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The Role of Gender and Friendship in Advanced Course Taking

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Abstract

This article examines the role of friends in girls' and boys' advanced course taking and explores whether friends' characteristics are particularly important for girls' math and science attainment. With the use of data from Adolescent Health and Academic Achievement and the National Longitudinal Study of Adolescent Health, the results indicate that same-sex friends' academic performance significantly predicts course taking in all subjects for girls, but not for boys. Furthermore, for math and science only, the effects of friends' performance are greater in the context of a predominantly female friendship group, which suggests that such groups provide a counterpoint to the gendered stereotypes and identities of those subjects.

Although parents are typically of primary importance in shaping children's lives, friends become increasingly important during adolescence (Furman and Buhrmester 1992). The influence of friends may be particularly strong during high school, since youths are subject to less adult supervision and spend increasing amounts of time with their peers (Kandel 1996). A wealth of previous literature has documented the potential for adolescent friendships to exert a negative influence, encouraging delinquency and problem behaviors (Aseltine 1995; Granic and Dishion 2003; Matsueda and Anderson 1998; Warr 1993; Weerman and Smeenk 2005). In contrast, the potential for friends to act as a positive academic influence has received much less attention (Crosnoe, Cavanagh, and Elder 2003).

This article investigates whether friends can be a positive resource for students' advanced course taking in high school and whether there are gendered patterns to any such effects. While having academically proficient friends early in high school may positively promote subsequent advanced course taking for both genders and across a range of subjects, it is particularly in science and math where we expect to find the strongest effects of friends' academic characteristics on later advanced course taking for girls. These stereotypically male subjects

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This article is based on school transcript data for participants in the Add Health study that was produced by investigators on the Adolescent Health and Academic Achievement (AHAA) project and linked to original Add Health data. Add Health policy stipulates that project investigators have no rights to proprietary use of data. The study requires that data be made available to outside scientists before articles using the data can be submitted for publication. The AHAA principal investigator allowed submission of this article before the release of the data. Because this was discovered when the article was already copyedited, Add Health has agreed to accommodate Sociology of Education's publication schedule by making unreleased variables used in the article available to investigators upon request. Requests should be directed to Joyce Tabor at tabor@unc.edu. Selected constructed variables based on the AHAA project are already available from Add Health, and future releases will include additional variables, including final versions of four preliminary variables used in this article. Prospective data users may obtain information on accessing the Add Health data at <http://www.cpc.unc.edu/projects/addhealth/data>.

are most likely to involve an academic climate that girls find unattractive, uncomfortable, and perhaps even hostile to them and in which they face obstacles to the pursuit of advanced work, including lower academic self-confidence, lower interest, and lower perception of the relevance of the subjects to future career opportunities (Correll 2001; Eccles 1994; Xie and Shauman 2003). Female friends who are successful in science and/or math represent a crucial counterpoint to such perceptions and obstacles, including notions of male superiority in these fields, and can function as role models, study companions, allies, intellectual resources, friendly competitors and spurs to excellence, or a combination of these roles.

In addition, we suggest that when these high-performing female friends are situated within a predominantly female friendship group, girls are provided with an environment in which there is little room for male stereotypes of math and science to resonate and, instead, ample opportunity for an alternative feminine identity of science and math to be cultivated. Thus, drawing on insights from both the social psychological and education literatures, we suggest that while it is likely that friends matter for the general academic success of students, the personal relationships that girls establish with other females who are proficient in science and math create a unique social and academic context on which they can draw as they pursue a trajectory of achievement in these historically male fields.

To examine the role of gender and friendship in advanced course taking, we use data from the National Longitudinal Study of Adolescent Health (Add Health) and its new educational component, the Adolescent Health and Academic Achievement (AHAA) study. Although Add Health data have previously been used to investigate the influence of friends on a variety of health and social issues, until the addition of the AHAA data, the possibility of investigating educational outcomes was severely limited. Thus, taken together, these data resources provide a new and unique opportunity to examine longitudinally the influence of friends on students' academic outcomes.

THE INFLUENCE OF FRIENDS IN HIGH SCHOOL

When one considers the influence of friends, the potential for the effects of selection to outweigh the effects of socialization must be considered. Adolescents may choose their friends through the courses that they take (Field 2004; Kubitschek and Hallinan 1998) or on the basis of similarities in academic and social priorities and interests (Moody 2001). Yet research that has carefully considered selectivity bias has found that friends' attitudes and behaviors remain an independent influence on students' experiences because individuals who may be brought together initially because of shared characteristics nevertheless influence one another via continued association and become even more similar over time (Haynie 2001; Kandel 1978, 1996). Our concern here is to investigate the direction of the influence of friends on advanced course taking while recognizing that students also choose friends to some extent on the basis of prior achievement and attitudes about school. Our use of longitudinal data with rigorous prior academic controls, along with multiple outcomes, provides an opportunity to increase our understanding of these social processes among adolescents.

There are several ways in which friends may be expected to have a positive impact on adolescents' educational outcomes (Crosnoe et al. 2003; Epstein 1983; Hallinan and Williams 1990). Friends' knowledge and academic skills represent a potential source of social capital for adolescents, since students are willing to accept information or advice from their friends as trustworthy sources (Crosnoe et al. 2003; Hallinan and Williams 1990). For example, friends can offer help with homework or impart information about the best teachers or the most important classes to take to get into college. By establishing norms that legitimate academic behaviors, such as studying hard, friends may provide a positive endorsement of individuals' own academic efforts. As students work and struggle to master cognitively demanding

curricula, friends may offer encouragement. For all these reasons, we would expect that having friends with high levels of academic performance would be positively related to students taking advanced courses at the end of high school. In addition, while mixed-gender friendship groups typically emerge during adolescence, particularly in the high school years, for academic and other outcomes, greater companionship and potential for role-modeling behavior are likely to occur among friends of the same sex (Schneider and Stevenson, 2000).

With regard to gender,¹ there is reason to believe that friendships may operate or function differently and even serve different purposes for girls than for boys. The social psychological literature indicates that girls are more other-oriented because they are typically socialized to worry about the opinions and approval of others (Eccles, Adler, and Meece 1984; Gilligan 1982). During adolescence, concerns about being well liked and popular may make girls more vulnerable to the influence of friends, in contrast to boys' concerns about being competent and independent (Beutel and Marini 1995; Leslie, McClure, and Oaxaca 1998). The friendships between girls tend to be more intimate, affectionate, supportive, encouraging, and involved than the friendships between boys (Beutel and Marini 1995; Felmlee 1999; Giordano 2003; McCarthy, Felmlee, and Haga 2004; South and Haynie 2004). While boys' friendships center more on specific activities, girls' friendships include more discussion of identity and disclosure of information. Furthermore, boys' friendships tend to emphasize competition, while girls' friendships are more cooperative (Beutel and Marini 1995).

Yet there is evidence that at least in some cases, boys' attitudes and actions are extremely responsive to the characteristics of male friends. The problem behaviors of friends are a powerful predictor of boys' subsequent delinquent involvement (Dishion et al. 2004; Felson and Haynie 2002; Toro, Urberg, and Heinze 2004; Van Lier et al. 2005). Thus, it is clearly the case that boys are not immune to the influence of friends. Little research, however, has explicitly examined whether friends similarly promote positive outcomes, such as academic achievement, for individuals of both genders.² Specifically, we are interested in examining whether high-performing friends of the same gender positively influence students' subsequent advanced course taking by motivating, encouraging, and promoting academic efforts and priorities. Our analyses offer a test of whether female friendships, characterized in the literature as generally more encouraging, involved, and intimate than male friendships (Johnson and Marini 1998; South and Haynie 2004), are more instrumental in facilitating a sustained, upward academic path toward advanced course taking in high school.

GENDER, FRIENDS, AND THE PURSUIT OF SCIENCE AND MATH

While we do not know whether friendships with high-performing same-sex peers promote high-end academic outcomes in general for both girls and boys, we do expect that such friendships are likely to be particularly important in facilitating girls' decisions to enroll in advanced math and science courses. Our intention is to build on previous research detailing the benefits of mentoring, close relationships with adults, and an all-female environment in promoting girls' interest and achievement in science and math, extending this research to include the potential benefits of high-performing female friends.

Although women's representation in science and math occupations has increased during the past few decades and the gender gap in test scores in these fields has declined, science and math continue to be stereotyped as male domains (Correll 2001; Kahle and Lakes 1983; Steele 1997). For example, girls are still less likely than boys to see themselves as future scientists

¹We are aware and respectful of the debate about using the terms *gender* and *sex*, where the former is discussed as a socially identified and constructed category, while the latter is discussed as a biological distinction. However, we use the terms interchangeably in this article.

²The few examples include Epstein (1983) and Crosnoe et al. (2003).

(Stake and Nickens 2005). Girls also continue to express less interest in science and math during the high school years and perceive themselves as less proficient in these areas compared to boys, despite comparable performance levels (Benbow and Minor 1986; Correll 2001; Xie and Shauman 2003).

Prior research on the science and math gender gap has highlighted the role of adult significant others who function as same-sex mentors to facilitate girls' and young women's achievement and persistence in these fields. From teachers and professors to mothers or other relatives who are employed in science, technology, engineering, and math (STEM) fields, these women offer a tangible representation of what is possible for adolescent girls in their own lives. These individuals also provide a role model for girls to follow in their own pursuit of these fields, since they can simultaneously relate to the general struggles of succeeding in science and math, as well as to the specific obstacles faced by girls and women. In sum, the positive impact of an older female mentor on a younger girl or woman depends upon a personal relationship between the two of them, which serves as the conduit through which positive messages are delivered and negative stereotypes and self-perceptions are dissolved (see, for example, Baker and Leary 1995; Dryler 1998; Eccles, Jacobs, and Harold 1990; J. Lee 2002; Seymour and Hewitt 1997; Shu and Marini 1998; Stake and Nickens 2005).

Given the importance of peers and friends during adolescence, it is likely that having female friends who function in a manner similar to these mentors may be crucial when girls are deciding whether to take advanced science and math courses in their junior and senior high school years. Yet in contrast to the numerous studies of the importance of parents and teachers as mentors, the role of friends at this life-cycle stage has only rarely been examined empirically. We suggest that scientifically or mathematically able friends provide the opportunity to relate to others who can identify with the same challenges, frustrations, and sense of accomplishment that are related to working hard in science and math. Finally, female friends can offer emotional support for the pursuit of subjects that are not only academically difficult, but stereotyped as masculine, a factor that may be particularly troubling to adolescent girls who are formulating the beginning of an adult feminine identity.

In addition, although we expect that high-performing female friends may be a key resource for girls' advanced science and math course taking, we also suggest that in studying these issues, it may be important to consider the gendered context of friendship groups. A number of studies have reported that a key consideration in driving women away from STEM fields of study is their perception of the chilly "masculine" environment in these fields (Ferreira 2003; Rogers and Menaghan 1991; Serex and Townsend 1999; Seymour and Hewitt 1997). When a girl or young woman is one of the few of her gender in a science or math classroom, study group, or program, it creates a ripe atmosphere for a hypercompetitive, "individualist" male culture to dominate—one in which gender stereotypes thrive and perceptions of female isolation and lack of fit reverberate. In contrast, research on science and math courses in same-sex schools and classrooms has indicated that in a predominantly female environment, stereotypes lose salience; role models, advocates, and study partners abound; and academic norms of cooperation and encouragement prevail (Burkam, Lee, and Smerdon 1997; Shapka and Keating 2003). Self-concept, a key element in girls' achievement and persistence in science and math, also tends to increase in such a female-friendly environment (V. Lee and Bryk 1986).

Thus, we suggest that a friendship group that is predominantly female *and* proficient in science or math will provide a similarly positive context for female achievement. In such a group, the dominant norms are likely to be cooperative and encouraging, rather than narrowly competitive (McCarthy et al. 2004). Gendered stereotypes of girls being weak in science or math or of these areas being male domains will be negated in such an environment. Of course, friendships differ from classrooms and schools in that they are voluntary associations, rather than formal

organizations. Yet given girls' inclination and receptivity to strong interpersonal relationships, a predominantly female environment that is focused on science- and math-related activities may function as an important social and academic resource for girls' advanced course taking when it comes in the form of a friendship group.

In contrast to math and science, girls' advanced course taking in subjects like English—a traditionally female subject in which girls are typically overrepresented—may be less related to the academic performance of female friends and the predominant presence of high-performing girls in their friendship group. The barriers of stereotypes, lower self-concept, and the lack of role models that apply to science and math do not apply here, so that the academic and social resources that are offered by female friends who excel in English may be less important. By considering English as a contrast to science and math, we can distinguish between the characteristics of friends that may generally be positive in promoting girls' academic outcomes and those aspects of friendships that are particular to promoting girls' course taking in science and math.

RESEARCH QUESTIONS

In this article, we seek to answer three main questions to gain a better understanding of the ways in which friends influence adolescents' academic success in high school and whether distinctly gendered processes may be at work. First, does same-sex friends' academic performance predict advanced course taking in the 11th and 12th grades for female and male students? Second, is the effect of the academic performance of same-sex friends more important in predicting girls' advanced course taking in the traditionally male-dominated areas of math and science than it is in the more traditionally female-dominated field of English? Third, is there an interaction between same-sex friends' performance and the gender composition of the friendship group that is particular to promoting girls' advanced course taking in science and math, such that the effects of friends' performance are greater in the context of a predominantly female friendship group?

DATA AND METHODS

In our study, we used data from Add Health and its educational component, the AHAA study. Add Health is a nationally representative stratified random sample of 7th–12th grade students in 132 middle and high schools in 1994–95 (Bearman, Jones, and Udry 1997). Nearly all the students in these schools completed a short survey, referred to as the In-School Survey, which provided a virtual census of students in each school ($N = 90,118$ students) and served to create the sampling frame for a longitudinal survey of students. Approximately six months later, generally during the spring and summer of the 1994–95 academic year, the longer and more detailed Wave I survey was administered to 20,745 students. The survey captured six nationally representative cohorts of students on the basis of their grade level, 7th–12th. Students were again surveyed in 1995–96 for Wave II ($N = 14,738$), with the exception of Wave I seniors. In 2001–02, the Wave III survey was collected, which followed up the Wave I respondents, including seniors and others who had not responded to Wave II ($N = 15,170$).

As part of Wave III, the respondents were asked to sign a high school Transcript Release Form (TRF), which authorized the collection of their official school transcripts from the last high school they had attended (see <http://www.cpc.unc.edu/projects/addhealth>). Approximately 91 percent of the Wave III respondents signed a valid TRF, leading to the collection of over 12,000 student transcripts. From these transcripts, the AHAA team created a series of indicators that capture students' course taking and performance in a range of subjects throughout their years of high school, thus supplying a rich source of academic information pertaining to the Add Health respondents (Rieggle-Crumb et al. 2005; see also <http://www.prc.utexas.edu/ahaa>).

Our analytic sample was developed by applying several filters to the base sample of the 11,023 students with data from the In-School, Wave I, and Wave III surveys of Add Health. Sample sizes resulting from each filter, along with the accompanying demographic characteristics, are shown in Table 1. The first filter excluded students who did not have data on friendships from the In-School survey, resulting in 10,115 students and slightly fewer African Americans and more girls. The second filter excluded students who lacked data from their high school transcripts. The third and final filter retained only students who were in the 9th- and 10th-grade cohorts in 1994–95 and those with longitudinal analytic weights. The latter criterion was necessary to ensure the representativeness of results, while the first was necessary to ensure that students' survey responses occurred during the beginning of high school and before the timing of the dependent variables, as is discussed later. The final filter retained fewer African American students and students with higher levels of parental education. It is also worth noting that the lower overall freshman-year grade point average (GPA) observed for the final sample is the consequence of our selection of the 9th- and 10th-grade cohorts, since students in the 11th- and 12th-grade cohorts represent students who stayed in high school, rather than dropping out.

Dependent Variables

We used three variables from the AHAA data to capture students' advanced course taking in three subjects. Using the Classification System for Secondary Courses (CSSC) codes assigned to each course on a student's transcript, AHAA created a series of course-taking indicators across a range of subjects. For math and science, course sequence indicators were constructed to capture the highest-level course the student reached by the end of high school. For example, the variable for the math course sequence ranges from lower-level courses, such as Basic and Applied Math; to mid-level courses, such as Geometry; to the most advanced courses of Precalculus and Calculus. We dichotomized both the math and science sequence variables to capture whether or not, for math, a student reached Precalculus or Calculus and for science, whether or not the student took Physics. These courses are typically taken during the junior or senior year because of the system of prerequisites that are needed to reach them.³

Because students are generally required to complete four years of English, it is not a specific subject within English but, rather, the Honors or AP designation that indicates whether a student has reached an advanced level at the end of high school. Using the CSSC codes specific to Honors English and AP English courses, AHAA created indicators of the level of students' English course each year of high school. Our dependent variable for English is a dichotomous indicator of whether or not the students took an AP English course or Honors English in their fourth year of high school.⁴

Independent Variables

Friends' Characteristics—Our main variables of interest capture the characteristics of friends while students are in high school. As part of the In-School Survey, students were asked to identify their best male and female friends, with a maximum of five friends of each gender. Because virtually every student in the school was interviewed, the individual survey responses of nominated friends could then be linked to the student (Carolina Population Center 2001).

³Approximately 100 students were omitted from our analysis because they took Physics during their first year of high school (which accounts for the difference in *N*s between the models for Physics and the models for math and English). This is likely the result of a recent reform movement in the science curriculum in high school in which the typical order of subjects is changed from biology, chemistry, and physics to a new order of physics, chemistry, and biology (Lederman 2001).

⁴The decision of how to categorize Advanced English is less clear than in the more hierarchically based curricula of science and math in high school. We conducted analyses with different definitions of Advanced English, including AP only as one option or AP or any Honors English after the freshman year as another option. The effect of friendship variables was consistent across these models. Finally, the measure used here to capture AP/Honor's English was offered in all Add Health high schools, as were Physics and Precalculus/Calculus.

In this way, variables could be created that represent the characteristics of the respondents' friends. A small percentage of students named friends who did not appear on the rosters, even though the students reported that these friends did attend that school, and some students nominated friends who did not attend the same school. These two instances are the source of missing data for friendship measures, such that approximately 8 percent of all friendship nominations could not be linked to the friend's own self-reported data (Carolina Population Center 2001). If a student nominated one or more friends with missing data in this manner, those friends were assigned the average value of the friendship group for the characteristic being measured, and a dichotomous variable indicating this fact was included in our models.

A primary focus of this article is the academic performance of students' friends. Using the self-reported grades from the In-School Survey, we constructed three variables: the average grades of respondents' same-sex friends in science, math, and English. Because we limited our sample to students who were in the 9th or 10th grade when the In-School Survey was conducted, our measures of friends and grades precede the dependent variable by more than a year, since the advanced courses considered here are taken in the 11th or 12th grade. Although friendships as well as grades may change in the interim, our approach allowed us to estimate the effects of friends longitudinally.⁵ Even when friendships change, adolescents typically form relationships with similar types of people, and an exploratory analysis of the grades of all AHAA respondents indicated that few students exhibited major changes in GPA from one year to the next.

In addition, because the presence of a predominantly female environment has been shown to encourage girls' pursuit of math and science, we applied this concept to friendship groups and created a measure of the gender composition of the student's self-reported friendship group.⁶ We created a dichotomous indicator for whether the student's group had a greater number of same-sex than opposite-sex friends (coded 1) or whether the group was gender equitable or composed of more opposite-sex friends than of same-sex friends (coded 0).⁷ An interaction term between the gender composition of the friendship group and the average grades of the same-sex friends was included to estimate whether the effects of such friends' grades are greater within the context of a predominantly female friendship group.

Finally, we included measures of the activities that students engage in with their friends of the same sex, to tap the level of involvement that characterizes students' friendships. For each nominated friend, the respondents indicated whether, in the past week, they had visited the friend's house, hung out after school, talked on the telephone, or spent time together during the weekend. The responses were summed for each friend and then averaged across friends, resulting in a variable ranging from 1 to 5. In addition, we constructed an interaction term between this variable and the gender composition of the friendship group to examine whether the effects of involvement vary according to the gendered context of the group.⁸ Overall, these

⁵Determining the persistence of friendship across years is not practically possible because the follow-up surveys of Add Health do not offer the same detailed friendship indicators (see <http://www.cpc.unc.edu/projects/addhealth/codebooks/wave2>).

⁶The Add Health questionnaire asked the respondents to identify female and male friends separately, which introduces the possibility that the respondents felt encouraged to list opposite-sex friends when they might not otherwise have done so. We attempted to address this issue in an exploratory analysis by controlling for the level of involvement (discussed later) with opposite-sex friends. In the exploratory analysis, we also added a variable for whether the students reported only one opposite-sex friend who was a romantic partner (which they were told to include in the instructions). The effect of this variable was not significant and is not included here.

⁷Fewer than 10 percent of students of either sex reported more opposite-sex friends, and we included them in the same category of those with an equal number of friends of both genders to create a dichotomous indicator for whether or not the student's friendship group was predominantly same sex. We also measured the gender composition of the friendship group as the proportion of friends who were of the same sex. The results using this alternative variable were virtually identical to those reported in the results here, but the proportion measure does not allow for as easy an interpretation of the effects of a predominantly same-sex group, which is a key focus of this article. We also included a variable for the overall number of friends in all our analytical models. The effect of this variable was not significant and was not included in the final models.

variables enabled us to account for the possibility that some friendships may be tighter and more involved than others.⁹

The measures of friendship characteristics used here stand in contrast to much previous research that has used a student's perceptions of his or her friends' characteristics, which can introduce upwardly biased estimates of friends' academic abilities. Add Health data provide the relatively rare opportunity to examine how a group of friends may shape an individual's academic trajectory using characteristics reported by friends themselves, rather than those perceived by the individual. In addition, the few previous studies that have considered the role of friends in girls' math and science achievement have been limited in scope, relying, for example, on girls' reports only of their best friend (Hanson 1996; Jacobs et al. 1998) or measures that do not distinguish between friends and academic peers (J. Lee 2002; Stake and Nickens 2005). Our study therefore provides an opportunity to use nationally representative data with detailed information on friendship groups to examine the relationship between the academic performance of female friends in science and math and adolescent girls' subsequent pursuit of advanced science and math courses.

Additional Variables—We controlled for students' own grades, relying on students' self-reported grades in the In-School Survey for math, science, and English, ranging from 1 for a D or below to 4 for an A. Using course-taking indicators from AHAA data on students' freshman year in high school, we controlled for the students' beginning course level in science, math, and English (see Appendix Table A for a detailed description of these and all subsequent variables). We also included several variables to control for students' attitudes and perceptions that may be relevant to their advanced course taking in high school. All these variables came from the Wave I student survey, which was administered several months after the In-School Survey, during the same academic year (1994–95).¹⁰ First, in keeping with previous studies that have used Add Health, we incorporated measures of academic engagement and attachment to school (Johnson, Crosnoe, and Elder 2001; Resnick et al. 1997). Engagement was measured by students' reports of the number of times in the past school year they skipped school, had trouble paying attention in school, and had trouble getting homework done. School attachment came from students' reports of how close they felt to people at school, whether they felt a part of their school, and whether they were happy at their school.

We also included a measure of students' perceived intelligence, since research has shown that a lower academic self-concept can inhibit girls' participation and achievement in science and math in particular (Correll 2001). In addition, we controlled for students' own educational expectations for going to college, as well as parental expectations, measured by students' reports of how disappointed their parents would be if they did not attend college. This measure taps whether the student feels a press toward educational attainment from his or her family. Furthermore, because girls in gender-equitable friendship groups may be more likely to date than may those in predominantly female groups, we accounted for romantic activities in our models with an indicator for whether or not the student had recently been in a romantic

⁸To create the interaction terms between the gender composition of the friendship group and both friends' grades and activities with friends, we first centered each of the two component variables by subtracting the variable mean from each original value. We then multiplied together the centered versions of these two variables. By doing so, we avoided the problem of colinearity between the interaction term and the main effects.

⁹Although another possibility would be to focus only on reciprocated friendships that include only respondents who simultaneously nominated one another in the In-School Survey, we are more interested in the characteristics and activities of the individuals whom the respondents perceived to be their friends. We argue that it is possible for a student to be influenced by the academic performance and commitment of someone whom he or she considers a friend, regardless of whether that person reciprocates the feelings of friendship as strongly. Furthermore, our approach of using all nominated or "sent" friendships and controlling for the level of involvement is consistent with that of many other studies of friendship that have used Add Health (Cavanagh 2004; Crosnoe et al. 2003).

¹⁰Some students answered the Wave I survey during the summer of 1995, and a small number did so in the fall of 1995. In both cases, the students were explicitly instructed to answer questions in reference to the school year 1994–95.

relationship.¹¹ Finally, we included several additional controls: race and ethnicity (African American, Latino, and Asian, with white as the contrast category), parents' educational level, family income, and family structure (intact family versus other).

Four variables (parents' education, family income, intact family structure, and students' grades) had nonnegligible amounts of missing data. Students with missing values were assigned the sample mean, and dichotomous indicators for missing data for each of these variables were included.¹² All the analyses were performed using the statistical software package Stata, using survey estimators that account for the clustering of students within schools when calculating standard errors.¹³ The analyses were weighted using the transcript weight that was designed for the AHAA component of the Add Health study.

Analytic Design—As we mentioned previously, a primary concern of studies that attempt to model the influence of friends is the issue of selection bias, such that individuals may choose friends who have characteristics similar to themselves, which complicates conclusions about whether subsequent similarities in behavior or attitudes are the result of socialization. Our analytic design attempted to lessen such a selection bias. First, in trying to tap the independent influence of same-sex friends' grades, we accounted for the academic performance of the respondent. We did so by controlling for the respondent's own grades in the same year, as well as for the level of the respondent's course in that subject. We also included interaction terms in our models between friends' grades and respondents' grades, to determine whether there were greater benefits of having high-performing friends for those who were themselves high performers, compared to those who were not (not shown here). None of the interaction effects was significant in any model. It is also worth noting that the correlation between the respondents' own grades and the average grades of the respondents' same-sex friends in a given subject was approximately .4, suggesting that students may select their friends at the beginning of high school on the basis of many other factors in addition to academic performance.

Second, we argue that our analytic design minimizes selection bias through the choice of advanced course taking as the dependent variable. Rather than model how friends become more similar on a given trait (such as delinquency) over time, we model how friends' grades early in high school are related to course selection at the end of high school, when course-taking choices typically become more flexible. In addition, our dependent measure takes place one to three years afterward, which decreases the risk of selection bias (Cohen 1983). Also, if our results indicate some support for our theoretical model, such that friends' grades matter more for one gender than for the other or in one subject versus another, this is evidence for the influence of friends via socialization. We are not suggesting that we have eliminated the possibility of bias. Rather, in keeping with other research, we argue that the effects of friendship on course taking are likely the result of both selection and socialization (Cohen 1983; Crosnoe et al. 2003), but the design of our models reduces the potential for any observed effects to be solely the result of selection.

¹¹To determine whether the influence of predominantly female friendship groups varied according to whether girls were romantically active, we created an interaction term between the two measures. The interaction effect was never statistically significant in any of the models and did not alter any of our main results.

¹²If students' self-reported grades were missing from the In-School Survey, we substituted the students' reported grades in that subject from the Wave I survey, if available. If not, students were then assigned to the sample mean. In addition, analyses using imputed missing values for all four variables that were calculated using the "impute" command in Stata yielded similar results to the mean-substitution method used here. For imputation, we used the Stata function for whole sample means, rather than subgroup means, since the number of missing values by subgroups, such as race/ethnicity, was small.

¹³We also performed all the analyses predicting boys' and girls' probability of taking Physics, Precalculus or higher, and AP/Honors English using hierarchical linear modeling (HLM). Doing so allowed us to partition the variance between students and the schools in which they are nested and provided the opportunity to model whether the effects of variables at the student level vary across schools and are based on certain school characteristics. The HLM models confirmed all the effects of friendship that we found for the Stata models, and after considering school demographic characteristics and measures of school performance, such as average GPA in the school across different subjects, we found no results that changed the effects of our friendship variables. The results are available from us on request.

After a brief discussion of descriptive statistics for our analytic variables, we use logistic regression to model friendship effects on advanced course taking. We present separate models for girls and boys, predicting their course taking in each of three subjects: science, math, and English.

RESULTS

Descriptive Results

Table 2 displays gender-specific means for advanced course taking in three subjects, the dependent variables in our analyses. Gender gaps are apparent in physics, where boys are overrepresented (35 percent versus 23 percent), and in English, where girls are overrepresented (20 percent versus 13 percent). Both differences are statistically significant. The gender difference in the percentage of students taking Precalculus or higher (36 percent for girls and 38 percent for boys) is small and not statistically significant. This finding is consistent with evidence of the current absence of a gender gap in high school math course taking (American Association of University Women 1998; National Center for Education Statistics 2001; Xie and Shauman 2003). Yet because women remain underrepresented in math fields in higher education and the labor force and gender stereotypes remain, it is important to examine the factors that encourage girls to take the advanced math courses that serve as prerequisites for the continued study of math beyond high school.

With regard to the independent variables, 37 percent of girls and 43 percent of boys reported more same-sex friends than opposite-sex friends. A slight majority of students therefore reported an equal number of male and female friends or, in a few rare instances, more opposite-sex friends than same-sex friends. Girls also reported higher levels of involvement with their same-sex friends than did boys. Girls' same-sex friends had higher grades in both science and English at the beginning of high school than did boys' same-sex friends. This pattern is consistent with gender differences in the female and male respondents' own grades, where girls' science and English grades were also higher than those of boys (although in both cases, only the differences in English are statistically significant). With regard to course taking early in high school, girls have slightly higher means on the level of the freshman course taken in each subject, with the difference in math being statistically significant. Briefly touching on a few of the control variables, we note that gender differences are apparent in academic attitudes as well, since boys reported significantly higher levels of school attachment than did girls (3.87 versus 3.76), and, in contrast, girls reported significantly higher levels of engagement (4.22 versus 4.12). Finally, girls reported higher educational expectations and having been in a romantically involved relationship in the past 18 months significantly more often than did boys.

Multivariate Analyses

We begin our multivariate analyses with a series of models estimating students' likelihood of enrollment in advanced courses (Physics, Precalculus, or higher and AP or Honors English IV) separately by gender (see Table 3). We consider the effects of same-sex friends' performance, as well as other variables, on the probability of taking an advanced course in a given subject, allowing us to determine whether friends' performance predicts course taking for both female and male students (Question 1) and whether the effects of friends' performance for girls generally extend across all subjects or are instead most pronounced in math and science (Question 2). In Table 4, we introduce interaction terms between same-sex friends' performance and the gender composition of the group, to examine whether for girls, the positive effects of high-performing friends on advanced course taking in science and math are even greater in the context of a predominantly female friendship group (Question 3).

The results in Table 3 indicate that across all three subjects, the grades of same-sex friends have a statistically significant positive effect on the probability of a girl progressing into advanced course work. For example, as the science and math grades of her female friends increase, the odds that a girl will take either Physics or Precalculus/Calculus by the end of high school increase by a factor of approximately 1.5, net of the other variables in the model. The effects of friends' grades are even stronger in English, where a girls' likelihood of taking AP/Honors English at the end of high school increases by a factor of 1.9 as her girlfriends' early English grades increase roughly one letter grade. Thus, in reference to our second research question, we found a general trend, such that high-performing female friends are positively related to subsequent advanced course taking across the subjects considered here, including English as well as math and science.

The main effect of the gender composition of female students' friendship group significantly influences girls' probability of taking Precalculus/Calculus. Girls with a predominantly female friendship group are 1.7 times as likely to reach this level of advanced math as are those with a gender-equal or predominantly male group. Finally, the level of involvement with their female friends is not significantly related to the probability of taking advanced courses in any subject.

The final three columns in Table 3 reveal the effects of friendship characteristics on male students' advanced course taking. For boys, the subject-specific grades of their male friends do not significantly predict their enrollment in advanced courses in any subject, and the effects are considerably smaller than the effects observed for female students.¹⁴ Therefore, in response to our first research question, we find only significant effects of same-sex friends' performance on advanced course taking for girls. In analyses not included here, we also tested for the effects of the grades of girls' and boys' opposite-sex friends. Although there is a strong correlation between same- and opposite-sex friends' grades (approximately .6), there is no statistically significant effect of the grades of opposite-sex friends on any of the outcome measures for either gender.¹⁵ Given the results shown here, this finding suggests the presence of a gendered pattern, such that having high-performing friends of the same sex functions as an academic resource to encourage the advanced course taking of female students in high school.

Other characteristics of male friendships exhibit significant effects in the negative direction. Specifically, boys with a predominantly male friendship group are actually less likely to take Physics and Precalculus/Calculus than are boys with other friendship groups. This finding suggests that predominantly male groups may have a less strong academic orientation than may more mixed-gender groups. Finally, higher levels of involvement with male friends are related to a decrease in the probability of boys taking AP/Honors English.

With regard to other variables considered in the analyses, Table 3 indicates that net of other factors, Asian and Latino students are more likely to take some advanced courses. Students' own grades, their level of course taking in the freshman year, perceived intelligence, own educational expectations, and family income all generally predict subsequent advanced course taking for both male and female students. In contrast, high perceived parental expectations significantly influence only girls to take Physics and AP/Honors English. This result is consistent with the literature on girls' stronger responsiveness than boys to the norms and values of individuals with whom they are close (see, e.g., Beutel and Marini 1995;Felmlee

¹⁴The differences between the coefficients for friends' grades for female students compared to the coefficients for friends' grades for male students are not statistically significant because of the relatively large size of the standard errors for the coefficients for male students. However, the logistic regression coefficients for female students are three to five times greater than the corresponding coefficients for male students. (For example, the coefficients for female and male students for Precalculus/Calculus were .380 and .072, respectively.)

¹⁵In addition, we tested for interactions between the respondents' own grades and the grades of their same-sex friends, as well as race interactions with all the friendship variables. None of these effects was statistically significant and did not change any of our key results.

1999;Giordano 2003) and speaks to the possibility that this may be particularly the case with regard to influencing advanced academic outcomes. For boys, parents' educational level is a significant predictor. Also, there appears to be no evidence that girls' romantic relationships are a distraction from their academic pursuits in science, math, or English. For boys, however, having had such a relationship in the past 18 months is related to a lower likelihood of taking Physics.

We now consider our third research question, examining whether the effects of friends' grades vary according to the composition of the group. We added interaction terms between the gender composition of the group and the average grades of students' same-sex friends, as well as interaction terms between gender composition and involvement, to the same analytical models shown in Table 3 for both our female and male samples. In the analysis of male students (not shown here), none of the interaction terms approached statistical significance. In addition, differences in the log likelihood between these nested models revealed that the inclusion of these two interaction terms for the model for male students did not significantly improve the model fit.¹⁶

Table 4 displays the results for the female sample, showing odds ratios for the main effects and interaction terms of the friendship variables. For both Physics and Precalculus/-Calculus, the interaction between the gender composition of the friendship group with the average grades of same-sex friends is positive and statistically significant. Thus, when girls have a friendship group that is predominantly female, the effect of friends' performance on advanced course taking is even stronger. While all female students benefit from having female friends with higher science or math grades, the estimated effect of such friends is greater in the midst of a friendship group that is mostly female, compared to one that is not. However, for English, the interaction between the composition of the friendship group and friends' grades is not statistically significant (with an odds ratio of less than 1). In contrast to the results observed for math and science course taking, the estimated benefits of female friends' grades for English are statistically the same for all female students, regardless of the gender composition of their friendship group. That is, for English, students with a predominantly female friendship group do not benefit more from having same-sex friends with high grades.

To get a sense of these effects, we show predicted probabilities of taking Physics, Precalculus/Calculus, or AP/Honors English for a hypothetical average white female student with a B average in each subject (see Figure 1).¹⁷ Beginning with Physics, there is a substantial jump in the probability of taking this course when girls' friends are mostly female *and* earn mostly As in science. The probability is almost double (.41 versus .25) that of an otherwise average girl who does not have a predominantly female friendship group or has friends with a B average. Strikingly, this predicted probability of .41 (for female students with "A" friends in a mostly female group) is equal to the predicted probability of taking Physics for a male student with comparable academic and background characteristics. This finding suggests that the presence of a friendship group that is both high performing and predominantly female may be a resource for girls that is strong enough to overcome the obstacles that make girls less likely than boys to take Physics.

For math, the results in Table 4 indicated significant and positive effects of both the main effects for friends' grades and the composition of the friendship group. Figure 1 shows that the

¹⁶See Jaccard (2001) for a specific discussion of the use of interaction terms in logistic regression.

¹⁷For the science model, we calculated the estimated effects for a student taking biology in the freshman year and with average values on other variables in the model. Similarly, for the math model, we calculated the estimated effects for a student taking Algebra I in the freshman year. For the English model, we calculated the estimated effects using the value of 1 standard deviation above the mean for taking Honors English in the freshman year (which is comparable to where the value for Algebra I and Biology fall on the distribution of the math and science variables, respectively).

probability of taking Precalculus/Calculus increases with both a shift in the gender composition of the friendship group and an increase in friends' grades. The strength of the interaction between these two friendship characteristics is also readily apparent, given that the highest probability (over .7), is for girls with a predominantly female friendship group *and* an A average. Yet for English, the lack of a positive interaction between friends' grades and the composition of the friendship group is apparent, since there is no significant difference in the probability of taking Advanced English for girls whose female friends have an A average in a group that is predominantly female, compared to one that is not.

DISCUSSION AND CONCLUSION

In this article, we have empirically examined the role of friends in a particular aspect of students' academic lives—their enrollment in advanced courses that are geared toward college preparation at the end of high school. Our primary interest was to explore the connections among gender, friendship, and academic success and specifically to explore the potential for female friends to promote girls' course taking in subjects—science and math—that have historically been male dominated and continue to be stereotyped as male domains. Our results indicate that for girls, having female friends with higher subject-specific grades increases the probability that they will take an advanced course in all the subjects considered: Physics and Precalculus/Calculus, as well as AP/Honors English. The effects are sizable across the subjects, with the effects for English even being slightly larger. Thus, for both traditionally female and traditionally male subjects, having female friends who excel academically is positively related to subsequent advanced course taking.

Yet we found unique effects for science and math, such that the effects of same-sex friends' grades on advanced course taking in these subjects were stronger for girls in a predominantly female friendship group. This finding suggests that a mostly female environment in which friends are academically successful is a tangible resource on which girls can draw to push forward in subjects that are stereotyped as male and in which women have been historically underrepresented. The nexus of the social and the academic—of friends with academic colleagues—in a mostly female context may be particularly valuable for girls' pursuit of advanced studies in math and science. Since there are no prevailing social stereotypes or norms to discourage girls' advanced course taking in English, having high-performing friends may help, but a predominantly female and academically successful group is less necessary as a source of encouragement, motivation, and companionship to overcome gendered obstacles.

In addition to the positive influence of female friends, there may be aspects of opposite-sex friendships that contribute to our results. For instance, it is possible that the presence of boys in a friendship group increases the discussion or salience of gender stereotypes. An equal presence of male friends in the group could also indicate a greater desire or opportunity for romantic relationships. This second explanation seems less likely because we did control for whether girls and boys were currently in or had recently been in a romantic relationship.¹⁸

The idea that the gender composition of occupations and college majors may influence the behavior and attitudes of individuals has long been a topic of interest (Kanter 1977; Sax 1996; Yoder 1994). In higher education, complaints of the lack of other women in their programs and the “chilly climate” of a predominantly male environment are common among female STEM majors and are a crucial factor in their attrition from these majors (Ferreira 2003; Serex and Townsend 1999; Seymour and Hewitt 1997). In this article, we considered

¹⁸Another possible explanation is that female students who are the most academically gifted or proficient may be less integrated into mixed-gender friendship groups and the socialization and party behavior that such groups may entail, either by choice or because there are perhaps more negative social status implications of academic achievement for girls than for boys.

the issue of gender composition, not of academic majors or courses, but of friendship groups as voluntary associations. When girls have a majority of female friends, and these friends are high-performing in math and science, this combination of factors appears to facilitate their continuance in an advanced trajectory in these subjects.

It is interesting to consider how the structure of the high school curriculum may provide an important resource for girls' advanced math and science course taking. All students are required to take math and science, and therefore at the beginning of high school, girls' same-sex friends are taking such courses. This situation subsequently creates a structural opportunity for an academic and social network to flourish, such that girls can encourage, compel, and learn from their friends, who are also studying, struggling, and succeeding in these subjects. The affective ties that are involved in friendship are likely to make the knowledge that other girls are working hard in math and science even more meaningful and offer a strong counterpoint to negative gender stereotypes and other forms of discouragement.

Our results about the effects of friendships for boys were less conclusive. We did not find significant effects of friends' grades on boys' subsequent advanced course work, yet the direction of the coefficients was positive. Future research may shed light on whether, for example, there are differences among boys with regard to the academic influence of friends. It is also possible that boys' friendships may press toward different kinds of academic outcomes. For instance, Crosnoe et al. (2003) found that friends who are academically oriented act as a protective mechanism against negative academic outcomes for both boys and girls, such as failing, being expelled, or dropping out of school. When considered along with the wealth of literature that has found that boys are strongly influenced toward delinquency by friends (Dishion et al. 2004; Felson and Haynie 2002; Toro et al. 2004; Van Lier et al. 2005), this finding suggests that perhaps for boys, friendships play a key role in promoting or discouraging either academic or social deviance, but may not necessarily provide the academic and social resources that are most helpful in encouraging students to take elite academic courses. In fact, boys may see their high-performing friends as competition in a winner-takes-all tournament and therefore may not rely on their friends for support, encouragement, assistance, or validation of their own academic pursuits.

Examining the influence of friends on individual behaviors and decisions is a complicated endeavor, since all studies must contend with the selection bias that is introduced by the fact that individuals choose their friends on the basis of certain characteristics, often those that they share in common (Kandel 1978, 1996). Our study is similarly limited, and we cannot know for certain that the estimated effect of friends' performance on individuals' course-taking choices is a causal one. Moreover, our analysis focuses specifically on freshman and sophomore students with friends in their high school and thus has limited generalizability. Even so, the gendered patterns we observed are strongly suggestive of the key role of the performance of same-sex friends in influencing girls' course-taking decisions and are consistent with research on gender differences in the importance of interpersonal relationships in general (Johnson and Marini 1998) and predominantly female environments in the areas of math and science in particular (Shapka and Keating 2003).

The positive effect of high-performing friends on girls' advanced course taking that has been discussed here also offers a strong counterpoint to the characterization of female friendship groups in the public discourse, which has often centered on the negative aspects of manipulation, psychological attacks, and an emphasis on romantic competition (Wiseman 2002). Although female friendship groups no doubt have the capacity for negative influence parallel to the sometimes detrimental effect of male friendship groups in promoting delinquency (Haynie 2001), the potential for friends to act as positive resources for girls'

academic achievement and specifically to facilitate achievement in traditionally male areas should not be overlooked.

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Appendix Table A

Description of Background Control Variables

Variable	Description
Race/ethnicity	Student-reported categories include African American, Latino, and Asian, with white as the contrast category. Categories are mutually exclusive, with students who belonged to more than one category coded with regard to the following order of precedence: Latino, African American, Asian, white.
Parental education	Coded as the highest level attained by either parent using the following scale: (1) high school diploma or less; (2) GED; (3) vocational, technical, or applied college; (4) some attendance at a college or university; (5) college degree; and (6) advanced degree.
Family income	Taken from the parent surveys from Wave I, in which parents were asked to record their total family income in the past year. Originally coded as a continuous variable from \$1 to \$999,999, we took the natural log of this variable for use in the analysis.
Intact family	A dichotomous indicator based on students' report of whether they lived with their two married biological parents in the home (coded 1) or whether they had any other family type, including stepfamilies and single-parent families (coded 0).
School engagement	Calculated as the average of students' responses to the following three questions: number of times in the past school year the respondent skipped school, had trouble paying attention in school, and had trouble getting homework done. For skipping school, the available categories of responses were: 0 = 0, 1 = 1–2, 2 = 3–5, 3 = 6–9, and 4 = 10 or more. For the other two items, response categories ranged from 0 (never) to 4 (everyday). All the items were reverse coded so that a high score means greater engagement.
School attachment	Calculated as the average of students' responses to the following questions: how close they felt to people at school, whether they felt a part of their school, and whether they were happy at their school. Original response categories for the three questions ranged from 1 = "strongly agree" to 5 = "strongly disagree." The responses were reverse coded so that a high score indicates high attachment.
Perceived intelligence	Measures how intelligent students believe they are in relation to other people their age, with responses including (1) below average, (2) about average, (3) slightly above average,

Variable	Description
	(4) moderately above average, and (5) extremely above average.
Students' expectations	Students' responses to a question asking how much they expect to go to college on a scale of 1 (low) to 5 (high).
Parental expectations	Students' perception of how disappointed their parents would be if they did not attend college, coded 1 for "very disappointed" and 0 otherwise.
Romantic relationship	A dichotomous indicator for whether or not the student had a romantic relationship in the past 18 months.
Freshman-year science course level	An ordinal variable of the science course sequence with the following categories: (1) Basic/Remedial Science, (2) General/Earth Science, (3) Biology I, (4) Chemistry, and (5) Advanced Science (Biology II, Chemistry II).
Freshman-year math course level	An ordinal variable of the math course sequence with the following categories: (1) Basic/Remedial Math, (2) General/Applied Math, (3) Prealgebra, (4) Algebra 1, (5) Geometry, (6) Algebra II, (7) Advanced Math (Algebra III, Finite Math, Statistics), and (8) Precalculus (including Trigonometry).
Freshman-year English course level	A dichotomous indicator for whether or not the student took an Honors English course in the freshman year.

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Figure 1.
Predicted Probability of Advanced Course Taking for an “Average” Female Student According to the Characteristics of Her Friendship Group

Table 1

Comparison of the Sample Characteristics with Each Sample Selection Filter

Characteristic	Base Sample	Filter 1	Filter 2	Filter 3
<i>N</i>	11,023	10,115	8,333	2,573
Female	.54	.56	.56	.55
White	.52	.57	.57	.59
African American	.23	.21	.21	.19
Latino	.15	.15	.15	.14
Asian	.08	.08	.08	.08
Parents' educational level	3.52	3.54*	3.59	3.61
GPA freshman year	2.64	2.68	2.68	2.64

Note: An asterisk indicates that the difference between the mean in the current column and that to the left is statistically significant. Base sample = students with In-School, Wave I, and Wave III data. Filter 1 = base sample with In-School friendship data, Filter 2 = the previous sample with transcript data, and Filter 3 = 9th- and 10th-grade cohorts and transcript weights.

Table 2

Descriptive Statistics

Variable	Females		Males	
	Mean	SD	Mean	SD
Physics	.23	.42	.35*	.47
Precalculus/Calculus	.36	.48	.38	.48
AP/Honors English	.20	.40	.13*	.33
Predominantly same-sex friends	.37	.48	.43*	.50
Activities with same-sex friends	2.22	1.14	1.87*	1.19
Average same-sex friends' science grades	2.89	.74	2.82	.78
Average same-sex friends' math grades	2.78	.73	2.79	.77
Average same-sex friends' English grades	2.95	.71	2.75*	.78
Freshman-year science grades	2.81	1.01	2.78	.99
Freshman-year math grades	2.75	1.00	2.76	1.02
Freshman-year English grades	2.93	.93	2.75*	.97
Freshman-year science course level	2.20	.86	2.16	.83
Freshman-year math course level	3.67	1.18	3.50*	1.27
Freshman-year English course level	.15	.38	.12	.32
School engagement	4.22	.64	4.12*	.66
School attachment	3.76	.86	3.87*	.77
Perceived intelligence	2.91	1.01	2.99	1.07
Students' expectations	4.32	.99	4.13*	1.12
Parental expectations	.56	.450	.60	.49
Romantic relationship	.58	.49	.53*	.50
African American	.18	.39	.14	.35
Latino	.09	.28	.09	.29
Asian	.03	.18	.07*	.25
Parent education	3.49	1.65	3.64	1.63
Family income (logged)	3.53	1.65	3.59	1.12
Intact family	.58	.47	.62	.46
<i>N</i>	1,428		1,145	

Note: An asterisk indicates that the difference between the mean in the column and that to the left is statistically significant. The *N*s reflect the unweighted sample size, but the descriptive statistics are weighted.

Table 3
Odds Ratios from the Logistic Regression Predicting Advanced Course Taking Across Gender and Subjects

Variables	Females			Males		
	Physics	Precalculus/ Calculus	AP/Honors English	Physics	Precalculus/ Calculus	AP/Honors English
African American	1.5	.783	1.47	1.49	.460	.734
Latino	.792	1.79*	3.19*	.870	.785	2.70*
Asian	2.25	.991	3.06*	3.42*	2.08	.969
Parental education	1.09	1.04	1.02	1.15*	1.31**	1.26
Family income	1.21	1.47*	1.09	1.23**	.966	1.01
Intact family	1.40	1.10	1.06	1.52*	1.63	1.25
School engagement	1.10	.921	1.32	1.23	1.48	1.39
School attachment	1.24	1.03	.922	1.10	.847	1.15
Perceived intelligence	1.32**	1.29**	1.51**	1.50***	1.65*	1.82***
Students' expectations	1.49*	1.80***	1.31	1.27	1.49*	1.74
Parental expectations	1.45*	.941	1.97**	.910	.55*	.600
Romantic relationship	.815	.80	1.19	.575*	1.08	1.15
Freshman-year course level (subject specific)	1.44*	3.70***	8.75***	1.72**	3.82***	8.33***
Freshman-year grades (subject specific)	1.45**	1.93***	1.62*	1.55**	1.41**	1.62*
Predominantly same-sex friends	1.25	1.67**	1.51	.604*	.648*	1.04
Activities with same-sex friends	.91	.930	1.03	.888	.849	.59***
Average same-sex friends' grades (subject specific)	1.45*	1.46*	1.91**	1.12	1.08	1.32
N	1,370	1,428	1,428	1,095	1,145	1,145

Note: The analyses are weighted; Ns reflect the unweighted sample size.

* $p < .05$,

** $p < .01$,

*** $p < .001$ (two-tailed tests).

Table 4

Main Effects and Interactions of the Characteristics of the Friendship Group Predicting Advanced Course Taking for Female Students

Main Effects and Interactions	Physics	Precalculus/ Calculus	AP/Honors English
<i>Main Effects</i>			
Predominantly same-sex friends	1.13	1.59*	1.78*
Activities with same-sex friends	.907	.925	1.02
Average same-sex friends' grades (subject specific)	1.46*	1.51*	1.98**
<i>Interactions</i>			
Predominantly same-sex friends * average same-sex friends' grades	1.66*	1.84*	.475
Predominantly same-sex friends * activities with same-sex friends	.896	.836	.834
<i>N</i>	1370	1428	1428

Note: The analyses are weighted; *N* reflects the unweighted sample size. Coefficients are odds ratios from the full logistic regression model with controls for race/ethnicity, parental education, family income, intact family, school attachment and engagement, perceived intelligence, parents' and students' expectations, romantic relationship, and freshman-year course level and grades.

* $p < .05$,

** $p < .01$,

*** $p < .001$ (two-tailed tests).