*
Support → Future	.12 (.18)	.21 (.22)	.10 (.14)	.27 (.17)	.36 (.20)	**.38 (.16)**	.05 (.16)	.03 (.23)	.04 (.15)
Mediator → Future	**.38 (.06)**	**.34 (.08)**	**.44 (.05)**	**.43 (.07)**	**.42 (.07)**	**.41 (.04)**	**.32 (.08)**	**.38 (.14)**	**.40 (.08)**
Discrimination → Future	.17 (.46)	.12 (.62)	.15 (.40)	.42 (.53)	.33 (.58)	.55 (.51)	.05 (.47)	-.05 (.67)	-.18 (.44)
Gender → Future	**.25 (.10)**	.15 (.10)	**.17 (.08)**	.15 (.09)	.10 (.10)	.02 (.08)	-.14 (.08)	**-.20 (.10)**	-.15 (.08)
Course Grade → Future	.19 (.12)	.21 (.14)	.14 (.08)	**.23 (.07)**	**.24 (.08)**	**.18 (.06)**	.09 (.08)	.07 (.10)	.06 (.08)
Parent Education → Future	.00 (.04)	-.01 (.04)	.00 (.03)	-.00 (.04)	-.01 (.04)	.02 (.03)	.05 (.03)	.05 (.03)	.04 (.03)
Parent Income → Future	.01 (.03)	.00 (.03)	.02 (.02)	.03 (.03)	.02 (.03)	.03 (.02)	.00 (.02)	.01 (.03)	.01 (.02)
Support X Disc → Future	.00 (.12)	.01 (.16)	.00 (.10)	-.06 (.12)	-.03 (.14)	-.10 (.12)	.02 (.12)	.05 (.17)	.06 (.11)
Support → Mediator	**.55 (.17)**	**.42 (.18)**	**.49 (.24)**	**.68 (.22)**	**.57 (.23)**	.39 (.27)	**.61 (.19)**	**.61 (.14)**	**.70 (.31)**
Discrimination → Mediator	.05 (.45)	.26 (.57)	-.04 (.67)	.17 (.74)	.41 (.80)	.02 (.89)	.46 (.62)	.67 (.46)	1.08 (.89)
Support X Disc → Mediator	-.07 (.12)	-.11 (.14)	-.04 (.18)	-.10 (.19)	-.18 (.20)	-.04 (.22)	-.20 (.15)	**-.26 (.11)**	-.32 (.23)

Note. **Bold** = p < .05. Self-Con = Self-Concept and Disc = Discrimination.

Table 19

Indirect Effects for Structural Equation Models Predicting Future in Math, Science, and English from Domain-Specific Discrimination, with Importance of Domain, Self-Concept in Domain, and Interest in Domain as Individual Mediators, Parent Support of Domain as a Moderator of Discrimination Experiences, and Gender, Course Grade, Parent Education, and Parent Income as Covariates (N = 318)

	Mediators for Math Model			Mediators for Science Model			Mediators for English Model		
	Important	Self-Con	Interest	Important	Self-Con	Interest	Imp	Self-Con	Interest
	B (SE)	*B (SE)*	*B (SE)*	*B (SE)*	*B (SE)*	*B (SE)*	*B (SE)*	*B (SE)*	*B (SE)*
Predictor Variables									
Support	**.21 (.07)**	**.14 (.07)**	.22 (.12)	**.29 (.11)**	**.24 (.10)**	.16 (.11)	**.19 (.08)**	**.23 (.10)**	.28 (.15)
Discrimination	.02 (.17)	.09 (.20)	-.02 (.29)	.07 (.32)	.17 (.34)	.01 (.36)	.15 (.21)	.25 (.22)	.43 (.39)
Support X Discrimination	-.03 (.05)	-.04 (.05)	-.02 (.08)	-.04 (.08)	-.08 (.08)	-.02 (.09)	-.06 (.05)	-.10 (.06)	-.13 (.10)

Note. **Bold** = p < .05. Self-Con = Self-concept. Indirect effect = (predictor → mediator) * (mediator → future in <domain>).

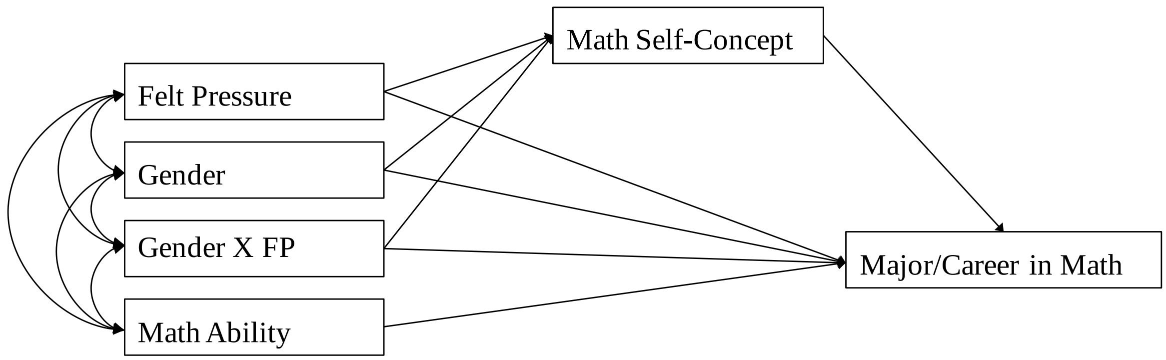

Figure 1. Relations among felt pressure and expectations to major/pursue a career in math, with math self-concept as a mediator, gender as a moderator of felt pressure, and ability as a covariate.

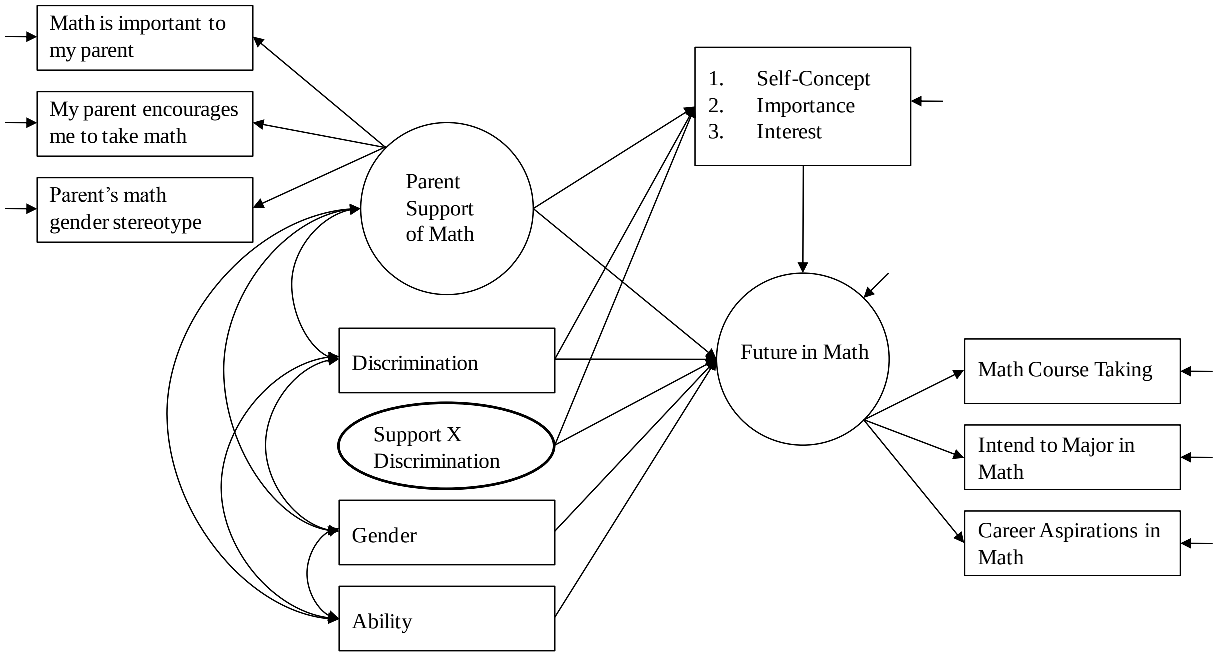

Figure 2. Relations among parent support of math, gender discrimination in math, support as a moderator of discrimination, and children's future in math, with math self-concept, importance of math, and interest in math as mediators (tested separately) and gender and ability as covariates.

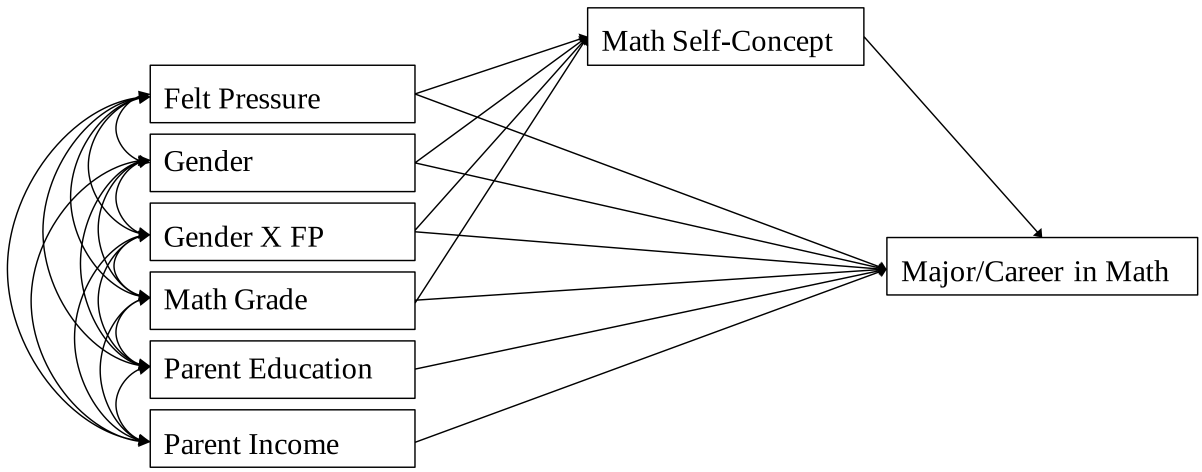

Figure 3. Relations among felt pressure and plans to major/pursue a career in math, with math self-concept as a mediator, gender as a moderator of felt pressure, and previous grade in math, parent education, and parent income as covariates.

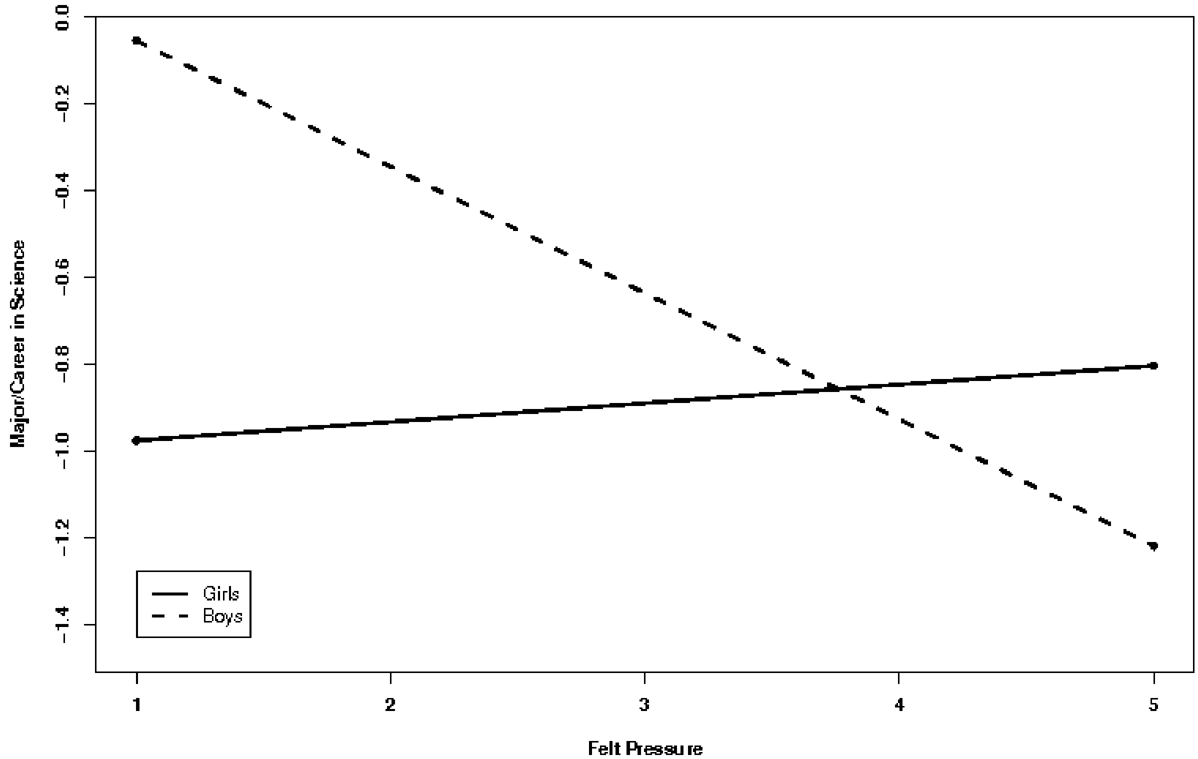

Figure 4. Interaction plot of felt pressure X gender predicting plans to major/pursue a career in science.

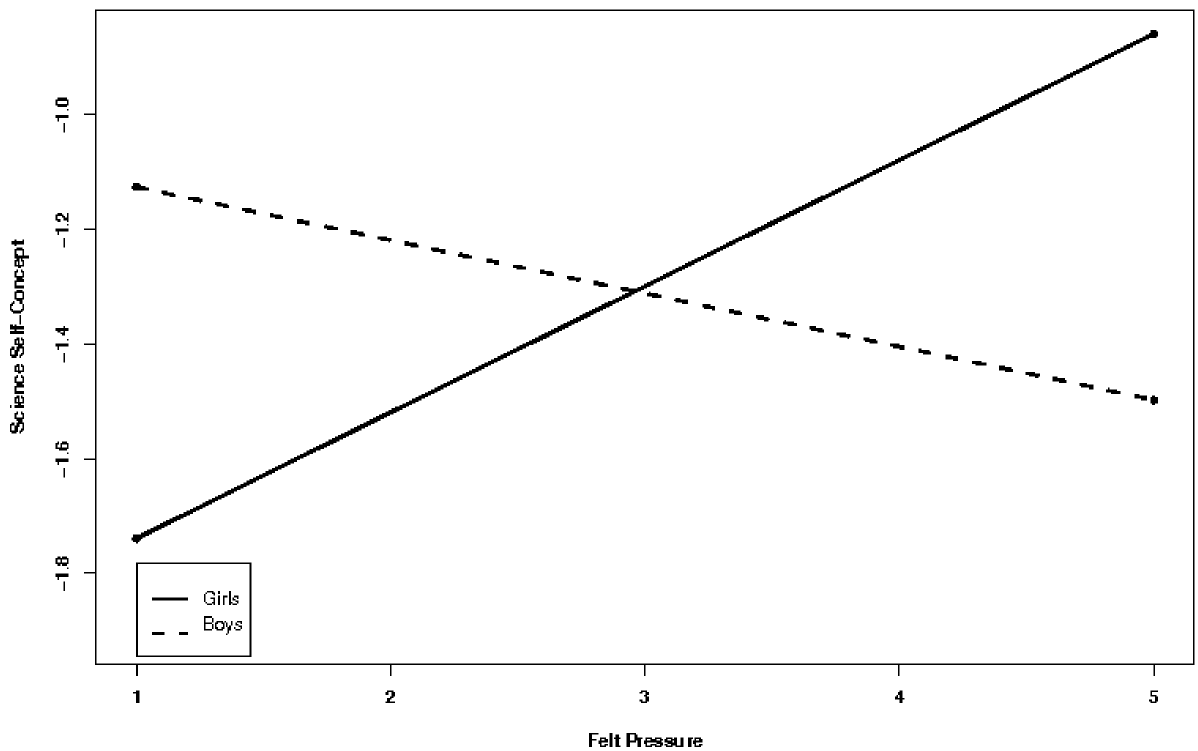

Figure 5. Interaction plot of felt pressure X gender predicting science self-concept.

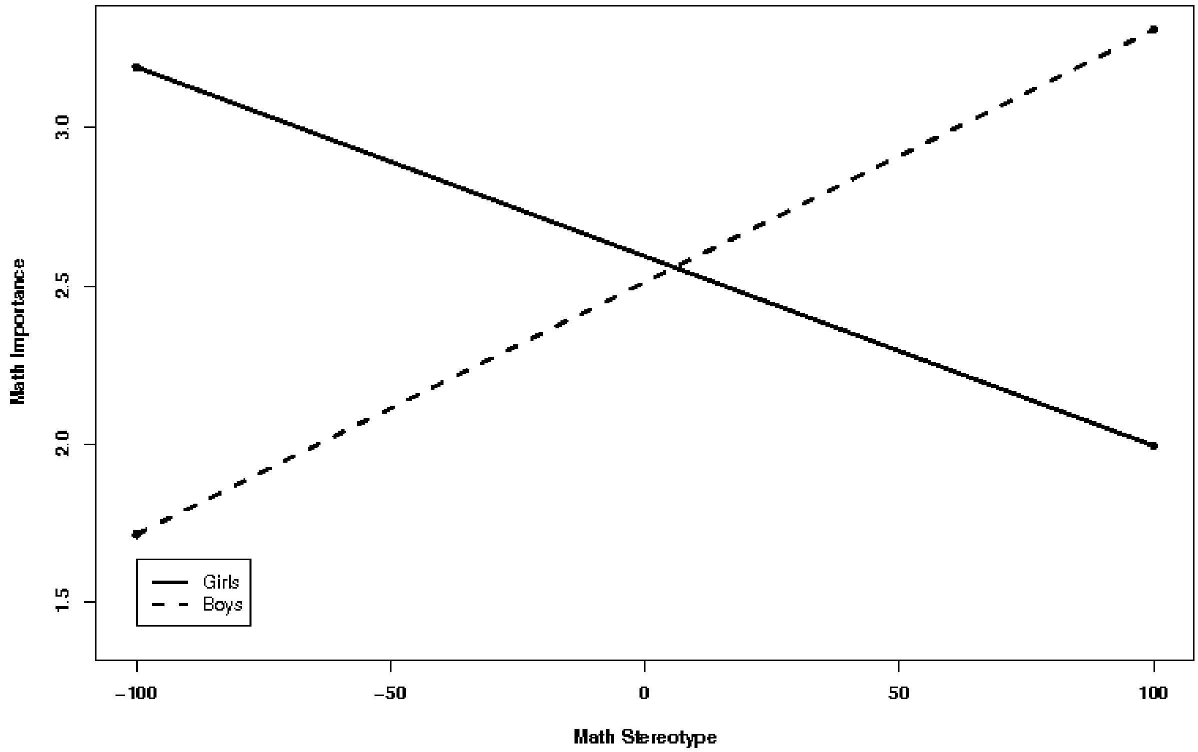

Figure 6. Interaction plot of math stereotype X gender predicting math importance.

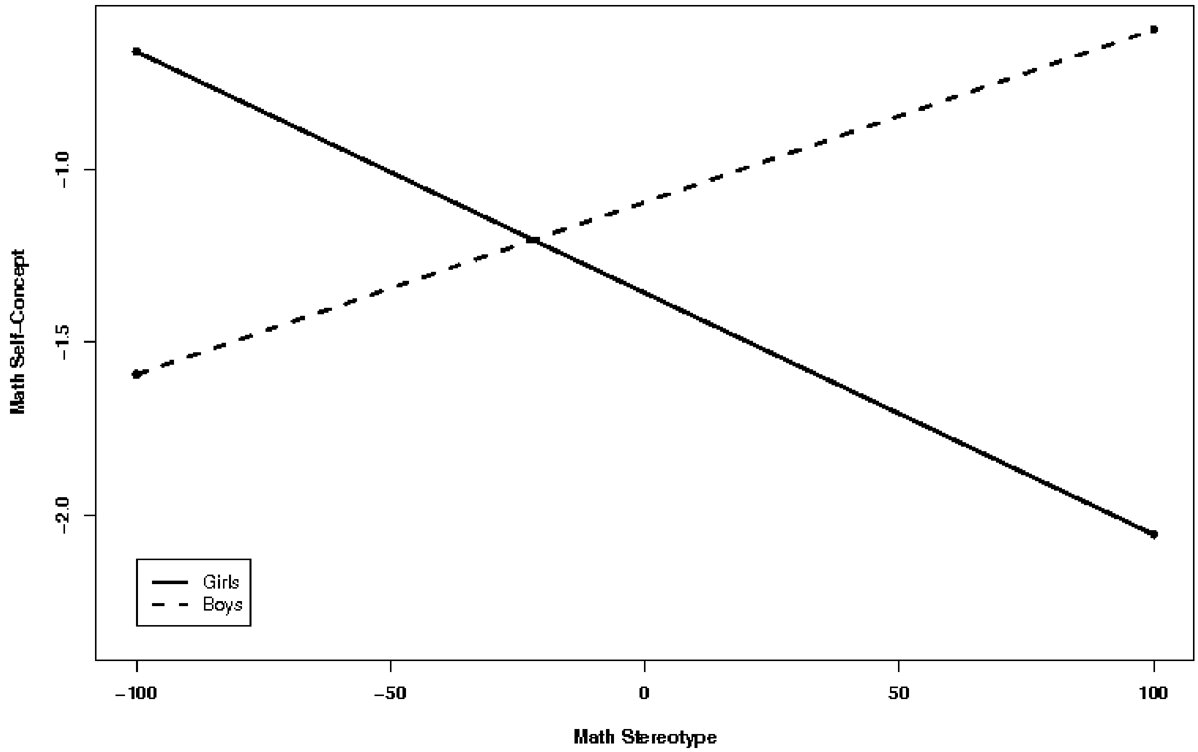

Figure 7. Interaction plot of math stereotype X gender predicting math self-concept.

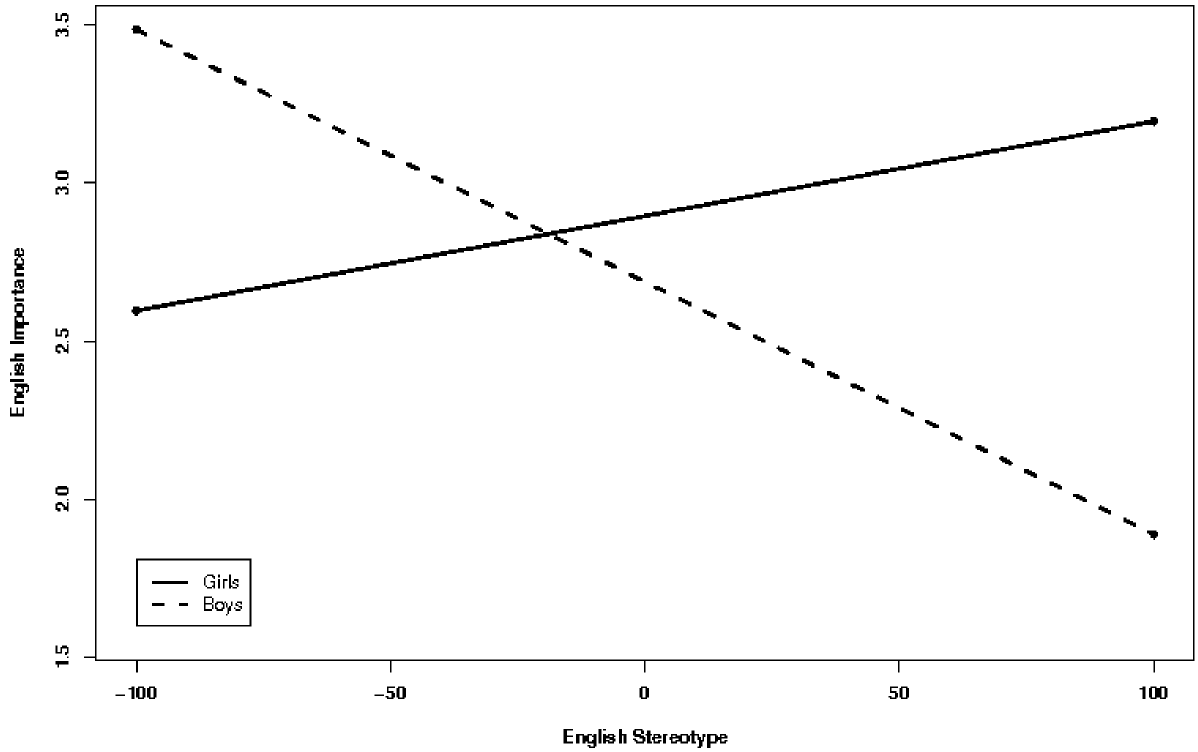

Figure 8. Interaction plot of English stereotype X gender predicting English importance.

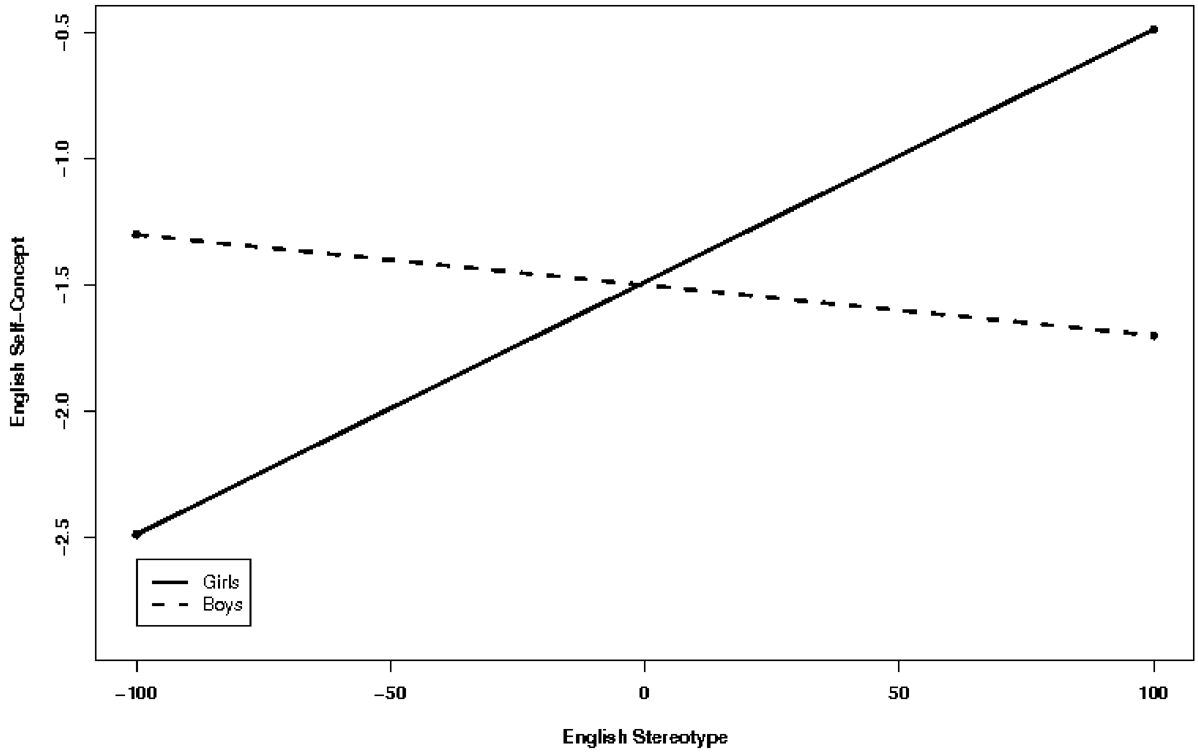

Figure 9. Interaction plot of English stereotype X gender predicting English self-concept.

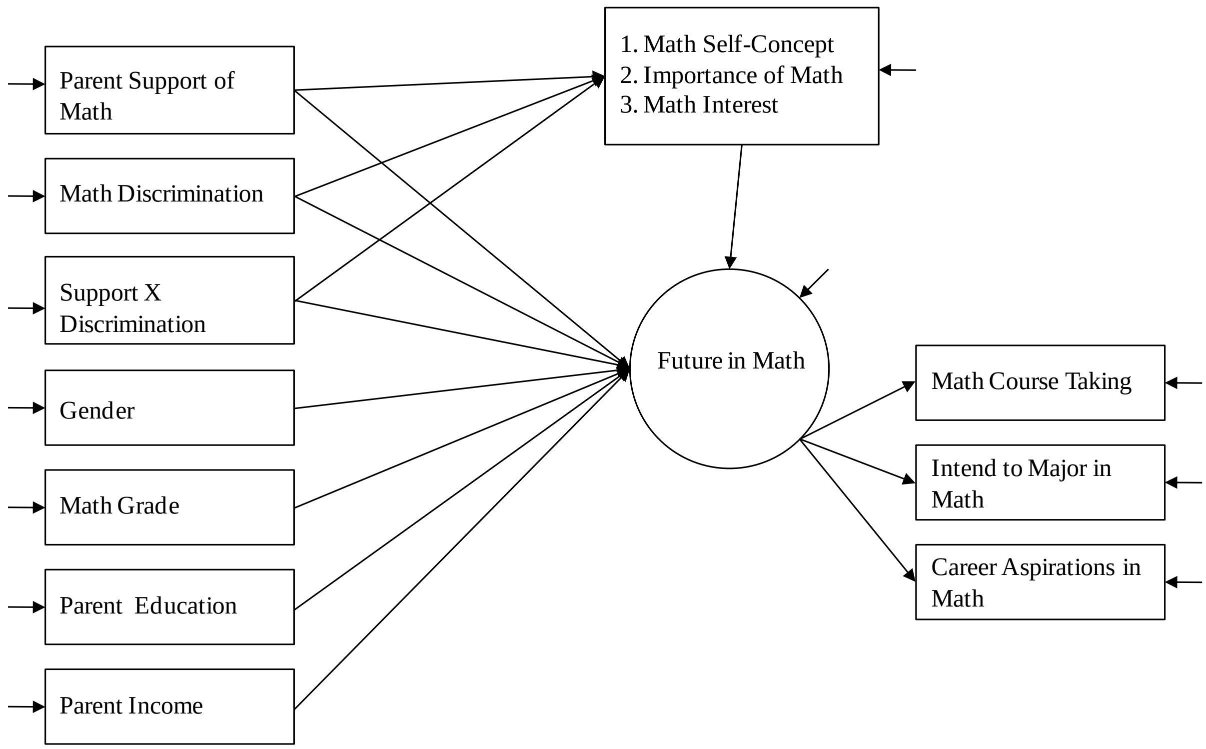

Figure 10. Relations among parent support of math, gender discrimination in math, support as a moderator of discrimination, and children's future in math, with math self-concept, importance of math, and interest in math as mediators (tested separately), and gender, previous grade in math, parent education, and parent income as covariates.

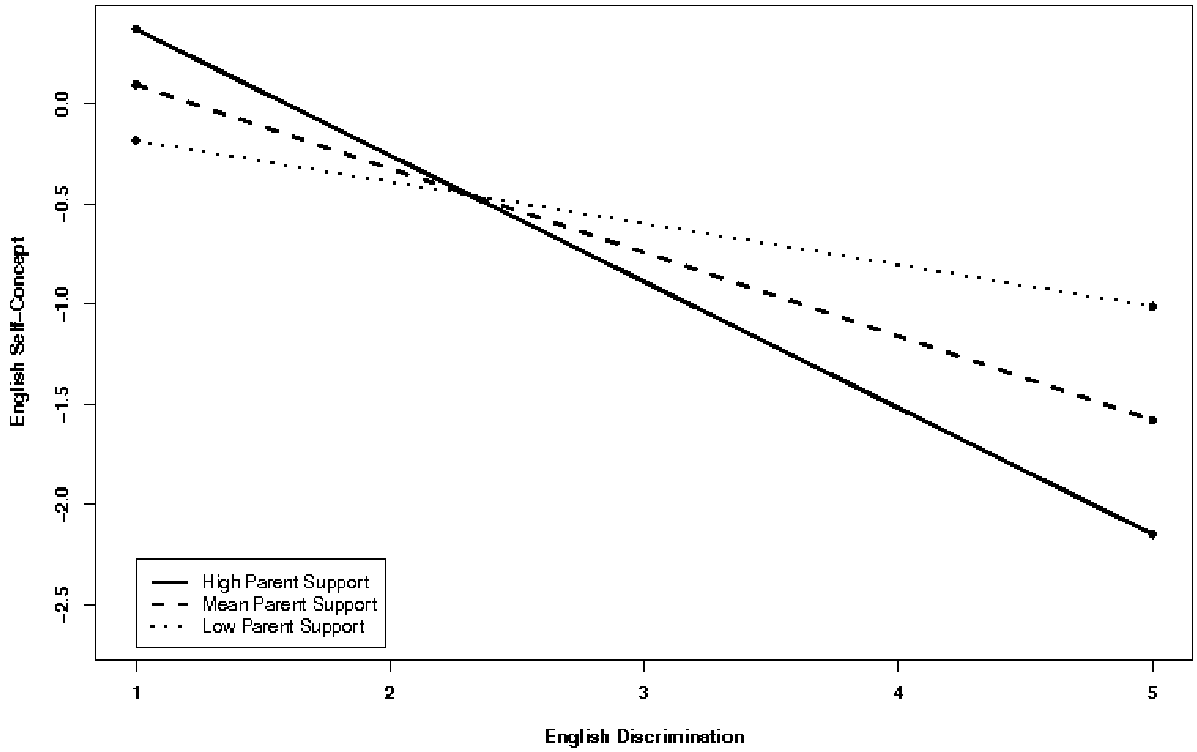

Figure 11. Interaction plot of English discrimination X parent support of English predicting English self-concept.

Appendix A

Complete List of Items in the Questionnaire

Felt Pressure Items for Girls

1. My parents would be upset if I acted like a boy.

2. My parents would NOT mind if I learned how to fix cars and bicycles.

3. My parents would NOT like it if I learned to fish and hunt.

4. My parents would be upset if I wanted to learn an activity that only boys usually do.

5. My parent would like for me to choose a career that is common for women to have.

6. My parent would probably have different career expectations for me if I was a boy.

Felt Pressure Items for Boys

1. My parents would be upset if I acted like a girl.

2. My parents would NOT mind if I wanted to take ballet or baton twirling lessons.

3. My parents would NOT like it if I wanted to learn how to knit or sew.

4. My parents would be upset if I wanted to learn an activity that only girls usually do.

5. My parent would like for me to choose a career that is common for me to have.

6. My parent would probably have different career expectations for me if I was a girl.

Gender discrimination Items

1. Because you are a girl/boy, you were given a lower grade than you deserved in <domain>.

2. Because you are a girl/boy, you were discouraged from taking an advanced level <domain> course in school.

3. Because you are a girl/boy, people assume that you’re not good in <domain>.

Complete List of Items in the Questionnaires

Gender Stereotype Items

1. I think that in <domain> girls do this well.

2. I think that girls find <domain>.

Perceptions of caregivers' stereotypes

1. My mother thinks that in <domain> girls do this well.

2. My mother thinks that girls find <domain>.

Intended Major Items

If you plan on going to college, please circle the number that best represents how likely you are to Major in each category (examples are given in parentheses). You may add an "other" category if your intended major is not listed.

1. Art (Music, Drama, Design, Dance, Art Teacher).
2. Computers (Programming, Computer Teacher).
3. English (Journalism, Language, English Teacher).
4. Math (Accounting, Architecture, Engineering, Statistics, Math Teacher).
5. Science (Astronomy, Chemistry, Physics, Biology, Science Teacher).
6. Social Science (Anthropology, Ethnic Studies, History, Psychology, Sociology, Social Science Teaher).
7. Sports (Kinesiology, Sports Science, Gym Teacher).
8. Other, Please Specify.

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