

SARA LOPUS¹ California Polytechnic State University

MARGARET FRYE University of Michigan*

Intramarital Status Differences Across Africa's Educational Expansion

Objective: This article documents how intramarital differences in educational status vary across Africa's heterogeneous educational expansion, which has encompassed an enormous breadth of educational opportunities during the past 50 years.

Background: Educational expansion influences intramarital status differences both by altering the educational composition of men and women and by reconfiguring the social conventions associated with a given educational context. Status differentials between marital partners can influence spousal well-being and, in the aggregate, determine the extent to which marriage provides a pathway to upward social mobility.

Method: Using Demographic and Health Survey data representing 32 sub-Saharan African countries and 5 decades of birth cohorts, the article examines the prevalence and propensity of educational pairings as a function of educational access (the percentage of a cohort who ever attended school) and wife's education level.

Results: Educational expansion created gendered changes in educational compositions of

married individuals, which led to increased prevalence of hypergamy (wives who married "up") in most countries. Educational expansion has also led hypogamous marriages to become less of a social aberration: in lower education contexts (but less so in higher education contexts), conventions lead women to "marry down" at far lower rates than would be expected based on the sex-specific compositions of husbands and wives.

Conclusion: Educational attainment remains a central determinant of social positioning in African society. However, as schooling expands across the continent, social conventions regarding educational status are playing a weakening role in determining who marries whom.

Educational characteristics influence a wide range of demographic phenomena, including whether, when, and whom we marry. In settings where cultural norms dictate a distaste for pairings between lower status men and higher status women, a person's years of schooling will influence the likelihood or necessity of such a match (De Hauw, Grow, & Van Bavel, 2017; Raymo & Iwasawa, 2005). At the household level, intramarital status differentials influence household decision making (Pyke & Adams, 2010), family planning (Behrman, 2016), and intimate partner violence (Behrman, 2018; Jewkes, 2002). At the population level, the aggregation of intramarital status differentials can impact inequality, both across households and across generations (Beck & González-Sancho, 2009; Fernández & Rogerson, 2001).

Social Sciences Department, California Polytechnic State University, Building 47, Room 13, 1 Grand Avenue, San Luis Obispo, CA 93407-0329 (slopus@calpoly.edu).

*Department of Sociology, University of Michigan, Room 3115 LSA Building, 500 S. State Street, Ann Arbor, MI 48109-1382.

Authors share equal authorship.

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As access to education becomes more prevalent for men and women—in tandem or at different paces—intramarital differences in educational status also change. Substantial research from various geographic contexts (Blossfeld, 2009; De Hauw et al., 2017; Esteve, García-Román, & Permanyer, 2012; Esteve et al., 2016; Mare, 1991; Schwartz & Mare, 2005; Smits & Park, 2009; Smits, Ultee, & Lammers, 1998) has provided insight into, for example, the increasingly similar education of wives and husbands in the United States (Mare, 2017) and the withdrawal from marriage among highly educated women in Japan (Raymo & Iwasawa, 2005). We extend this research into sub-Saharan Africa, a context characterized by unusual heterogeneity in educational trends, encompassing contexts where attending secondary school has long been typical and contexts where attending any school at all remains exceptional (Frye & Lopus, 2018). Whereas existing research details the impacts of late-stage educational and economic development on marital outcomes, African data allow us to observe pairings in even the earliest stages of educational expansion.

Changes in the educational composition of a population can influence intramarital differences in education through two distinct processes. First, an increase in the prevalence of a given educational credential for men, women, or both genders will exert direct effects on marital sorting patterns through changes in the availability of that credential on the marriage market. For example, in a low-education scenario where a lack of formal schooling is the predominant education level for both men and women, educational homogamy—marriages in which husbands and wives have identical levels of education—will abound, as uneducated men and women marry one another. However, if educational access expands along a gendered pattern, such that primary education becomes the modal education level for men while women remain mostly uneducated, hypergamy—marriages in which women marry “up” in education—could overtake homogamy.

Second, changes in the educational composition of a population can influence pairings indirectly by altering the social conventions undergirding the marital sorting process—conventions that designate some intramarital status differences as preferable and others as inferior (Latvala, 2006; Namatende,

2016; van Bavel, Schwartz, & Esteve, 2018). We use *conventions* to describe context-specific cultural norms and values regarding the acceptability and desirability of certain pairings, enacted through individual-level preferences of brides and grooms, familial interventions into the marriage search, and broader societal-level gendered expectations and moral taboos (Basu, 1998; Bledsoe, 1990; Kalmijn & Van Tubergen, 2010). Conventions are likely to be specific to a given educational status (e.g. the stigma of a woman marrying “down” will differ if a wife has 5 years of school and her husband zero compared with 5 years and her husband 10). Conventions are also likely to vary across time; when the educational composition of a population changes, the social meaning of a given credential shifts (Frye & Lopus, 2018), and gender roles and family forms are transformed (Caldwell, 1980; van Bavel et al., 2018). In this way, a population’s educational composition indirectly impacts its propensity or aversion toward a given assortative mating outcome, as individuals—in response to social conventions—pair more (or less) often than would be expected based solely on the marginal distributions of husbands’ and wives’ characteristics. The influence of conventions can thus be assessed by comparing a population’s observed marital sorting patterns with the patterns expected to occur if husbands and wives sorted independently of their own educational statuses. We term positive deviations from independence *propensities* and negative deviations *aversions*.

In summary, a population’s prevalence of each type of marital pairing is simultaneously determined by the direct and indirect effects of a given educational context. Direct effects operate through compositional constraints imposed by the marginal distributions of men’s and women’s educational compositions, whereas conventions—themselves a product of educational context—lead to educational-group-specific propensities toward certain types of pairings and aversions away from other types. With this in mind, we pursue two distinct research questions. First, looking across Africa and comparing cohorts where schooling is rare to those where schooling is commonplace, we ask the following: To what extent does cohort-level educational access influence the prevalence of women marrying up (hypergamy), across (homogamy), or down

(hypogamy)? Second, exclusively investigating the strength of social conventions by accounting for underlying gender-specific educational compositions, we ask the following: How do propensities or aversions toward assortative mating outcomes vary across educational context? We break down the answers to each of these questions by wife's level of education to examine how women operate within the unique educational opportunities of their birth cohorts.

We leverage maximal regional and temporal heterogeneity across Africa, employing 5 decades of birth-cohort-level data from 32 sub-Saharan African countries. We use aggregated country-cohort-level data to document how marital sorting patterns vary across educational access. We find that the expansion of education over time has coincided with an increase in the prevalence of educational hypergamy in most African countries. However, for women with low- to middle-levels of education, these increases in hypergamy prevalence have been accompanied by declines in hypergamy propensity, signaling a loss of status as more women pursue higher education. We also find that hypogamy aversions have weakened among women in all educational groups, suggesting that educational expansion lessens the strong antihypogamy conventions that we document in low-education contexts and that have been discussed in previous research on Africa (Bledsoe, 1990; Matlon, 2016; Namatende, 2016). As education expands across Africa, the marital pairings for most women are becoming more similar to what would occur if couples married without regard to education. In the face of widespread educational access, social conventions regarding educational status are playing a weakening role in determining who marries whom.

Educational Expansion and the Prevalence of Hypergamy, Hypogamy, and Homogamy

In various countries where marital sorting has been studied during periods of educational expansion, researchers have identified declines in the prevalence of educational hypergamy (Esteve et al., 2012, 2016). However, because those studies investigate hypergamy prevalence among heterogamous couples (i.e., those with differing levels of education), the hypergamy trends are influenced by concurrent homogamy trends, which are not investigated. In this article, in contrast, hypergamy, homogamy, and

hypogamy are all considered to be outcomes of interest.

In addition, in most world regions where researchers have investigated intramarital differences in educational status, educational access had already reached moderate levels of coverage by the middle of the last century, when historical analyses of this process often begin. Because of the gendered way that education tends to expand (with access tending to benefit boys and men prior to girls and women; Lopus & Frye, 2018), studies of later stage educational expansion capture a period of time during which women's education rises relative to men's (DiPrete & Buchmann, 2013; Esteve et al., 2016; Goldin, Katz, & Kuziemko, 2006; Grant & Behrman, 2010), driving a closure or even a reversal of the educational gender gap (Behrman, 2016; DeRose & Kravdal, 2007; Lloyd, Kaufman, & Hewett, 2000). In parts of Africa, in contrast, many individuals born in the middle of the last century had virtually no access to formal schooling, so African data provide the opportunity to examine intramarital educational differences across a stunning range of educational contexts. Beyond answering a question of historical interest, data that precede widespread educational access have contemporary relevance as well: Even today, the expansion of mass education remains in its early stages in some West African countries.

Educational Assortative Mating Propensities

Around the world, scholars have documented a longstanding cultural preference for unions in which husbands are at least as educated as wives and a corresponding opposition toward female status-dominant relationships (Basu, 1998; Hitsch, Hortaçsu, & Ariely, 2010; Tichenor, 2005; for a review, see van Bavel et al., 2018). In the United States and Europe, this distaste for hypogamy appears to have weakened over time: Marriages in which women have higher status are no longer more likely to dissolve (Schwartz & Han, 2014), and attitudinal surveys show a growing acceptance of hypogamy (Esteve et al., 2016). Other evidence, however, suggests that the cultural preference for hypergamy may persist despite a decreasing prevalence of hypergamous marriages. Even as partners become more similar in education, they maintain status hypergamy along other dimensions, such as income (Y. Qian, 2017). In behavioral

experiments, single, highly educated women avoided revealing career ambitions because they might be penalized on the marriage market (Bursztyn, Fujiwara, & Pallais, 2017), and men avoided female partners they perceived as having higher status than them in online and in-person dating experiments (Fisman, Iyengar, Kamenica, & Simonson, 2006; Hitsch et al., 2010).

In sub-Saharan Africa, the cultural expectation that husbands have higher economic and educational statuses than their wives is pervasive and well documented (e.g. Bledsoe, 1990; Matlon, 2016; Wyrod, 2016). University-educated women in East Africa perceive themselves to face a marriage penalty due to their educational attainment (Latvala, 2006; Namatende, 2016). On the other side, uneducated men in West and East Africa express difficulty finding partners due to their lack of formal schooling (Matlon, 2016; Wyrod, 2016). Research also suggests that women's educational advancement relative to men's may be triggering backlash against women: Behrman (2018) documented an association between aggregate-level declines in hypergamy and increasing intimate partner violence in three East African countries. To date, no research in sub-Saharan Africa has measured the propensity of women of different educational groups to marry up—or how this process varies across levels of educational expansion.

In other world regions, some scholars (Okun, 2001; Z. Qian & Preston, 1993; Schwartz & Mare, 2005) documented increasing propensity toward homogamy over time, but a multicountry study in East Asia documented the reverse (Smits & Park, 2009), and in Europe, Grow and van Bavel (2015) found that changes in prevalence of educational sorting patterns between married partners can be explained by composition alone. Other research posits that educational expansion will bring about nonlinear impacts on assortative mating propensities (Smits et al., 1998).

METHOD

We use data from 119 Demographic and Health Surveys representing married couples from 32 sub-Saharan African countries (Table A1 in our Methodological Appendix, File S1). The Demographic and Health Surveys provide nationally-representative survey data on topics related to sexual and reproductive health, child health, fertility, and development (Demographic and Health Surveys and ICF

International, 2017). Data collection procedures are standardized to facilitate comparisons across countries and over time. The Demographic and Health Surveys are collected using a two-stage sampling procedure in which households are randomly selected from primary sampling units, which are most often constructed using census enumeration areas. Within each household, women between ages 15 and 49 are invited to participate; to ensure that women have completed their education prior to being interviewed, we restrict our age range to 25 to 49. All female respondents who have ever married provide information about their male partners' education, so the women's questionnaires provide data on intramarital status differences. (In File S1, we show that for the approximately 18% of our sample for which matched couple-level data are also available, husbands' and wives' reports of husbands' educational status are consistent more than 90% of the time; in cases where they differ, wives are most likely to underreport husbands' education by one category.) Surveys were conducted between 1990 and 2016, resulting in cohorts of wives born between 1940 and 1992.

We combine all available surveys for each country and generate 5-year birth cohorts of women (e.g., 1950–1954) and their husbands. For the oldest birth cohort, we include up to a 10-year age span (1940–1949) to account for smaller sample sizes in this age group, although most of the countries' earliest surveyed women were born later than 1940. For the youngest birth cohort, we include up to an 8-year age span (1985–1992).

In sub-Saharan Africa, marriage takes various forms, including traditional marriages, civil unions, religious weddings, and “de-facto” marriages with no formal ceremony (Frye & Trinitapoli, 2015; Hunter, 2016; Meekers, 1992). Because scholarship suggests that defining a union as a “marriage” is associated with educational status (Bledsoe, 1990), we follow the precedent set by most scholars of marriage in sub-Saharan Africa and do not distinguish between formal marriage and cohabitation. This expansive definition of marriage best allows us to understand partner sorting by education across a wide variety of contexts and time periods.

We limit analyses to women aged 25 to 49 who report either currently or formerly being married or living with a partner (93% of women across all countries; Table A1 in File S1) and

who have nonmissing education data for both themselves and their husbands (94% of all ever-married women; Table A1 in File S1). For the 21% of women who report having been married more than once, we use the educational status of their most recent partner. This could bias our results if marital sorting outcomes varied across the life course, but we find no evidence of systematic variation in intramarital differences in education by age surveyed (see File S1). Men could be counted as members of more than one union (e.g., if multiple cowives from the same polygynous union are surveyed or if a man's divorced wife and new wife are both surveyed), but this does not substantively influence our results. We provide more information about our treatment of marital dissolution and polygyny in the File S1.

Because of heterogeneity in the timing and frequency of surveys, the number of available birth cohorts varies across countries. Figures and models exclude country cohorts or country-cohort-educational groups with fewer than 30 couples, reducing our sample by less than 1% overall (Table A1 in File S1). Our analytic sample includes 642,378 couples representing 267 country-specific birth cohorts. In File S1, we describe country inclusion criteria, the prevalence of never marriage (Figure A2 in File S1) and missing data (Table A1 in File S1) by country, and our application of survey weights to make our data nationally and regionally representative.

Measures

Using time as our primary explanatory axis would muddy our understanding of the relationships between marital pairings and contextual educational opportunities because countries' educational expansions occurred at vastly different levels and paces in recent decades (Frye & Lopus, 2018). Instead, we document patterns across the spectrum of educational access, which we define as the proportion of individuals in each country-birth cohort who report having ever attended school (Frye & Lopus, 2018; Lopus & Frye, 2018). Although closely related to alternative measures of educational context, such as mean years of education, "percent with any formal education" allows for straightforward comparisons across time and space without being biased by heterogeneity in countries' years-to-credential requirements

or skewed upward by a small proportion of individuals with very high levels of educational attainment. For each country cohort, we approximate the dual-sex measure of the percent with any formal education by taking the average of the gender-specific values for all individuals who were selected to complete the women's and men's questionnaires and who were born in the birth years of interest. (This is in contrast to most of the rest of our analysis, which includes only married women and their husbands.) In cases of cohort-level gender imbalances, a country cohort's true percent with any formal education is likely to vary slightly from our approximation.

We measure trends in marital pairings by estimating the proportion of unions in each country-specific birth cohort that are hypergamous, homogamous, or hypogamous. We consider homogamous unions to be those in which both marital partners fall in the same of four educational categories and heterogamous (hypergamous or hypogamous) unions to be those in which partners fall in different educational categories. Because school-related networks may play an important role in partnership formation, we choose to classify educational categories in terms of levels attended (i.e., grouping those who completed primary school with those who attended some primary school), rather than credentials attained (i.e., grouping those who completed primary school with those who attended some secondary school). The categories are "no formal education" (for those who never attended any school), "primary education" (for those who attended between 1 year and completion of primary school), "secondary education" (for those who attended between 1 year of middle school and completion of high school), and "higher education" (for those who advanced beyond high school). Although marital pairing outcomes could be measured with a continuous outcome variable (e.g., difference in partners' years of schooling), we prefer this categorical measurement of hypergamy because it is parsimonious with our classification of women into educational categories elsewhere in the analysis. Likewise, this categorical approach to describing intramarital status differences reflects that status differences are nonlinear: The difference between, for example, 0 years and 1 year of school is distinct from the difference between 10 and 11 years.

Because compositional changes in the educational makeup of aggregated individuals

can obscure the differing behaviors of women within each educational group (Blossfeld, 2009; Schwartz & Mare, 2005), we break down marital pairing outcomes by wife's education level. This approach allows us to investigate how marital behaviors are influenced by individuals' educational positions within their greater educational context and to consider the rigidity or fluidity of specific educational boundaries as education expands.

Analytic Strategy

We begin by depicting the gender gap in percent ever educated (between women and men within each country cohort and also between wives and their husbands) across educational expansion to show country-level trends in gendered educational access. Next, we present trends in the prevalence of each type of marital pairing (hypergamy, homogamy, and hypogamy) across educational access for each of 32 African countries. We then aggregate these country-specific prevalence values to discern how patterns of marital pairings vary across Africa's educational expansion.

Next, we present a model that examines the relationship between individual-level educational hypergamy, individual-level educational status, and cohort-level educational context, net of country- and period-specific variation. Country and period fixed effects allow us to isolate the effects of educational context on hypergamy prevalence, independent of all within-country variation that is time invariant (e.g., historical differences in educational systems, differences in wealth and natural resources) and all within-period variation that is space invariant (e.g., international development campaigns focused around expanding access to basic education, changes in the availability of global aid). Specifically, our logistic regression model examines how the association between wives' own education and their likelihood of being in a hypergamous marriage varies as a function of the percentage of individuals in a country cohort with any formal education. We interact wife's education with cohort-level educational prevalence to examine how the effect of contextual-level educational prevalence is contingent on individual-level educational status. The model also controls for wife's birth year. We exclude women with higher education from the model because hypergamous marriage is an

impossibility for them given our classification of educational status.

Finally, we use a log-linear framework to isolate trends in marital conventions by controlling for constraints in the marginal compositions of husbands and wives. Specifically, we construct odds ratios—described as “the measure of choice in studies that wish to partial out differences in marginal distributions” (Powers & Xie, 2008, p. 77)—to quantify the extent to which women in each cohort-specific education level are marrying up, across, or down either more frequently than predicted under independent sorting (propensities) or less frequently than predicted under independent sorting (aversions). Because odds ratios are invariant to changes in the total sample size or the marginal distributions of husbands and wives, they provide a straightforward, highly interpretable metric for comparing assortative outcomes across a breadth of contexts and broken down by women's own educational status.

Log-linear models are often presented as a series of increasingly complex formulations, with each iteration of the model testing how effectively the pairings in a population or populations are described by a set of assumptions (see, e.g., Mare, 1991; Schwartz & Mare, 2005). In contrast, our objective is not to identify a set of assumptions that “best fit” the highly heterogeneous set of cohorts and educational groups in our data. Instead, we take advantage of the symmetry and parsimony of the independence assumption (i.e., that couples sort independently of husbands' and wives' levels of education) using odds ratios to visualize differences in assortative mating across hundreds of cohorts along a spectrum of educational contexts. These ratios illustrate how far each cohort-specific educational group deviates from the basic assumption of independence for homogamy, hypergamy, and hypogamy and in what direction (propensity vs. aversion). Because the independence model uses only the marginal distributions when calculating frequencies, it is straightforward to combine educational groups in asymmetrical ways, as is necessary when comparing, for example, hypogamy for primary- versus secondary-educated women.

Odds ratios range from zero to infinity, with ratios greater than one representing propensities, ratios less than one representing aversions, and ratios equal to one representing independent sorting. For each country cohort and

women’s education level, we collapse a 4 × 4 cross-tabulation of observed frequencies of wife–husband educational pairings into a series of 2 × 2 tables, such that the rows represent the wife’s educational category of interest and the educational categories of all other wives, and the columns represent the husband’s educational categories of interest and the educational categories of all other husbands. In each table, we define the husbands’ categories of interest relative to the wives’ to represent homogamy, hypogamy, or hypergamy. From these 2 × 2 cross-tabulations, we calculate odds ratios that express the odds ($\omega_{i,j}$) that wives in a given educational group, i , will marry men in a given group(s), j , compared with the odds ($\omega_{i,i}$) that wives in all other educational groups (with notation “!” to express “not” i) will marry men from that same group(s):

$$\theta_{i,j} = \frac{\omega_{i,j}}{\omega_{i,i}} = \frac{f_{i,j}/f_{i,lj}}{f_{l,i,j}/f_{l,i,lj}}$$

Take the following examples, in which education is coded from 0 = *no schooling* to 3 = *higher education*. In the case of hypergamy among primary-educated women, the odds ratio is calculated as:

$$\begin{aligned} \theta_{1,23} &= \frac{\omega_{1,23}}{\omega_{023,23}} = \frac{f_{1,23}/f_{1,01}}{f_{023,23}/f_{023,01}} \\ &= \frac{(f_{1,2} + f_{1,3})/(f_{1,0} + f_{1,1})}{(f_{0,2} + f_{0,3} + \dots + f_{3,3})/(f_{0,0} + f_{0,1} + \dots + f_{3,1})} \end{aligned}$$

In the case of homogamy among primary-educated women, the odds ratio is calculated as:

$$\begin{aligned} \theta_{1,1} &= \frac{\omega_{1,1}}{\omega_{023,1}} = \frac{f_{1,1}/f_{1,023}}{f_{023,1}/f_{023,023}} \\ &= \frac{(f_{1,1})/(f_{1,0} + f_{1,2} + f_{1,3})}{(f_{0,1} + f_{2,1} + f_{3,1})/(f_{0,0} + f_{0,2} + \dots + f_{3,3})} \end{aligned}$$

In the case of hypogamy among primary-educated women, the odds ratio is calculated as:

$$\begin{aligned} \theta_{1,0} &= \frac{\omega_{1,0}}{\omega_{023,0}} = \frac{f_{1,0}/f_{1,123}}{f_{023,0}/f_{023,123}} \\ &= \frac{(f_{1,0})/(f_{1,1} + f_{1,2} + f_{1,3})}{(f_{0,0} + f_{2,0} + f_{3,0})/(f_{0,1} + f_{0,2} + \dots + f_{3,3})} \end{aligned}$$

Consistent with our four-category educational classification scheme, the marriages of no-education women are never hypogamous (they cannot marry down), and the marriages of higher education women are never hypergamous (they cannot marry up).

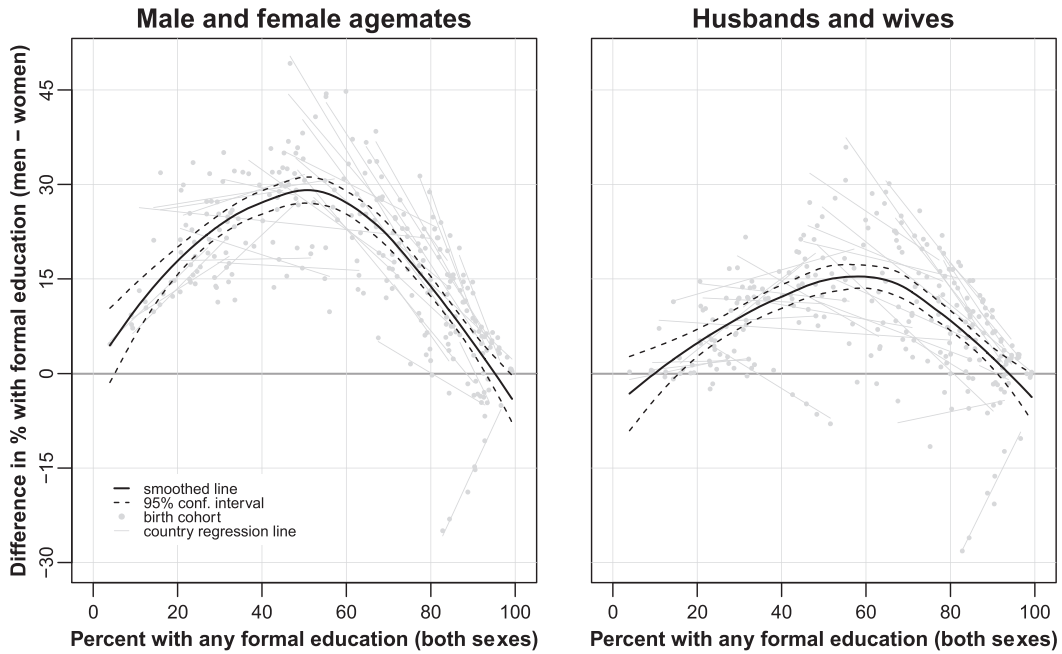
RESULTS

Educational Compositions of Wives and Husbands

Figure 1 provides an overview of gendered trends in basic educational access across educational expansion. The x -axis represents the percent of individuals who ever attended any school. The y -axis represents the absolute difference between the percent of men and women who ever attended any school: Positive values represent a male advantage (in which a higher proportion of men than women attended school), and negative values represent a female advantage. Each country cohort is represented by a point, and the gray lines reflect country-specific changes in gender gap across educational expansion (approximated using linear regression). In the left panel, points represent the difference in percent ever educated between women and men in the same birth cohort, regardless of their marital status. In the right panel, points represent the difference in percent ever educated between wives and their husbands. We provide a more detailed overview of gendered differences in education (plotting all levels and presenting each country separately) in File S1 (Figure A1 in File S1).

In nearly all country cohorts, the educational participation of men was higher than that of women as was the educational participation of husbands in comparison with their wives. Moving rightward along the x -axis of each panel, the gender gap grows and then declines, indicating that education tended to become available for boys before girls. As the country-specific fit lines demonstrate, many countries with lower baseline levels of education saw an increase in the educational gender gap during the study period, whereas many countries with higher baseline levels saw the gender gap close. Comparing across the two panels, the educational gender gap was somewhat smaller for wives and their husbands than for male and female agemates, likely due to the effect of widespread age hypergamy in Africa. (On average, husbands in this

FIGURE 1. THE EDUCATIONAL GENDER GAP BETWEEN (LEFT) MALE AND FEMALE AGEMATES AND (RIGHT) HUSBANDS AND WIVES, ACROSS EDUCATIONAL EXPANSION (WEIGHTED ESTIMATES).



Note: In the agemates panel, data for men's educational prevalence come from the representative Demographic and Health Surveys men's questionnaires. In the husbands and wives panel, husbands' educational data come from the Demographic and Health Surveys women's questionnaires.

dataset were 8.1 years older than their wives, and around two thirds of husbands were 5 or more years older than their wives.)

Prevalence of Educational Marital Pairings Across Educational Expansion

Having outlined these gendered trends in educational expansion, we next describe changes in the prevalence of educational hypergamy, homogamy, and hypogamy across levels of educational access. Figure 2 depicts country-specific trends in each type of marital pairing across each country's course of educational expansion. Countries whose lines fall farther to the left side of the figure had lower levels of educational access than did those whose lines fall toward the right, and countries whose lines span a longer horizontal distance experienced greater educational expansion across the observed birth cohorts. All countries experienced an increase in educational access, so the graphs can be read as moving roughly from left to right over time.

In nearly all country cohorts, marital homogamy was the most prevalent pairing type, followed by hypergamy and then hypogamy. Counter to the prevailing narrative of "the end of hypergamy" in most international contexts (Esteve et al., 2012, 2016), the prevalence of educational hypergamy increased between the earliest and latest observed birth cohorts in the majority of African countries (19 of 32). Of the 19 countries that experienced increasing hypergamy (identified with black borders around the plots; Figure 2), this increase was significant in 12 (heavy black borders; $p < .05$). In contrast, decreasing prevalence of educational hypergamy was observed in 13 countries (gray borders), and the decrease was significant in 8 (heavy gray borders; $p < .05$).

Most countries that experienced a significant increase in hypergamy were located in West Africa and had low baseline levels of educational access, as evidenced by lines that begin on the left-most portion of the plot. Most countries that experienced a significant decrease in hypergamy

FIGURE 2. PREVALENCE OF EDUCATIONAL MARITAL PAIRINGS ACROSS EDUCATIONAL ACCESS IN 32 SUB-SAHARAN AFRICAN COUNTRIES (WEIGHTED PROPORTIONS).

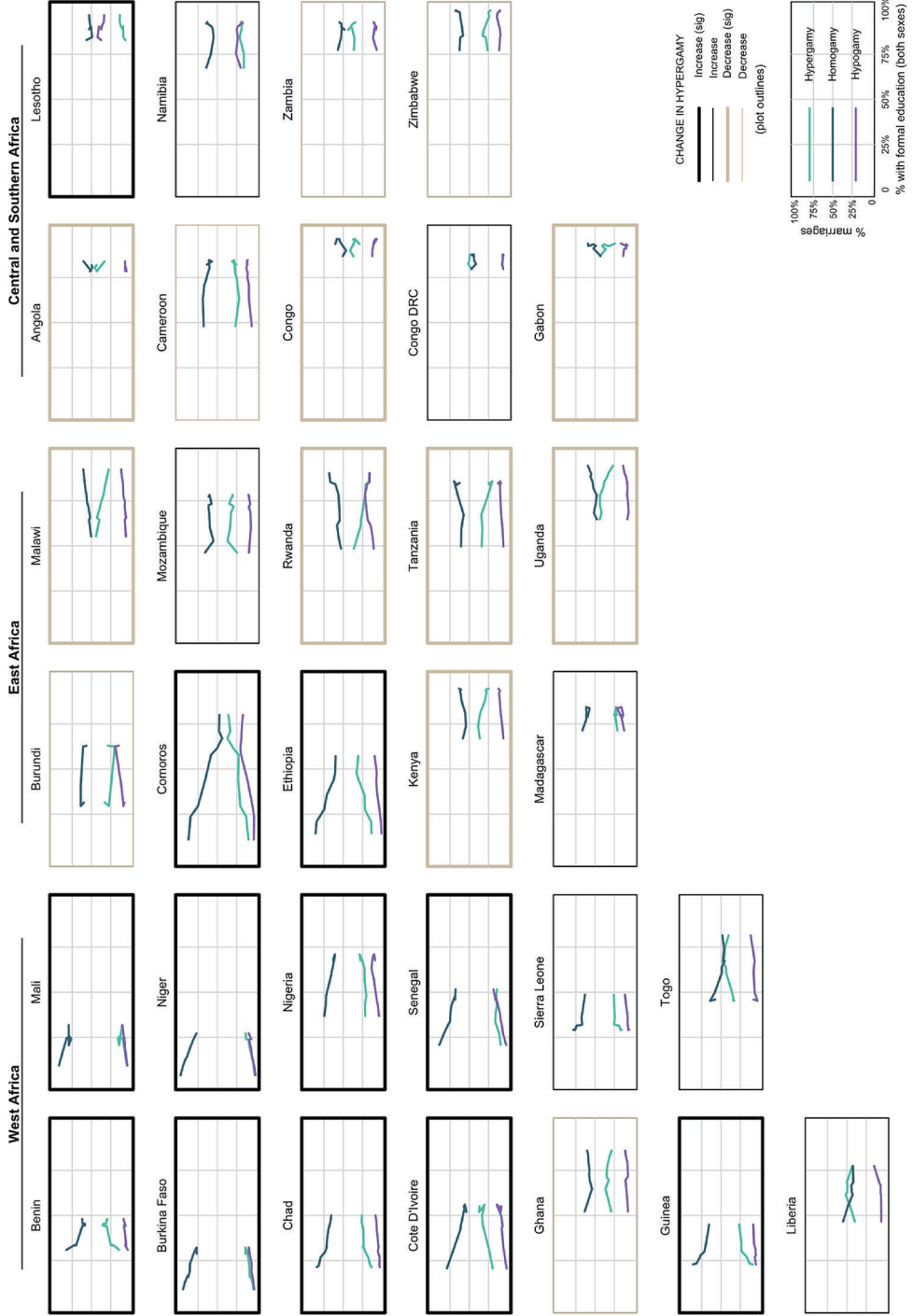
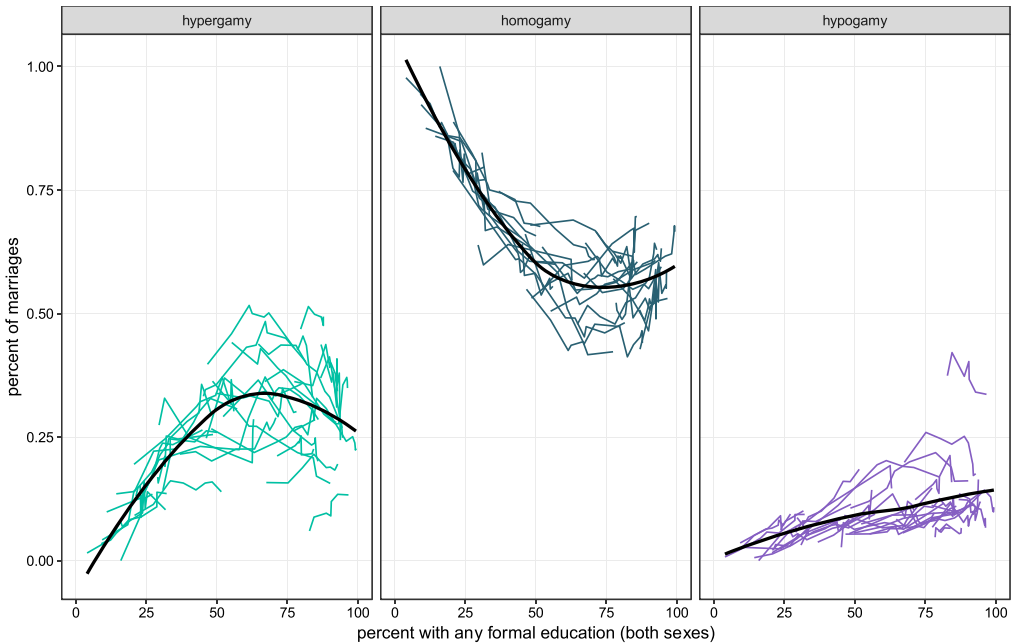


FIGURE 3. PREVALENCE OF EDUCATIONAL HYPERGAMY, HOMOGAMY, AND HYPOGAMY ACROSS EDUCATIONAL ACCESS IN 32 SUB-SAHARAN AFRICAN COUNTRIES (WEIGHTED PROPORTIONS).



were located in East, Central, or Southern Africa and had middle or high baseline levels of educational access, as evidenced by lines that begin in the center or right-most portions of the plot. In the Great Lakes region of East Africa (Kenya, Malawi, Rwanda, Tanzania, and Rwanda), we observed a distinct pattern of significant decreases in hypergamy and dramatic improvements of educational access (relatively long lines in Figure 2). Burundi (also in the Great Lakes region) followed a similar trend, although the change in hypergamy there was not significant.

Aggregating these trends for all countries, an inverted U-shape emerged for hypergamy across educational access (Figure 3): Hypergamy prevalence was low at the lowest levels of educational access, rose with educational expansion, peaked at mid to high levels of educational access, and declined at the highest levels of educational access. For homogamy, we noted a corresponding U-shape, although with a flatter slope at medium to high levels of educational access than we observe for hypergamy. Finally, hypogamy—although always rare—became increasingly common as educational access increased.

We next employed country and period fixed effects to isolate how the association between hypergamy prevalence and educational context varied by wife's educational status. The likelihood of a hypergamous marriage was lowest among women with no formal education and highest among women who attended secondary school (Table 1). Among women with no formal education, the model identified a positive relationship between educational access (the percent of the population with any formal education) and the likelihood of being in a hypergamous union. In contrast, among women with primary or secondary education, the likelihood of being in a hypergamous union declined in contexts with higher levels of educational access, as evidenced by the greater magnitude of the negative interaction terms compared to the coefficient on educational access.

Taken together, the education-group-specific trends presented in Table 1 explained the aggregated hypergamy trends exhibited in Figure 3. As education expanded, the rising hypergamy prevalence of no-education women led to sharp increases in the aggregated hypergamy trends. At the highest levels of educational access,

Table 1. Summary of Logistic Regression for Hypergamous Marriage as a Function of Educational Access and Educational Status, With Country and Period Fixed Effects

Predictor	B (OR)	SE B
Cohort-level educational access (percent ever educated)	0.015*** (1.015)	0.002
Women’s educational status (reference: no education)		
Primary	1.414*** (4.113)	0.052
Secondary	2.604*** (13.519)	0.067
Birth year	0.005 (1.005)	0.004
Interaction terms		
Educational Access × Primary	-0.028*** (0.973)	0.001
Educational Access × Secondary	-0.055*** (0.947)	0.001
Constant	-1.071*** (0.343)	0.112
AIC	666,900	
Percent hypergamous	26.9	
N	628,751	

Note: The model was estimated using survey weights adjusted to account for cross-national and temporal variation in sampling rates. Women with higher education are excluded from the model because of their impossibility of marrying “up,” given our classification of educational groups. AIC = Akaike information criterion. *p<0.05; **p<0.01; ***p<0.001.

where well-educated women constituted a larger share of the population, their behaviors (i.e., declining hypergamy prevalence among secondary education women and the impossibility of hypergamy among higher education women) pulled down the aggregated hypergamy prevalence.

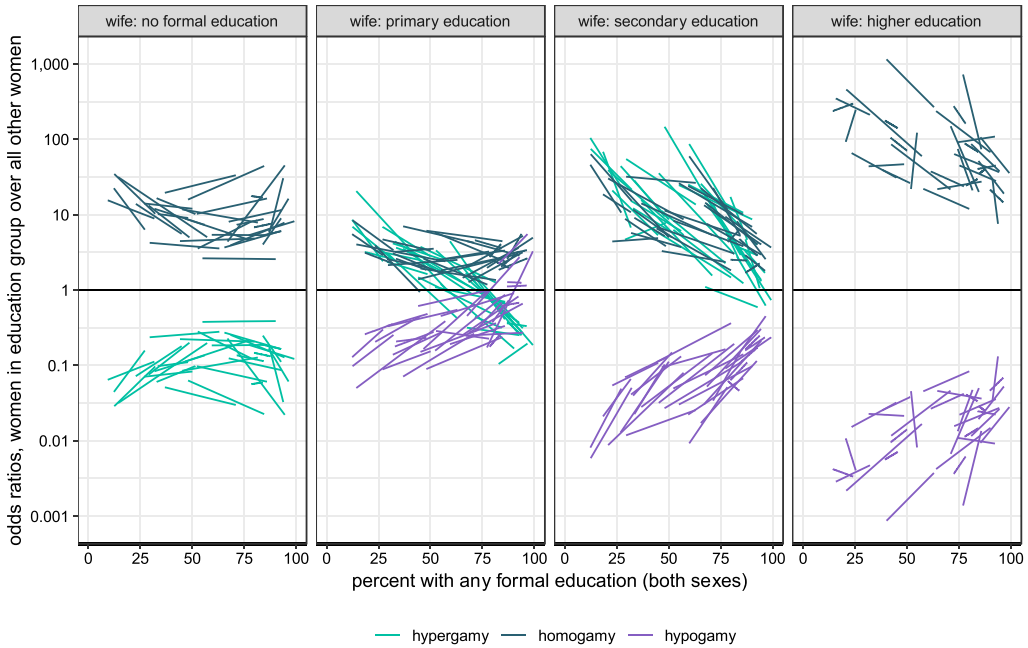
Propensities Toward Educational Assortative Mating

The prevalence outcomes documented previously represented the combined effects of composition (i.e., marginal differences in the educational status of husbands and wives) and conventions (i.e., propensities or aversions toward hypergamy). In Figure 4, we plotted country-specific best-fit lines representing the odds ratios for each country-cohort-educational group to isolate the impact of social conventions

in particular. These ratios compared women’s marital sorting behaviors within the educational group of interest to those from women in other educational groups, netting out the influence of the educational composition. Because an odds ratio equal to one would represent independent sorting (in which frequencies of husband–wife educational pairs were determined entirely by the marginal educational distribution of husbands and wives), deviations from one indicated that women of a given educational status exhibited patterned tendencies (or “conventions”) to marry some educational statuses and not others. Specifically, values above one represented a propensity toward a category of educational pairing (i.e., prevalence higher than would be observed under independence), and values below one represented an aversion toward that category of pairing (i.e., prevalence lower than would be observed under independence). The further the odds ratios deviated from one, the more dramatically the educational group’s behavior differed from independent sorting. Therefore, at points along the x-axis where propensity and aversion values tended to fall far above and below one, conventions were strongly influencing marital outcomes. (Figure A3 in File S1 displays confidence intervals for each country-cohort-educational group, showing that most estimates were significantly different from one, except for where the country-specific trendlines cross one.)

Looking broadly across educational access (the x-axis of Figure 4) and educational groups (the panels), we noted two principal trends in marital propensities. First, conventions had a particularly strong influence on women who attended any school in contexts where education was rare (toward the left side of each x-axis) but less of an influence where education was more widespread. Second, women who comprised the educational elite (secondary-educated and higher educated women) experienced stronger overall conventions than did less-educated women. We observe homogamy propensities (values greater than one) across all countries, at all stages of educational expansion, and among women at all levels of education (Figure 4). Likewise, hypogamy values were less than one for almost all cohorts and educational groups, suggesting a consistent (though weakening) aversion toward women marrying down. The social conventions surrounding

FIGURE 4. COUNTRY-SPECIFIC BEST-FIT LINES REFLECTING ASSORTATIVE PROPENSITIES FOR WIVES IN FOUR EDUCATIONAL CATEGORIES, ACROSS EDUCATIONAL ACCESS.



Note: Assortative propensities represent the deviation from expected prevalence of marital outcomes under conditions of independent sorting.

hypergamy, on the other hand, differed across educational categories: We observed aversions toward hypergamy among no-education women, either propensities or aversions among primary-education women (varying across educational access), and propensities among secondary-education women.

For women with no formal education (the far-left panel of Figure 4), we observed a slight U-shaped pattern in homogamy propensities across educational access: Within countries that began at low levels of educational expansion, no-education women's homogamy propensities tended to decline as educational access increased, but within countries that started off at higher levels of educational access, no-education women's homogamy propensities tended to increase. Each hypergamy odds ratio for no-education women was the inverse of the corresponding homogamy odds ratio, leading to a complementary inverted U-shaped pattern for hypergamy.

Primary- and secondary-educated women exhibited strong hypergamy propensities along the left side of the x -axis, where access

to education was low (Figure 4). However, with educational expansion, these hypergamy propensities fell to the point of crossing the $y = 1$ line (especially for primary-educated women), representing declining hypergamy propensities and, ultimately, increasing hypergamy aversions in the highest education contexts. This decline in hypergamy propensities across educational access existed both within countries (as evidenced by the predominance of downward-sloping country-specific lines) and across countries (as evidenced by clouds of lines that are lower on the right side of the x -axis).

This growing aversion toward hypergamy among primary- and secondary-educated women appears to be due to a loss of status as education expanded: Whatever "elite" societal position they held on the left side of the x -axis (when education was not widespread) was no longer held by women with that same educational status on the right side (when many of these women's female agemates had gone further in school). Aligned with this interpretation of a loss in status for middle-education women, their declines in

hypergamy propensity were largely offset by steeply increasing hypogamy propensities (or, more accurately, by weakening hypogamy aversions): As education became more widespread, the avoidance of downward marriages diminished. In contrast, we did not see much evidence that hypergamous marriages among these groups were being replaced by homogamous marriages, which might signal a growing proportion of partners who met at school. Among secondary-education women, homogamy propensities tended to decline steeply across educational access. Among primary-educated women, homogamy propensities declined slightly in about half of the countries in our sample (primarily those who began the study period with low levels of educational access) and increased slightly in the remainder of countries (largely those that began the study period at higher levels of educational access).

Among higher education women (the far-right panel of Figure 4), homogamy propensities were particularly high, with odds of marriage to higher education men 10 to 1,000 times greater than other women's odds of marriage to this same group of men. In other words, higher educated women exhibited far higher rates of marriage within their own educational status—and far lower rates of marriage to men with lower education levels—than would be expected under conditions of independent sorting. However, this tendency declined with educational expansion, as demonstrated by the downward-sloping homogamy propensities.

For primary-educated, secondary-educated, and higher educated women, propensities and aversions toward hypergamy, homogamy, and hypogamy were generally weaker in higher education contexts than in lower education contexts. Although the same cannot be said of no-education women, they comprise a smaller share of the population moving rightward along the x -axis. Taken together, these factors—diminishing conventions among women who attended school, alongside their growing population prevalence—point to an overall decline in the strength of marital conventions across educational expansion. That said, even in the highest education contexts, homogamy propensities remained quite high among higher educated women, with odds ratios of a higher educated husband ranging roughly from 10 to 100.

DISCUSSION

Across sub-Saharan Africa, educational homogamy was the modal marital outcome in nearly all countries and birth cohorts (Figure 2): Individuals were most commonly married to others with their same level of education. That said, stark regional disparities in level of educational expansion have translated into comparably stark regional disparities in the trajectories of hypergamy, homogamy, and hypogamy prevalence over time. In West Africa, where educational access tends to be lower than in other African regions, most countries have undergone significant increases in the prevalence of educational hypergamy (Figure 2), consistent with the widening of the educational gender gap that has accompanied Africa's transition from low to middle levels of educational expansion (Figure 1). In contrast, in many East, Central, and Southern African countries, where baseline levels of educational access were higher, we document significantly declining hypergamy (Figure 2). These regional trends roughly map onto the continent's colonial histories, with low baseline levels of educational access in many of the former French colonies and higher baseline levels in many of the former British colonies. Aggregated across countries, we identify an inverted U-shape in the prevalence of educational hypergamy and a U-shape in the prevalence of homogamy as educational access has expanded across Africa (Figure 3).

Our identification of increasing hypergamy in a majority of sub-Saharan African countries lies counter to the findings of Esteve et al. (2012, 2016), who described declining prevalence of educational hypergamy over time in nearly all international settings, including Africa. These divergent findings are largely attributable to a fundamental difference in research questions: Whereas Esteve et al. investigated hypergamic pairings as a proportion of heterogamous pairings, we investigate hypergamy as a proportion of all pairings. Illustrating the importance of this distinction, in most countries where we identify a rise in hypergamy prevalence, we would identify the opposite if we measured hypergamy as a percentage of heterogamous pairings. In those countries, hypergamy has declined among those who sort unevenly, but uneven sorting has itself become more prevalent. Rather than removing homogamy from the equation, we analyze trends in all of the pairing types (hypergamy, homogamy, and hypogamy),

each of which provides information essential to understanding how education shapes marital outcomes.

The dominance of educational homogamy in nearly all country cohorts (Figure 2) is driven at least in part by the propensity toward educational homogamy that exists across countries, across time periods, across educational contexts, and among women in all educational groups (Figure 4). Some scholars have interpreted heterogamy as a proxy for love-based pairings or openness in the marriage market and homogamy as a proxy for rigid, closed class boundaries (Blossfeld, 2009; Smits et al., 1998). Among women with little or no schooling, the increasing propensity toward educational homogamy observed in high-education contexts (Figure 4) could indeed signal widening social distance between educational groups and worsening opportunities for upward mobility, consistent with an identified “nonnegligible” impact of educational assortative mating on African wealth inequality (Pesando, 2019). However, the interpretation that heterogamy is good for society may be ill founded in Africa and, potentially, in other world regions where hypergamy dominates the heterogamic pairings. Rather than representing relationships that are progressive and love based, hypergamous pairings may reflect patriarchal norms (Therborn, 2004)—both cause and consequence of women’s inferior status. Behrman (2016), for instance, argued that in Africa, homogamous relationships tend to be more egalitarian than hypergamous relationships.

Moreover, we are not convinced that homogamy signals arranged marriages and rigid class boundaries, whereas heterogamy signals selection of one’s own mate on the basis of love. Given that schools often serve as the place where romantic partners meet one another (Bourdieu & Passeron, 1990; Johnson-Hanks, 2006; Lloyd & Mensch, 1999; Mare, 1991; Mensch, Grant, & Blanc, 2006), and given that similar levels of complementary traits (e.g., educational status) can enhance feelings of love within partnerships (Lichter & Qian, 2019; Stevenson & Wolfers, 2007), homogamy—and not hypergamy—seems the likelier reflection of a love-based pairing.

That said, propensities are not synonymous with preferences. The weakening of the social conventions proscribing hypogamous marriages, for example, might well represent a reduction

in some women’s well-being—not at all a reflection of their concerted choice or desire. Propensities could also change because women in a given educational group have less agency in selecting a marriage partner, particularly if that educational status becomes an indicator of extreme disadvantage in highly educated contexts. Although our approach allows us to isolate the effects of conventions on marital outcomes (separate from the compositional effects of the educational distribution of husbands and wives), identifying the specific cultural drivers of these patterned behaviors is outside the scope of this project. Similarly, due to data limitations, we cannot discern whether our findings are driven by changes in individual preferences, familial systems (e.g., arranged vs. autonomous marriages), social institutions (e.g., churches and schools), or broader sociocultural processes (e.g., urbanization, exposure to Western culture through mass media).

As higher education becomes more prevalent for women, the relative status of women with medium levels of education appears to decline. Primary and secondary schooling become less salient markers of elite status, as evidenced by declining propensities toward marrying highly educated and similarly educated men and weakening aversions to marrying down (Figure 4). At the same time, though, these changes are occurring alongside a broader diminishment in the strength of marital conventions, even among women in the higher education category. As education expands, well-educated individuals are beginning to exhibit sorting behaviors that come closer to—but still deviate greatly from—independence.

Unlike in the United States (Schwartz & Mare, 2005), as education has become more widespread in Africa, the social or spatial separation between the highly educated and the less educated has begun to dissipate. These weakening conventions may indicate that education level is no longer such a meaningful source of stratification: Whereas in low-education contexts, education is a strong indicator of status, the boundaries between educational categories may become less indicative as more people obtain educational credentials. On the other hand, the upswing in homogamy among no-education women in the highest education contexts indicates that a lack of education becomes a more salient marker of negative status, connoting exceptional disadvantage and

likely rendering these women less desirable on the marriage market.

Because national-level data conceal considerable heterogeneity in educational conditions, geographic segregation between more- and less-educated individuals may also be an important factor underlying our findings. For instance, if schooling permeates remote rural areas later than it permeates cities and the urban periphery, rural residents may constitute a more homogenous pool of wives and husbands than the country-level compositions would suggest at particular points along the trajectory of educational expansion. An analysis of African mating data at the subnational level, such as the urban–rural comparisons in Pesando (2019), may therefore be a fruitful area for future research.

Despite our project's focus on who marries whom, we note that educational status and contextual-level educational access also influence entry into marriage (Figure A2 in File S1). Among no-schooling and primary-educated women, the proportion never married increases steadily across educational access but remains quite rare, whereas for secondary-educated and higher educated women, the proportion never married increases steeply from low to moderate levels of educational access and then levels off at around 13% (Figure A2 in File S1). In the United States, Mare (1991) predicted that increasing rates of never marriage among highly educated individuals may lead to a higher prevalence of educational homogamy, whereas Schwartz and Mare (2005) predicted the opposite impact on homogamy if the increase in never marriage largely occurred among less-educated individuals. The effects of never marriage on intramarital status differentials in sub-Saharan Africa merit further investigation.

Marriages among the coming generation of young adults will be shaped by the educational compositions of today's school-aged children. Although gains have been made in achieving universal primary education, gender inequities persist, with boys continuing to outnumber girls in primary school in the majority of sub-Saharan African countries (United Nations Statistics Division, 2015). Particularly for those West African countries with the lowest levels of educational expansion today, we expect educational gender gaps to widen before they close. Alongside the direct effects of these gendered changes in educational

compositions on marital outcomes, we predict the continuation of a simultaneous process, in which the indirect effects and correlates of educational expansion alter social norms and conventions. In the many West African countries where we observe increased hypergamy prevalence over time, we expect that hypergamy will decline in the future, as the combined impacts of a closing gender gap and weakening hypergamy conventions ultimately take effect.

When the educational composition of a population changes, longstanding systems of social stratification are transformed—between men and women, between husbands and wives, and between those who have and have not attended school. For most African women and within most educational categories, marriage patterns have deviated less from independent sorting as education has become more widely available. Even in the highest education contexts, though, patterns of marriage continue to be shaped by conventions, which esteem or devalue pairings based on gendered valuations of educational status. With further educational expansion, the influence of conventions dictating who should marry whom may continue to decline, or perhaps conventions will align with other, noneducational dimensions of social stratification.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

File S1. Methodological Appendix.

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