Assortative Mating Among College Graduates: Heterogeneity Across Fields of Study

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Abstract

Prior research on assortative mating commonly treated college graduates as a homogeneous group. This study advances the literature by investigating heterogeneity in assortative mating patterns across fields of study among college graduates. As baccalaureate degree fields are related to occupational attainment, important questions remain about whether field-of-study homogamy exacerbates occupational homogamy. Drawing on the school-to-work transition literature, which has shown that college fields of study differ in their linkages to a targeted or diffuse set of occupational destinations, the authors analyzed data on 24,670 college-educated newlyweds from the 2009-2016 American Community Surveys. Log-linear analysis revealed a tendency for college graduates, especially those in vocational-specific fields (fields that have targeted connections to specific occupations; e.g., law, health, and education), to marry a spouse in the same field. In addition, occupational homogamy was more likely to occur among couples with two spouses in the same vocational-specific field than among couples with two spouses in different fields of study. By examining the patterns and implications of field-of-study assortative mating, this study underlines the importance of horizontal differentiation of higher education in shaping opportunities to meet partners and highlights the role of the linkage between field of study and occupation in structuring marriage markets.

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Assortative mating, or who marries whom, fundamentally shapes population characteristics, as it organizes people into families and determines the joint attributes of married couples (Schwartz, 2013). As marriage requires high levels of intimacy, the extent to which individuals marry outside their own socio-demographic groups reflects intergroup social distance and the strength of social boundary (Kalmijn, 1998). Because education is a fundamental structure of social hierarchy in contemporary U.S. society, a strong tendency for college graduates to marry each other is generally viewed as evidence of social closure (Schwartz & Mare, 2005).

Although education is one of the traits most intensively studied in the assortative mating literature (see Blossfeld, 2009 for a review), college graduates are commonly treated as a homogeneous group (e.g., Mare, 1991; Qian, 2017; Schwartz & Mare, 2005). By theoretically and empirically showing that college graduates who marry each other are heterogeneous in their assortative mating patterns, the current study fills two gaps in the literature. First, U.S. research has yet to consider college field of study—a key dimension of horizontal differentiation of higher education (Gerber & Cheung, 2008)—as a potential mechanism for sorting college graduates into marriage. Second, how marital sorting on baccalaureate degree field is associated with occupational assortative mating is an important, yet unaddressed, question. Field of study may well structure college graduates into higher or lower levels of occupational homogamy, because whether college graduates are channeled into a targeted or diffuse set of occupations in the labor market depends heavily on their fields of study in college (DiPrete et al., 2017). By examining how college graduates are paired in marriage on field of study, this study highlights within-group heterogeneity in assortative mating among college-educated couples and helps better understand the implications of this heterogeneity for social inequality among married couples.

In this study, we argue that field of study is an important but often neglected dimension of spousal resemblance for college-educated couples. Recent research on the school-to-work transition has shown that skills gained through specialized training in each field of study prepare college graduates for different future occupations (DiPrete et al., 2017; Shauman, 2006, 2009). Drawing on this body of research, we speculate that the degree of field-of-study homogamy and how closely field-of-study homogamy is related to occupational homogamy among college graduates vary by the linkage strength between fields of study and occupations. To test this speculation, we examine the strength of field-of-study homogamy among couples involving two college graduates and evaluate the variation in the degree of occupational homogamy across spousal pairings of field of study. By investigating the patterns of assortative mating on field of study, this study provides a more granular understanding of how a college education influences mate selection, above and beyond its impact on individuals' educational attainment.

ASSORTATIVE MATING ON FIELD OF STUDY AMONG COLLEGE GRADUATES

The college enrollment has steadily risen in the United States. The total undergraduate enrollment in degree-granting postsecondary institutions increased 30% from 2000 to 2015 (13.2 million students in 2000 to 17.0 million in 2015), and is projected to increase to 19.3 million students by 2026 (McFarland et al., 2017). With the expansion of higher education, the share of heterosexual couples in which both spouses were college graduates increased (Breen & Salazar, 2011). Moreover, even after controlling for the structural shift in the size of the college-educated population, prior research found an increased tendency for college graduates to marry each other since 1960 (Schwartz & Mare, 2005).

Prior studies of education-based assortative mating tended to focus on educational levels and classify all college graduates as one single, homogeneous educational group (e.g., Hou & Myles, 2008; Mare, 1991; Qian, 2017; Schwartz & Mare, 2005). Nevertheless, heterogeneity remains within this group. Research on higher education has increasingly recognized within-group heterogeneity among college graduates caused by horizontal stratification, or stratification by field of study (see Gerber & Cheung, 2008 for a review). Because different fields of study tend to channel students to different occupations, college graduates majoring in fields that are connected to lucrative occupations tend to be more economically advantaged (Davies & Guppy, 1997). In other words, the economic returns to college education vary substantially by field of study (Roksa, 2005). For instance, in 2009, full-time workers with a bachelor's degree in science or engineering had annual median earnings of $72,415, compared to $49,152 for education degree holders and $52,691 for arts/humanities degree holders (Siebens & Ryan, 2012).

Economic stability is increasingly considered as a prerequisite for marriage (Cherlin, 2004). Given the economic disparity by field of study, researchers have started to ponder: Does field of study play a role in union formation and mate selection of college graduates? Compared with people in different fields of study, people in the same field of study tend to share more coursework (and thus physical environment, interests, and ideologies). As a result, majoring in the same field likely allows individuals to have higher chances of meeting and interacting with each other in college, which in turn increases the likelihood of field-of-study homogamy (i.e., marriage involving two spouses majoring in the same baccalaureate degree field).

Empirical research on field-of-study assortative mating is, however, scarce. To the best of our knowledge, there are only two existing studies; they both used European data and found a strong tendency for individuals to form field-of-study homogamy, but did not consistently reveal

how and why individuals in various fields had differential levels of field-of-study homogamy. Specifically, one study found that among the college-educated in Norway, field-of-study homogamy was most prominent in law and medicine (Eika et al., 2014). The authors argued that law and medicine had the highest economic returns, so that individuals in these fields would find each other attractive as potential spouses. The other study examined college graduates in 24 European countries and found that field-of-study homogamy was the strongest in social sciences, but this working paper did not provide satisfying explanations for the finding (Bičáková & Jurajda, 2017). Note that these two studies assumed that field of study operated in the same way as occupation in shaping assortative mating patterns, such as via reducing the search cost and sorting individuals with similar preferences into marriage. Because of the assumed similarity between field of study and occupation, these two studies did not further consider the relationship between field-of-study homogamy and occupational homogamy. Our study aims to investigate the variation in the degree of field-of-study homogamy by field of study and the relationship between field-of-study homogamy and occupational homogamy in the United States.

HOW FIELD-OF-STUDY HOMOGAMY BEGETS OCCUPATIONAL HOMOGAMY

Field of study and occupation indeed share many aspects that shape individuals' mate selection. First, field of study and occupation may reduce the cost of searching for a spouse. College graduates sharing a field of study may end up in the same occupation and thus meet colleagues in the same field of study who may become their future spouses (McClendon et al., 2014). Second, individuals' marital choices are likely constrained by their marriage market conditions such as the gender composition of college majors and the workplace (Lichter et al., 1991). Third, men and women may have preferences for financial and nonfinancial partner traits correlated with

field of study and occupation, considering that both field of study and occupation are associated with college graduates' starting wage, the steepness of their earnings profile, and attitudes toward gendered family roles (McClintock, 2018; Van Bavel, 2010). Hence, both educational systems and labor markets play a role in structuring the marriage market and individuals likely display a tendency to form field-of-study homogamy and occupational homogamy.

Due partly to the shared aspects of field of study and occupation, prior research did not consider the role of field of study in shaping occupational assortative mating (Hout, 1982; Kalmijn, 1994; Kalmijn & Flap, 2001). However, the overlap between field of study and occupation is far from perfect, as college graduates in the same field of study have various pathways into the labor market. To what degree do two college graduates sharing a field of study also share an occupation and become an occupationally homogamous couple? Are some fields of study more likely than others to lead to occupational homogamy? Below, we draw on the school-to-work transition literature to propose hypothesized answers to these questions.

Different fields of study have differential pathways to occupational destinations. In recent decades, a large body of literature has elaborated on how institutional and organizational characteristics of schools are related to accessing positions in the labor market (DiPrete et al., 2017; Shavit & Muller, 1998; Shavit et al., 2007). In an educational system where vocational-specific trainings are maintained and coordinated by the state and are backed by state-sanctioned licensing requirements, students are more likely to leave school with a more specific set of skills required by their future employers (Shavit & Muller, 1998). This system greatly reduces the cost of job search and improves the efficiency in matching college graduates to their future jobs. The United States, however, does not have such a coordinated system. Instead, the U.S. higher education system provides students with more general skills, whereas vocational skills are

typically learnt after the onset of their career via on-the-job training (DiPrete et al., 2017). In this system, individuals in vocational-specific fields are much more likely to identify a targeted set of occupations that directly require the skills gained from certain fields of study in college. How can we measure whether a field of study is vocational-specific or not? Following DiPrete and colleagues (2017), we define vocational specificity by the strength of linkage between fields of study and occupational categories. Some fields of study are related to employment in many different kinds of occupations (weak linkage and low vocational specificity), whereas other fields of study are linked to a more targeted set of occupations (strong linkage and high vocational specificity). According to this definition, law, architecture, health, computing, physical sciences, education, and arts are among the college majors that have strong linkages to occupations and therefore high vocational specificity (DiPrete et al., 2017: p. 1933).

The linkage strength is key to understanding the fine-grained mechanisms of assortative mating on field of study and occupation among college graduates. Many people met their spouse in college (Rosenfeld & Thomas, 2012). If both spouses majored in the same vocational-specific field, they are more likely to be channeled to a targeted set of occupations and thus to work in the same occupation. In this scenario, field-of-study homogamy serves as a precursor to high levels of occupational homogamy for college graduates in vocational-specific fields, due to the strong linkage between their field of study and occupation. It is also likely that people met their spouse in the workplace (Kalmijn & Flap, 2001). A strong linkage between field of study and occupation suggests higher chances of encountering coworkers who majored in the same field of study in college, which in turn increases the likelihood that college graduates in vocational-specific fields marry a colleague who received a bachelor's degree in the same field. In this scenario, field-of-study homogamy emerges from occupational homogamy.

To sum up, majoring in a field of study that has a strong linkage to occupations increases the likelihood that people with similar economic prospects and attitudes towards work and family meet and interact with each other not only in the same educational environment but also in the same occupational environment. In other words, college graduates in vocational-specific fields are more likely to be exposed to marriage markets (e.g., schools and workplaces) that consist of potential spouses in the same field of study. Thus, we propose two hypotheses below.

Hypothesis 1: Field-of-study homogamy is more likely to occur among college graduates in vocational-specific fields than among those in non-vocational-specific fields.

Hypothesis 2: Occupational homogamy is more likely to occur among couples in which two spouses were in the same field of study, especially in the same vocational-specific field, than among couples in which two spouses were in different fields of study.

METHOD

Data and Sample

We used data from the 2009–2016 American Community Surveys (ACS). All datasets were obtained from the Integrated Public Use Microdata Series (IPUMS; Ruggles et al., 2017). The annual ACS between 2009 and 2016 (the latest available year) was a 1% national random sample of the U.S. population. The data are well suited for this research because since 2009, the ACS has collected information about the fields in which respondents received a bachelor's degree if they held a bachelor's degree at the time of interview. In addition, the ACS contains information on whether respondents married within the past 12 months and their primary occupation. Thus, we were able to examine newlywed couples and to measure both spouses' baccalaureate degree fields and their occupations roughly at the time of marriage. Examining assortative mating

among newlyweds minimizes bias arising from marital dissolution and changes in traits after marriage; this is especially relevant when the variables of main interest are characteristics that may change quite substantially following marriage (e.g., employment) (Gonalons-Pons & Schwartz, 2017; Qian, 2017).

Among the 24,886,364 respondents in the 2009–2016 ACS, we obtained a sample of 33,660 couples that married within the past 12 months, with both spouses present in the household and having at least a bachelor's degree. We excluded couples if either spouse 1) was enrolled in school (for whom occupation might not be meaningful, 7,426 couples were dropped), 2) was unemployed, with no work experience in the last 5 years (for whom occupation was not asked, 1,370 couples were dropped), or 3) worked in the military-related occupations (due to very small sample sizes and the distinct nature of these occupations, 194 were couples dropped). Our final analytic sample consisted of 24,670 couples.

Variables

Field of Study

We collapsed the original 176 codes for field of study into eight categories. The Georgetown University Center on Education and the Workforce collapsed undergraduate majors into 15 groups (Carnevale et al., 2015). These groups (and their dominant major with percentage over 50%, if any) included: 1. Agriculture/Natural Resources; 2. Architecture/Engineering; 3. Arts; 4. Biology/Life Sciences (biology); 5. Business; 6. Communications/Journalism (communications); 7. Computers/Statistics/Mathematics; 8. Education; 9. Health; 10. Humanities/Liberal Arts; 11. Industrial Arts/Consumer Services/Recreation; 12. Law/Public Policy (criminal justice and fire protection); 13. Physical Sciences; 14. Psychology/Social Work (psychology); and 15. Social

Sciences. To reduce zero cells while preserving adequate detail in field of study for log-linear

analysis, we further combined these 15 groups into eight groups: STEM (including 1, 2, 4, 7, and

13), Arts (3), Business (including 5 and 11), Education (8), Health (9), Humanities/Liberal Arts

(10), Law/Public Policy (12), and Social Sciences (including 6, 14, and 15). A small share of

respondents (2,899 husbands and 3,269 wives) reported a second field in which they received a

bachelor's degree, and our supplementary analysis revealed that 49% of husbands' second fields

and 42% of wives' second fields belonged to the same broad group (out of the eight groups

described above) as their first-mentioned fields. Following Montez and colleagues (2018), we

only used the first-mentioned fields. In addition, the ACS only asked undergraduate majors even

for respondents who had advanced degrees. We did a series of sensitivity analysis, such as

excluding couples in which at least one spouse's first and second fields belonged to different

broad groups, controlling for whether each spouse had a bachelor's degree only or an advanced

degree and its interaction terms with college field of study and occupation in log-linear models,

and using a sample of couples in which neither spouse had an advanced degree. We confirmed

that our results below were robust to alternative samples or model specifications.

Occupation

To perform log-linear analysis, we had to aggregate over 300 occupational categories in the ACS

to much fewer categories (Hout, 1983, Kalmijn, 1994, Kalmijn & Flap, 2001). The IPUMS has

consistently classified occupations from all years since 1950 into the Census Bureau's 2010 ACS

occupation classification scheme. According to the Standard Occupational Classification (SOC)

system, respondents' occupations can be classified eight broad categories: management,

professional and related occupations, service occupations, sales and office occupations, farming,

fishing and forestry occupations, construction, extraction and maintenance occupations, production, transportation and material moving occupations, military specific occupations (dropped from our sample), and unemployed (dropped from our sample). Because our sample only consists of college graduates, the majority of the respondents had management, professional and related occupations whereas only a small proportion (and mostly men) had farming, construction, or production occupations. Thus, we disaggregated management, professional and related occupations into management, business and financial operations occupations and professional occupations (as suggested by two-digit occupational codes adopted by IPUMS). Taken together, we classified occupations into five broad categories: (1) management, business and financial operations, (2) professional, (3) service, (4) sales and office, and (5) all others.

Analytical Strategies

Gender segregation exists both in baccalaureate degree fields and in occupations (Blau et al., 2013; England & Li, 2006). When examining assortative mating on field of study and occupation, we used log-linear models. Log-linear models control for gender differences in the marginal distributions of these attributes, so that we could identify assortative mating patterns net of the effects of population structure (Hout, 1983; Kalmijn, 2010). In log-linear analysis, we produced a four-way table with 1,600 cells (8 fields of study for husbands * 8 fields of study for wives * 5 occupational groups for husbands * 5 occupational groups for wives). About 26.81% of these cells (429 out of 1,600) were zero cells. To deal with zero cells, we added 0.1 to each cell before conducting log-linear analysis (Agresti, 2002).

We first assessed marital sorting on field of study, then associations between spouses' occupations, and finally, variation in the degree of occupational homogamy across spousal pairings of field of study. To begin, our basic model is as follows:

$$\log\mu_{ijkl} = \lambda + \lambda_{ik}^{HFHO} + \lambda_{jl}^{WFWO}, \quad [1]$$

where *HF* is husband's field of study (i = 1, 2, …, 8), *WF* is wife's field of study (j = 1, 2, …, 8),

HO is husband's occupation (k = 1, 2, …, 5), and *WO* is wife's occupation (l = 1, 2, …, 5). Thus,

μ_{ijkl} is the expected number of marriages between men in field of study i, occupational group k

and women in field of study j, occupational group l. This model includes the association between

field of study and occupation for both husbands and wives as well as all the lower order terms.

Note that in this model, we assumed no association between husbands' and wives' attributes.

To capture the tendency for individuals to marry a spouse in the same field of study, in

Model 2, we added one parameter on the main diagonal of field of study. The model is specified

as Equation [2] below, where γ_{ij}^{FO} is a parameter estimate for measuring the overall strength of

field-of-study homogamy (*FO* = 1 when $i = j$ and *FO* = 0 otherwise).

$$\log\mu_{ijkl} = \text{Equation}[1] + \gamma_{ij}^{FO} \quad [2]$$

In Model 3, instead of using a uniform field-of-study homogamy parameter, we used

eight parameters along the main field-of-study diagonal (i.e., variable diagonal parameters; Qian,

2017). As shown in Equation [3], δ_{ij}^{FE} is a set of parameter estimates for homogamy of each field

of study (*FE* = 1 when $i = j$ =1, …, *FE* = 8 when $i = j$ = 8, and *FE* = 0 otherwise).

$$\log\mu_{ijkl} = \text{Equation}[1] + \delta_{ij}^{FE} \quad [3]$$

To capture the tendency for individuals to marry within their occupational groups, we

built on Model 3 and added one parameter on the main occupational diagonal in Model 4. The

model is specified as Equation [4].

$$\log\mu_{ijkl} = \text{Equation}[3] + \varphi_{kl}^{OO}, \quad [4]$$

where φ_{kl}^{OO} is a parameter estimate for measuring the overall strength of occupational homogamy

(*OO* = 1 when $k = l$ and *OO* = 0 otherwise).

Finally, to examine whether occupational homogamy varied by the spousal pairing of field of study, we added the interaction terms between the eight field-of-study homogamy parameters and the one occupational homogamy parameter in Model 5. The model is as follows:

$$\log\mu_{ijkl} = \text{Equation}[4] + \delta_{ij}^{FE}\varphi_{kl}^{OO}, \quad [5]$$

RESULTS

Descriptive Results

Table 1 shows the distribution of husbands' and wives' fields of study. About 34% of husbands majored in a STEM field, 27% in business, and 17% in social sciences. Together, men in these three fields comprised over three quarters of the husbands in our sample. In contrast, the top three fields for wives were social sciences (23%), business (21%), and STEM (17%). The distribution of husbands' and wives' fields of study here was consistent with prior research on gender segregation in baccalaureate degree fields, which revealed that women were most seen in majors such as psychology, sociology, accounting, and marketing (that is, social sciences and business in our classification of field of study) whereas men were most likely to major in electric engineering, physics, and computer science (that is, STEM fields in our classification).

Table 1 also shows the percentage of men and women marrying a spouse in the same field of study by their own fields of study. Higher percentages of husbands majoring in education, social sciences, health, and business married a wife in the same major (34%, 32%, 31%, and 30%, respectively), whereas for wives, higher percentages of college graduates in STEM, business, and social sciences fields married a husband in the same field (55%, 39%, and 24%, respectively). These patterns were due in part to gender differences in the marriage market size (i.e., the pool of potential spouses). For example, as there are much more men than women

majoring in STEM fields, the pool of potential spouses in the same field of study is larger for

women in STEM than for men in STEM. This might contribute to a higher percentage of women

in STEM than men in STEM marrying a spouse in STEM. A similar logic applies to the health

field. Since health is a female-dominated field of study, a higher share of men than women in

health married a spouse in the same field (31% vs. 7%). Log-linear models, which we will turn to

below, control for the distributional differences of men and women across fields of study and

thus "are able to single out that part of the association between spouses' attributes that is

independent of the effect of marginal distributions (Kalmijn 1991: p.508)."

Table 1. Percentage Distributions of Husbands' Fields of Study, Wives' Fields of Study, and Field-of-Study Homogamy

Fields of study	Husbands ($N = 24,670$)		Wives ($N = 24,670$)	
	Percent	% marrying a spouse in the same field of study	Percent	% marrying a spouse in the same field of study
STEM	33.71	27.38	16.63	55.50
Arts	4.35	25.98	6.22	18.18
Business	26.70	30.01	20.67	38.77
Education	4.08	33.70	11.26	12.20
Health	2.37	31.11	9.90	7.45
Humanities/liberal arts	8.89	20.33	10.94	16.52
Law/public policy	2.72	7.89	1.49	14.44
Social sciences	17.17	32.13	22.88	24.11
Total	100.00	28.03	100.00	28.03

Table 2 presents the occupational distribution of husbands and wives, and the percentages

of husbands and wives married to a spouse in the same occupational group. Most husbands and

wives worked in the professional occupations, but wives (52%) were more concentrated than

husbands (44%). Comparable percentages of husbands and wives worked in service occupations

(5%) and sales and office occupations (16%). More husbands worked in management, business,

and financial operations occupations (29%) and other occupations (6%) than did wives (25% and

1%, respectively). Similar to fields of study, at least partly due to the distributional differences of men and women across occupational groups, much higher percentages of women than men in other occupations married a spouse in the same occupational group (17% vs. 3%), whereas a higher share of men in professional occupations than that of their female counterparts married a spouse in the same occupational group (62% vs. 52%). As explained above, we will use log-linear models to control for gender differences in the occupational distribution.

Table 2. Percentage Distributions of Husbands' Occupation, Wives' Occupation, and Occupational Homogamy

Occupation	Husbands ($N = 24,670$)		Wives ($N = 24,670$)	
	Percent	% marrying a spouse in the same occupation	Percent	% marrying a spouse in the same occupation
Management, business, and finance	28.58	32.78	24.69	37.94
Professional	44.13	61.58	52.35	51.91
Service	5.54	12.74	5.04	13.99
Sales and office	15.69	24.15	16.73	22.66
Other	6.06	3.41	1.18	17.47
Total	100.00	41.24	100.00	41.24

Figure 1 shows the percentage of couples in which two spouses worked in the same occupational group, given field-of-study homogamy. We also show couples in which two spouses differed in field of study as a reference. When two spouses shared field of study, they were also more likely to share occupations, compared with when two spouses differed in field of study (50% vs. 38%). Couples in which both spouses majored in health, education, or STEM were the most likely to form occupational homogamy (77%, 68%, and 60%, respectively). Health, education, and STEM are all highly vocational-specific fields of study (DiPrete et al., 2017). The descriptive results suggested that the higher percentages of occupational homogamy were due in part to the vocational specificity of the fields. Specifically, according to our proposed theoretical argument, men and women majoring in health, education, and STEM tend

to be channeled to a targeted set of occupations, which increases their opportunities to meet and interact with potential spouses in the same field of study.

Figure 1. Percent Couples in Which Both Spouses Were in the Same Occupational Group, by Spousal Pairing of Field of Study
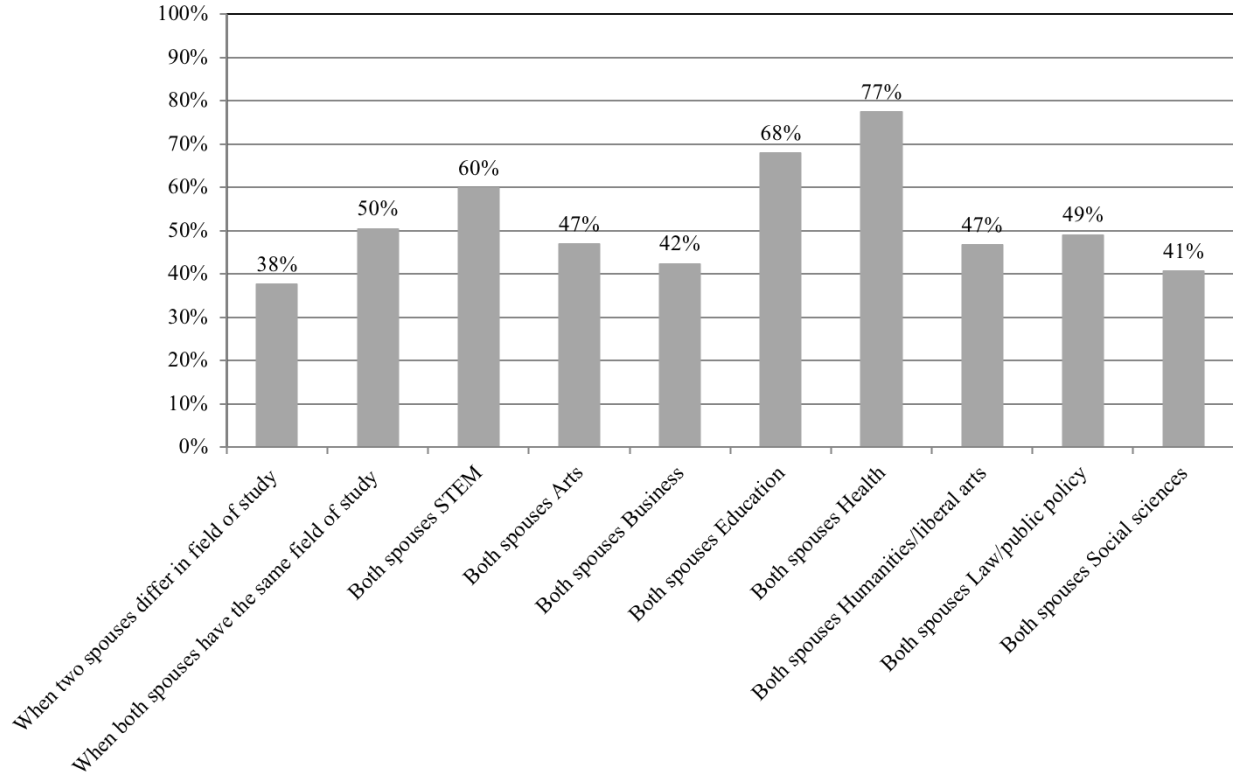
Results of Log-Linear Models

The descriptive results regarding assortative mating on field of study and occupation may be confounded by gender differences in the distributions of field of study and occupation. We apply log-linear models to explore assortative mating patterns net of the effect of marginal distributions. Table 3 reports the goodness-of-fit statistics—the deviance and the Bayesian information criterion (BIC) statistics. A smaller value of BIC indicates a better fitting model (Raftery, 1986). The baseline model, Model 1 (specified as Equation [1]), assumed no association between the husband's and the wife's characteristics. In Model 2, we added one

parameter on the main diagonal of field of study, and the great reduction in BIC indicated a

strong tendency for individuals to form field-of-study homogamy. In Model 3, we used eight

parameters along the main field-of-study diagonal, and the further reduction in BIC suggested

that the degree of homogamy varies by field of study. In Model 4, we added one parameter on

the main occupational diagonal to Model 3. The decrease in BIC suggested the tendency for

individuals to marry within their occupational groups. Finally, Model 5 included the interaction

terms between the eight field-of-study homogamy parameters and the one occupational

homogamy parameter, which appeared to be the best fitting model according to BIC.

Table 3. Goodness-of-Fit Statistics of Log-Linear Models

Model		*df*	Deviance	BIC
1	HField×HOcc+WField×WOcc	1521	5435.17	-9957.06
2	Model 1 + Field-of-study homogamy (diagonal parameter)	1520	3331.36	-12050.75
3	Model 1 + Field-of-study homogamy (variable diagonal parameters)	1513	2914.22	-12397.05
4	Model 3 + Occupation homogamy (diagonal parameter)	1512	2158.76	-13142.39
5	Model 4 + Field-of-study homogamy (variable diagonal parameters)×Occupation homogamy (diagonal parameter)	1504	2033.89	-13186.30

Note. $N = 24{,}830$ (24,670 + 1,600 * 0.1); cells = 1,600. *df* = degrees of freedom. HField=husbands' field of study ($df = 7$); WField=wives' field of study ($df = 7$); HOcc = husbands' occupational group ($df = 4$); WOcc = wives' occupational group ($df = 4$).

We present Models 4 and 5 in Table 4. The coefficients in these models were log odds.

Positive (negative) log odds indicate higher (lower) odds of marriage compared to the reference

category. In model 4, all the field-of-study homogamy indicators were positive, meaning that

individuals were more likely to marry within than to marry outside their fields of study. College

graduates in law/public policy, arts, health, and education fields had the highest odds of field-of-

study homogamy, whereas those in social sciences, business, and humanities/liberal arts fields

were the least likely to marry a spouse in the same field of study. Similarly, couples were more

likely to marry within than to marry outside their occupational group ($\beta = 0.408$, $p < 0.001$).

**Table 4. Select Parameters from Log-Linear Models of Assortative Mating on Field of Study and Occupation**

	Model 4			Model 5		
	Coef.		SE	Coef.		SE
Field-of-Study Homogamy						
STEM	0.925	***	0.035	0.695	***	0.045
Arts	1.655	***	0.075	1.530	***	0.095
Business	0.438	***	0.034	0.394	***	0.039
Education	1.262	***	0.070	1.035	***	0.109
Health	1.228	***	0.091	0.757	***	0.166
Humanities/liberal arts	0.653	***	0.058	0.517	***	0.073
Law/public policy	1.644	***	0.151	1.340	***	0.198
Social sciences	0.378	***	0.038	0.319	***	0.044
Occupational Homogamy	0.408	***	0.015	0.329	***	0.017
Interaction Terms						
Occupational homogamy * STEM				0.434	***	0.049
Occupational homogamy * Arts				0.288	*	0.125
Occupational homogamy * Business				0.157	**	0.050
Occupational homogamy * Education				0.372	**	0.127
Occupational homogamy * Health				0.690	***	0.187
Occupational homogamy * Humanities/liberal arts				0.316	**	0.098
Occupational homogamy * Law/public policy				0.828	**	0.272
Occupational homogamy * Social sciences				0.146	*	0.058

Note. Coef. = Coefficients; SE = Standard Errors. Results of full models are available upon request.

To facilitate interpretation of Model 4, in Figure 2, we present the odds of field-of-study homogamy for each field of study. Field-of-study homogamy in which both spouses had a bachelor's degree in arts was 5.23 [=exp(1.655), Model 4] times as likely to occur as field-of-study heterogamy in which two spouses majored in different fields. The likelihood of field-of-study homogamy was also relatively high in law/public policy, education, and health fields (5.18 times, 3.53 times, and 3.41 times the likelihood of field-of-study heterogamy, respectively), whereas the likelihood of field-of-study homogamy was relatively low in social sciences, business, and humanities/liberal arts fields (1.46 times, 1.55 times, and 1.92 times the likelihood of field-of-study heterogamy, respectively). Recall that arts, law/public policy, education, and health are all vocational-specific fields whereas social sciences, business, and humanities/liberal

arts fields have weak linkages to occupations (DiPrete et al., 2017). Our results support Hypothesis 1 that field-of-study homogamy is more likely to occur among college graduates in vocational-specific fields than among those in non-vocational specific field.

Figure 2. Odds of Field-of-Study Homogamy, by Field of Study
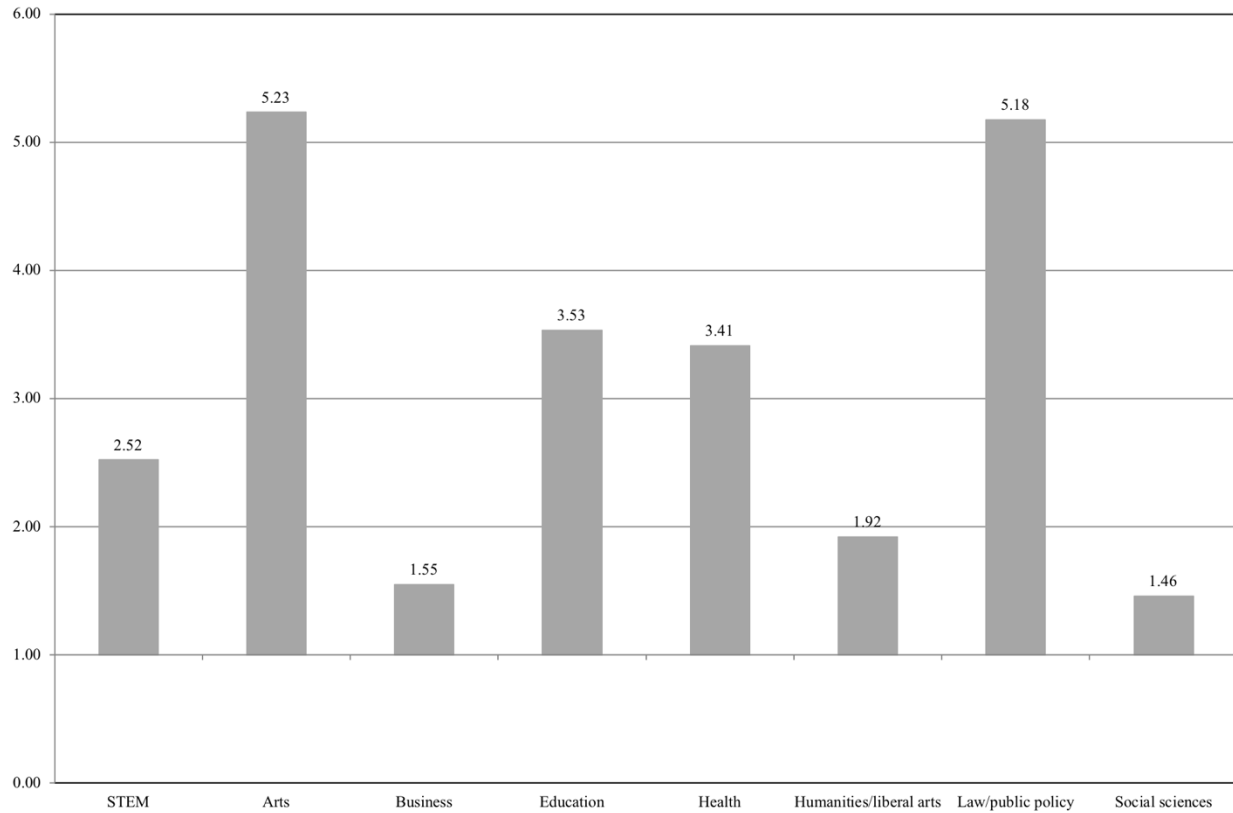
Model 5 in Table 4 directly speaks to our research question about whether vocational-specific fields of study are associated with greater occupational homogamy. All interaction terms between the occupational homogamy indicator and the field-of-study homogamy indicators were statistically significant. Specifically, the tendency to form occupational homogamy was the highest among couples in which both spouses majored in law/public policy, health, STEM, or education fields. To facilitate interpretation of Model 5, in Figure 3, we present the odds of occupational homogamy by the spousal pairing of field of study. When two spouses differed in field of study (i.e., field-of -study heterogamy), occupational homogamy was 39% [= exp(0.329)

– 1, Model 5] more likely to occur than occupational heterogamy in which two spouses worked

in different occupational groups. The likelihood of occupational homogamy was even higher

when two spouses graduated from the same field of study. For example, when both spouses had a

bachelor's degree in law/public policy, the likelihood of occupational homogamy was 218% [=

exp(0.329 + 0.828) – 1, Model 5] higher than that of occupational heterogamy. Similarly, when

both spouses had a bachelor's degree in health, STEM, or education fields, the likelihood of

occupational homogamy was 177%, 115%, and 102% higher than that of occupational

heterogamy, respectively. As discussed above, health, law, and education are highly vocational-

specific fields and some STEM fields such as computer science and physical sciences are also

vocational-specific (DiPrete et al., 2017). Hence, our results support Hypothesis 2 that

occupational homogamy is more likely to occur among couples in which two spouses were in the

same field of study, especially in the same vocational-specific field, than among couples in

which two spouses were in different fields of study.

Figure 3. Odds of Occupational Homogamy, by Spousal Pairing of Field of Study
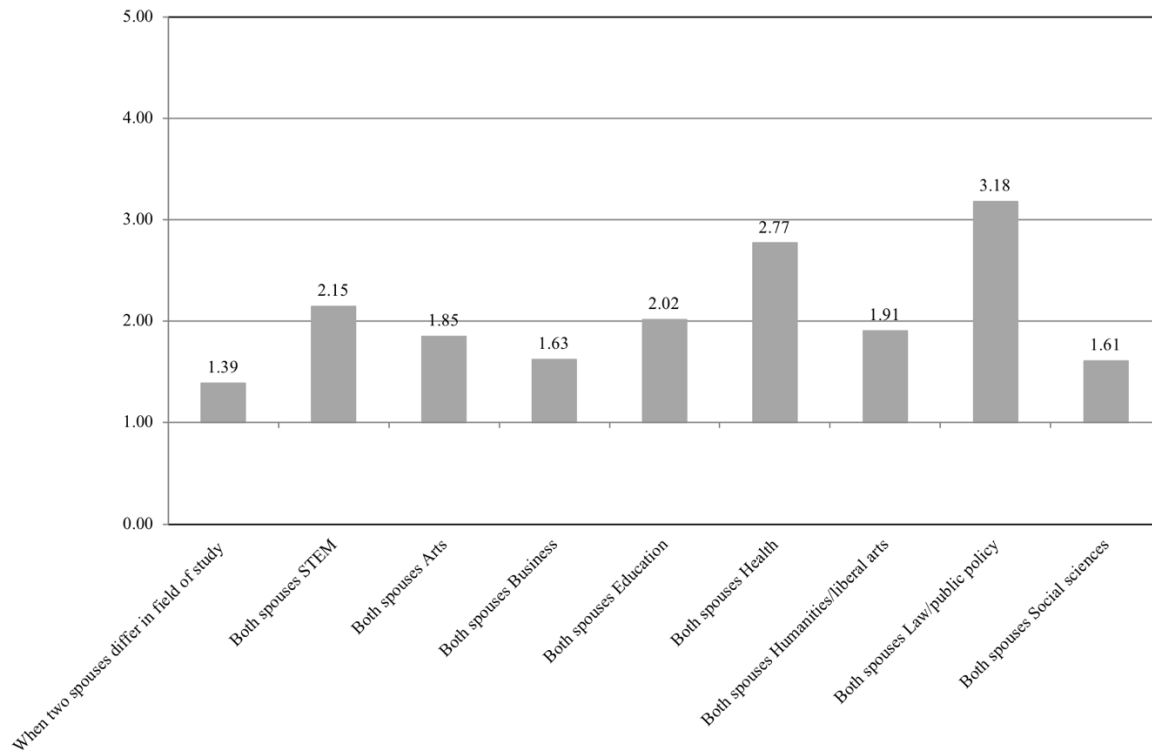
DISCUSSION

This study used data from the 2009–2016 American Community Surveys to investigate the strength of field-of-study homogamy among college-educated newlyweds and the variation in the degree of occupational homogamy across spousal pairings of field of study. We speculated that the strength of linkage between a field of study and occupations, or the vocational specificity (DiPrete et al., 2017), might play an important role in shaping assortative mating patterns. Controlling for spouses' distributions of field of study and occupation, we found that field-of-study homogamy was more likely to occur in vocational-specific fields than in non-vocational-specific fields, and that couples in which two spouses were in the same field of study, especially in the same vocational-specific field, were more likely to form occupational homogamy.

This research makes several contributions to the literature. First, we highlighted the unique role played by field of study in shaping assortative mating patterns, in light of a scarcity

of research on this topic. While most prior research on assortative mating tended to treat college graduates as a single group (e.g., Mare, 1991; Qian, 2017; Schwartz & Mare, 2005), we found a strong tendency for college graduates to marry a spouse in the same field. Given the expansion of higher education, future research should move beyond the focus on educational levels and pay more attention to various forms of horizontal stratification in postsecondary education and their implications for union formation and mate selection (Gerber & Cheung, 2008).

Second, drawing on the school-to-work transition literature (DiPrete et al., 2017; Shauman, 2006, 2009), this research linked field of study, occupation, and assortative mating, thereby providing a conceptual framework to better understand the dynamics of mate selection. We proposed that the linkage strength between field of study and occupation (DiPrete et al., 2017) in part explained field-of-study assortative mating patterns and the relationship between field-of-study homogamy and occupational homogamy. We speculated that majoring in fields of study with strong linkages to targeted occupations allows college graduates to be exposed to marriage markets (e.g., schools and workplaces) that consisted of potential spouses in the same field, leading to higher field-of-study and occupational homogamy in vocational-specific fields. We indeed found that both field-of-study homogamy and occupational homogamy was higher in vocational-specific fields such as health and law/public policy but lower in non-vocational-specific fields such as business and social sciences. Our findings suggest the importance of field of study—a key dimension of horizontal differentiation of higher education (Gerber & Cheung, 2008)—in shaping opportunities to meet partners and also highlight the role of the linkage between field of study and occupation in structuring marriage markets.

Due to the data requirement of log-linear models, one limitation of this study was the broad categorization of occupational group. The role of the linkage strength between field of

study and occupation in shaping assortative mating was likely underestimated, because college graduates in non-vocational-specific fields were disproportionally classified into one occupation, leading to inflated occupational homogamy for them. In other words, if we were able to use more detailed occupational categories, we would have observed even greater differences in the degree of occupational homogamy between couples with two spouses in vocational-specific fields and couples with two spouses in non-vocational-specific fields. In addition, to reduce zero cells in log-linear analysis, we could only pool data from the 2009–2016 ACS. Considering that changes in the gender composition of college majors and occupations have stalled since the mid-1990s (Blau et al., 2013; England & Li, 2006), we did not expect our results to exhibit much temporal variation. When data are available, a fruitful avenue for future research is to examine trends in field-of-study assortative mating over a longer time period.

In sum, using nationally-representative U.S. samples of college-educated newlyweds, this study identified the role of field of study in assortative mating among college graduates and investigated the implications of field-of-study homogamy for occupational homogamy. It underscored the great heterogeneity within college graduates, as their marriage market was divided into smaller sections by field of study. By highlighting the role of field of study—a horizontal dimension of education-based stratification—in mate selection, this research opens up new arenas for future research to advance the understanding of heterogeneity in assortative mating and inequality in economic and family lives among college graduates.

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