Does the Internet Affect Assortative Mating?
The Case of Educational, Racial and Religious Endogamy

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Abstract

During the last years finding a partner via the Internet became increasingly popular, transforming the dating landscape and the process of relationship initiation. This study revisits Blau's social structure theory and the supply perspective on assortative mating by exploring the role played by the digital marriage market in breeding couples' socio-demographic similarity. It examines the educational, racial/ ethnic and religious endogamy of couples that formed through the Internet compared to other contexts of meeting such as friends, family, neighbors, school etc. The analysis is performed for 2,970 partnered individuals in the U.S. and 8,144 in Germany. Using log-multiplicative models that allow for the strength of partners' association to vary along meeting settings, I find that the Internet promotes weaker couple endogamy compared to conventional contexts such as school, family, or religious venues. This finding contests the universal norm of endogamy and shows that the Internet has the potential to reduce barriers between social groups, at least to a higher extent than contexts of interaction typically known to foster endogamy.

Keywords: assortative mating, Internet, marriage market

Introduction

Mate selection and assortative mating (i.e., the nonrandom pairing of individuals with similar traits) depend on particular contexts of interaction that mediate the formation of partnerships (Bozon and Héran 1989; Kalmijn and Flap 2001; Lampard 2007; Mollenhorst, Völker, and Flap 2008a). The pool of available partners supplied by certain social contexts and networks determines the extent to which individuals are able to match with people belonging to their own group. However, knowledge about the way in which the Internet as the most recent and increasingly prevalent setting of partner selection, influences assortative mating patterns is absent.

The ongoing shifts in work and family life and the decline of traditional settings of meeting and mating (Rosenfeld and Thomas 2012) mean that individuals become progressively more in charge with the process of finding a partner (Barraket and Henry-Waring 2008). Against this backdrop, the Internet as dating environment surged in popularity, fundamentally changing the dating landscape and the process of relationship initiation. In the U.S., more than one-third of marriages begin online (Cacioppo et al. 2013). In Germany, online dating platforms (i.e., dating websites where people enroll with the specific purpose of finding a romantic partner) have witnessed a rapid surge, with approximately 5.4 million people seeking a partner online (Schulz et al. 2008). Attitudes towards the Internet as a suitable way to meet people and find a match have also grown more positive over time (Smith & Duggan 2013). Despite the large interest it raises among scientists, media and general audiences alike (Sprecher 2009), there is still limited understanding about the nature of relationships formed through the Internet. Social relations initiated online are assumed to take on different forms than in traditional face-to-face settings, given that cyberspace provides distinct ways of communicating and interacting with others, non-mediated by typical third parties and unconstrained by physical boundaries (Houston et al. 2005). During the early stages of its development, the Internet was in fact subject to utopian predictions about its role in making ascriptive characteristics obsolete (Barlow 1996; Castells 2001). Individuals' matching based on similar race or socio-economic status, known to prevail in segregated offline environments, would then dissolve in the boundless space of the Internet. Skeptics, on the other hand, suggested that online dating[1] would reproduce existing patterns of assortative mating and that "the same type of people are meeting online as they do offline"

(Henry-Waring & Barraket 2008, p. 29). Studies examining partner preferences and first-stage contacting behavior in online dating platforms have consistently revealed positive assortative mating in online partner selection (e.g., Skopek, Schulz, and Blossfeld 2011; Lewis 2013; Lin and Lundquist 2013; Potarca and Mills 2015; Robnett and Feliciano 2011; Yancey 2009). It remains unknown, however, whether the 'amount' of assortative mating decreases or increases in the context of digital mating markets compared to other places of meeting and mating. The question that guides this study is whether the online environment contributes to alleviating the typical social divides between groups by providing an unrestrictive space for partner selection, or whether it preserves social boundaries and even promotes more similarity between partners due to individuals' strong norm of endogamy and online opportunities for easily getting in contact with similar others.

This research aims to examine the extent to which online partnership markets foster couple endogamy in contrast to conventional offline settings of meeting by using recent data referring to how couples meet in the U.S. and Germany, two countries were Internet dating has become a widely accepted and utilized channel for finding a partner (Cacioppo et al. 2013; Schulz et al. 2008). I focus on three most commonly studied types of endogamy (Schwartz 2013), related to education, race/ ethnicity, and religious background. In this study, endogamy and related terms are generically used to describe similarity for both married and unmarried couples. I distinguish between several types of meeting contexts, namely: the Internet (referring to online dating platforms, online communities, chat rooms, online social networks, online gaming etc.), family, friends, neighbors, leisure, the workplace, school, religious venues, voluntary organizations, and other settings.

The paper adds to the literature in several ways. First, it contributes to the recent line of studies examining the ways in which new technologies affect partner selection and romantic outcomes (e.g., Cacioppo et al. 2013; Rosenfeld and Thomas 2012). Second, it provides the first comprehensive comparison between couples that met via the Internet and couples that met via offline meeting venues, with respect to endogamy patterns. Using the same U.S. data source, the study by Rosenfeld and Thomas (2012) offers novel insights into the differences between couples that met via the Internet and couples that met via family intermediaries. I extend the work by Rosenfeld and Thomas (2012) by contrasting online settings to more than one offline

setting, and by performing analyses that are more appropriate for the structure of the data, as described in the Methods section. Third, the current research draws conclusions about endogamy patterns characterizing both U.S. and German couples, enable more far-reaching conclusions about the impact of the Internet on assortative mating. Finally, whereas most research examines endogamy patterns in connection to married couples only (e.g., Hou & Miles 2008; Mare 1991; Rosenfeld 2008), the current study refers to both marital and non-marital relationships and is thus better able to capture the broader reality of romantic unions.

Theoretical Background

Endogamy Patterns and Trends

Research on mate selection spanning over several decades has consistently indicated individuals' tendency of choosing partners from within their own educational, religious, and ethno-racial group (e.g., Blau and Duncan 1967; Blossfeld and Timm 2003; Burgess and Wallin 1943; Mare 1991; Smits, Ultee, and Lammers 1998; for reviews, see Blossfeld 2009; Kalmijn 1998; Schwartz 2013). In-group preferences are motivated by the need to preserve in-group cohesion (Sumner 1906), the need for security given by interactions with culturally similar individuals (Hutnik 1991), or in-group favoritism as a means of sustaining a positive and distinguishable social identity (Tajfel 1982). Marital sorting (i.e., whom marries whom) along education, race/ ethnicity and religion has received particular attention in the literature on assortative mating (for a recent review, see Schwartz 2013) given their significance in indicating economic and social between-group boundaries (Blau and Duncan 1967; Blossfeld 2009; Fernández and Rogerson 2001; Mare 2000). An overview of the relevance, patterns and trends associated with each of the three types of endogamy examined in the present study is provided below.

Education represents a central predictor of favorable labor market prospects and overall socioeconomic status (Blossfeld 2009; Fu and Heaton 2008; Mare 1991; Rosenfeld 2008), as well as an indicator of cultural resources and lifestyle (Halpin and Chan 2003; Hou and Miles 2008; Mare 1991). The *educational resemblance* of partners has consequences for the transmission of social advantage across generations (Kalmijn 1991; Schwartz and Mare 2005;

Ultee and Luijkx 1990), as well as the development and educational achievement of offspring (Beck and González-Sancho 2009). Research on patterns of educational endogamy in both the U.S. and Germany provides evidence of high educational endogamy (Blossfeld and Timm 2003; Fu and Heaton 2008; Rosenfeld 2008). Whereas most studies examining German data indicate a trend of increasing educational endogamy over time (Blossfeld and Timm 1997, 2003; Grave and Schmidt 2012), findings are inconsistent with respect to the direction of change the U.S. One line of empirical studies indicates that spouses' educational resemblance has sequentially increased over the last century (e.g., Hou and Myles 2008; Kalmijn 1991; Qian and Preston 1993). A second group of studies uncovers non-linear trends, with educational endogamy first increasing, then decreasing over time (e.g., Mare 1991; Liu and Lu 2006) or initially rising and afterwards declining (Schwartz and Mare 2005). Finally, a third line of research suggests that the association of husbands' and wives' education remained relatively stable or slightly decreased in most of the 20th century (Fu and Heaton 2008; Raymo and Xie 2000; Rosenfeld 2008).

In comparison to educational endogamy, *racial/ ethnic endogamy* is much more prevalent, robust, and associated with less divergent research findings (Germany: González-Ferrer 2006; Milewski and Kulu 2013; U.S.: Fu and Heaton 2008; Rosenfeld 2008). Same-race/ ethnicity partnering is believed to most accurately indicate the continuity of group boundaries (Fu 2001). Interracial/ interethnic marriages, particularly between majority members and racial/ ethnic minorities, are an indicator of assimilation and diminishing social and cultural distances between groups (Alba and Nee 2003; Gordon 1964). Despite hierarchical patterns of crossing racial/ ethnic boundaries in partnership choices and preferences (Bonilla-Silva 2004; Fu 2001; Potarca and Mills 2015) and different trajectories of assimilation for different groups (Alba and Nee 2003; Klein 2001), empirical studies examining changing trends in racial/ ethnic endogamy over the last century find overall trends of declining same-race/ ethnicity partnering and increasing intermarriage rates (Germany: Lucassen and Laarman 2009; Schroedter 2006; Todd 1994; U.S.: Fu and Heaton 2008; Rosenfeld 2008).

Religious endogamy is considered as one of the main contributing factors to marital quality (e.g., Heaton 1984; Myers 2006), scarcity of relationship disputes and conflicts (e.g., Curtis and Ellison 2002), as well as marital stability (e.g., Heaton and Pratt 1990; Lehrer and Chiswick 1993). Spouses who share the same religion are believed to benefit from more

effective partnerships due to common beliefs and values grounded in the same (religious) ideology (Myers 2006). Partners' religion influences not only the type of religious practices performed by each, but also lifestyle decisions with respect to child care, time and financial management, the formation of social and professional networks, and residential choices (Lehrer 1998; Lehrer and Chiswick, 1993). Even though research indicates strong homogamous patterns along religious lines in both countries included in this study (e.g., Germany: Klein and Wunder 1996; U.S.: Bisin, Topa, and Verdier 2004; Blackwell and Lichter 2004), the last decades witnessed both drops in rates of endogamy and increases in religious intermarriage (Germany: Hendrickx, Schreuder, and Ultee 1994; U.S.: Lehrer 1998; Rosenfeld 2008; Sherkat 2004).

Social Contexts of Interaction – The Supply Side Perspective

As Blau's (1977) theory of social structure suggests, interpersonal choices are largely determined by the opportunities for contact that each social setting provides. What may appear as personal preference for similar others is in fact highly contingent on the configuration of contexts. The social contexts or foci of activity in which people initiate and construct relations differ in the characteristics of individuals embedded in them (Feld 1984; Marsden 1990). As a result, any study of personal relations needs to account for the social composition of different types of social settings. Each context provides a distinctive pool of potential interaction partners (supply), from which people can select according to personal preferences (demand). The supply of contact opportunities supported by each social setting determines whether or not individuals can realize the previously discussed dominant preference for similar others. The more socially and culturally homogenous a context is, the higher chances people have to associate with those belonging to the same background. The supply-side perspective and its focus on the importance of local interaction opportunities in breeding similarity have been connected to multiple types of close personal relations, ranging from marital or cohabiting unions (e.g., Blau and Schwartz 1984; Kalmijn 1998; Kalmijn and Flap 2001), sexual relationships (e.g., Laumann et al. 1994), friendships and acquaintanceships (e.g., McPherson and Smith-Lovin, 1987; Mollenhorst, Völker, and Flap 2008a), or core discussion networks (e.g., Mollenhorst, Völker, and Flap 2008b). This study continues the tradition of applying the supply-side perspective in examining how meeting venues favor similarity of romantic partners with a particular focus on digital

settings. In order to draw expectations about the relative contribution of Internet venues in breeding endogamy, an overview of the social composition, supply of spousal alternatives and general marriage market conditions provided by both conventional and digital meeting settings is outlined below.

Conventional Meeting Settings

Due to a balanced gender and age distribution and a subsequently large pool of young male and female candidates, *school settings* (i.e., ranging from primary school to university) constitute one of the most abundant partnership markets (Kalmijn and Flap 2001). Schools display high levels of internal homogeneity in terms of educational level, predominantly for individuals at the upper end of the schooling distribution who are inherently more uniform in their final educational attainment (Mare 1991), and religious affiliation (Kalmijn and Flap 2001). Meeting partners via school is therefore associated with strong and multiple endogamous effects, particularly with respect to education, class and religion (Kalmijn and Flap 2001; Lampard 2007; Mollenhorst, Völker, and Flap 2008a).

Workplaces are social contexts that are highly homogenous in socioeconomic status and education, but less segregated with respect to other ascribed characteristics such as race/ ethnicity or religion (Feld 1984; Mcpherson, Smith-Lovin, and Cook 2001). Research indeed reveals that romantic ties among co-workers are associated with high endogamy with respect to education (Mollenhorst, Völker, and Flap 2008a), but none with respect to religion (Kalmijn and Flap 2001; Mollenhorst, Völker, and Flap 2008a).

Personal networks consisting of *family members* and *friends* are usually highly homogeneous on ascribed characteristics such as race/ ethnicity and religion (Feld 1984; Mcpherson, Smith-Lovin, and Cook 2001). Having friends and family as intermediaries in the mating market not only ensures opportunities for positive sorting along these lines, but also entails direct third party pressures to conform to endogamy norms (Kalmijn 1998; Lampard 2007). Empirical findings, however, remain inconclusive. Kalmijn and Flap (2001) find positive effects of family networks on religious endogamy only, while Mollenhorst and colleagues (2008a) encounter no significant effects. Mixed results are also found for *neighborhood* as context for meeting partners with relatively high levels of homogeneity with respect to social

class, race/ ethnicity, and religion. Compared to other settings, neighborhoods are shown to favor either lower (Mollenhorst, Völker, and Flap 2008a) or higher religious similarity between partners (Kalmijn and Flap 2001).

Other settings that are not clearly linked to either high or low endogamy are *public places* for drinking, eating, or socializing, as well as *voluntary organizations*. Such optionally selected contexts generally present lower structural constraints and higher chances of meeting people of different backgrounds (Bozon and Héran 1989). Nonetheless, these settings also preserve some degree of social and cultural segregation (Lampard 2007). Certain voluntary associations, for instance, are religion-affiliated (Feld 1984) or targeted towards specific groups (e.g., youth organizations, professional organizations), resulting in particular types of social composition and endogamy (Mcpherson, Smith-Lovin, and Cook 2001). Finally, *religious venues* are known for high levels of religious homogeneity (Feld 1984) that leads to high probabilities for partners to share the same system of beliefs.

Digital Partnership Markets

As previously noted, current studies of partner preferences and interaction observed on Internet dating platforms reveal positive assortative mating patterns along various social lines. Skopek and colleagues (2011) find that educational similarity influences contact and response behavior in the initial stages of online dating. Various research addressing racial preferences in online dating in both the U.S. and Europe points to the endurance of same-race preferences and typical racial hierarchies (Wilson, McIntosh, and Insana 2007; Feliciano, Robnett, and Komaie 2009; Yancey 2009; Feliciano, Lee, and Robnett 2011; Lewis 2013; Lin and Lundquist 2013; Robnett and Feliciano 2011; Potarca and Mills 2015). Finally, studies that examine the religious preferences of online daters indicate that both men and women are more likely to contact potential partners with the same religious affiliation (Fiore and Donath 2005; Hitsch, Hortaçsu, and Ariely 2010). Other online venues could also lead to couple endogamy. For instance, social networking sites maintain ties with former high school classmates (Ellison, Steinfield, and Lampe 2007), allowing schools to operate as marriage markets further into the age of adulthood and ensure educational similarity between partners (Schwartz 2013).

Moreover, the specific design of Internet dating platforms, social networks or online communities allows for the screening of potential partners based on key socio-demographic characteristics. This facilitates and reduces the cost of searching and eventually finding a partner that is similar on many characteristics (Schwartz 2013). In addition to allowing for the selection of a similar partner with minimum efforts, an easy to access supply of partner candidates implies that online venues would favor the materialization of similarity preferences and would therefore boost the number of endogamous unions (Finkel et al. 2012; Schwartz 2013). Compared to traditional settings of meeting and mating, online venues thus provide a theoretically more accessible pool of similar others as prospective partners. The hypothesis that follows is that the Internet would promote *more* educational, ethno-racial and religious endogamy in comparison to other meeting settings.

However, when contrasting couples that met through the Internet with couples that met via a traditional marriage market (e.g., family), Rosenfeld and Thomas (2012) find no difference between the two groups with respect to partners' educational gap. They also reveal that same-race partnering is as frequent among those who met online as it is among the couples that met via family members. When it comes to the ways in which new forms of technology affect religious endogamy, the authors ultimately show that the Internet does favor interreligious partnering. These findings suggest that, contrary to previous arguments, the online marriage market is not linked to more couple endogamy and in fact contributes to diminishing particular boundaries between social groups (in this case, with respect to religion). The Internet brings together people who, due to lack of access and time, remain underexposed in traditional settings (Sprecher 2009), and it offers numerous opportunities for interaction, less restricted by geography or social belonging. Given that the online environment ensures increased exposure to socio-demographic diversity and a weakening of third party control (Rosenfeld and Thomas 2012; Schwartz 2013), individuals are more 'at risk' of forging romantic relationships with dissimilar others. This leads to a competing hypothesis, predicting that online venues would be associated with *less* educational, ethno-racial and religious endogamy than offline meeting settings.

Data and Measures

For U.S. couples, this study uses data from the first wave of the How Couples Meet and Stay Together (*HCMST*) survey (Rosenfeld, Thomas, and Falcon 2011), which took place in 2009. *HCMST* is a nationally representative longitudinal survey of English-speaking adults in the U.S., which oversamples lesbian and gay respondents (for a more detailed description of survey design, see Rosenfeld and Thomas 2012). For German couples, analyses are based on data from the first waves of the German Family Panel (*pairfam*), and the supplemental project 'Demographic Differences in Life Course Dynamics in Eastern and Western Germany' (*DemoDiff*), release 5.0 (Nauck et al. 2014). *pairfam* contains information on the partnership and fertility trajectories of men and women born in 1971–1973, 1981–1983, and 1991–1993. A detailed description of the *pairfam* study and its cohort stratified random sample can be found in Huinink et al. (2011). *DemoDiff* consists of an oversample of Eastern German respondents born in the years 1971–1973 and 1981–1983 (Kreyenfeld et al. 2011). The *pairfam* data were gathered between 2008 and 2009, while *DemoDiff* data were gathered between 2009 and 2010.

Both U.S. and German surveys are largely interested in respondents who are in either a married or unmarried partnership, and inquire about the main socio-demographic characteristics of the respondent and their current partner, various aspects of their relationship, as well as the circumstances in which they met. For the *HCMST* survey, respondents were asked to recall how and where they originally met their partner, both in closed-ended and open-ended questions. Based on the answers to the open-ended question, the data managers created a scheme of meeting settings, which they used in recoding the original answers. In the case of *pairfam* and *DemoDiff*, respondents answered a close-ended question regarding how they met their partner.

Among the 4,002 respondents in the *HCMST* data set, 3,009 declared to be in a romantic relationship at the time of the first wave. After removing cases with missing data on one of the variables of interest, the analysis is performed on a final sample of 2,970 partnered respondents, aged between 19-95 years old. The combined *pairfam* and *DemoDiff* sample size comprises of 13,891 respondents, out of which 8,381 were in a partnership at the time of data collection. The final *pairfam/ DemoDiff* sample used in this study consists of 8,144 partnered respondents with non-missing individual or couple information. As previously indicated, the *pairfam/ DemoDiff* data target younger respondents (i.e., aged between 14-39 years old).

Measurement of variables

The main characteristics examined in this research are respondent's and partner's educational level, race/ ethnicity, and religion. In the U.S. sample, *education* is a categorical variable which distinguishes between 'less than high school', 'high school degree', 'some college', and 'bachelor's degree or higher'. In the German sample, the classification of educational level includes 9 categories according to the International Standard Classification of Education (ISCED) code adapted to the German institutional context. I recode this variable into the following 4-category scheme: 'currently enrolled' (referring to persons who are still enrolled in the German educational system), 'low' (including no degree and lower secondary education), 'medium' (upper secondary and post-secondary non-tertiary education), and 'high' (first and second stage of tertiary education).

In the U.S. sample, *race/ ethnicity* is a four-category variable with the following options: non-Hispanic White (reference group), non-Hispanic Black, Hispanic, and other. The first three categories are featured in the original coding of the data set, while the 'other' category was constructed by the author to include the non-Hispanic Asian or Pacific Islander, non-Hispanic American Indian, and non-Hispanic other racial groups due to insufficient cases. In the German sample, *race/ ethnicity* distinguishes between native German, ethnic German immigrants (Aussiedler, referring to German minorities resettled from Eastern Europe), Turkish background (either first or second generation), and other (referring to half-Germans and non-Germans of non-Turkish origins). The variable measuring respondent's race/ ethnicity was constructed based mainly on mother's and father's country of birth. Given lack of information on the origin of partner's parents, partner's race/ ethnicity was gauged by looking at nationality.

In the *HCMST* data set, *religion* is a categorical variable that measures both partners' religious affiliation at age 16. It differentiates between the following: Catholic, other Christian (broad recoded category referring to Baptist, Protestant, Mormon, Pentecostal, Eastern Orthodox, other Christian), non-Christian (generic recoded category including Jewish, Muslim, Hindu, Buddhist, other non-Christian), and no religion. Unfortunately, the variable measuring partner's

religion in the *pairfam/ DemoDiff* survey contains too many missing cases to be used in the analysis. Therefore, we also discard information referring to respondent's religion.

The categorization of *meeting settings* in the *HCMST* data set is based on the multiple answers to the open-ended question of how respondents met their partner (as coded by the data managers). The original classification comprises of various meeting settings and intermediaries (associated with either respondent or partner). To ensure maximum comparability of results between U.S. and German data, I constructed the following ten categories: 1) Internet venues (including online dating platforms, online social networking sites, Internet gaming websites, Internet chat rooms, Internet communities, and other Internet settings); 2) friends; 3) family; 4) neighbors (i.e., having met as neighbors or through neighbors); 5) leisure (broad recoded category that refers to non-organized socially constructed settings and that includes having met through the following: bar, restaurant, other public social gathering place, public space, private party, blind date, vacation, business trip); 6) workplace (having met as co-workers or through co-workers, or as part of a customer-client relationship); 7) school (includes school and college); 8) religious venues (referring to church or other religious organizations); 9) voluntary organizations (e.g., social organization, health club/ gym, volunteer service activity), and finally 10) other settings (broader category that refers to military service, non-Internet singles service, and (non-specified) others). 48.7 percent of respondents mention one meeting setting. However, a great deal of participants reports two or more meeting venues. In order to properly contrast the Internet setting with each of the remaining nine meeting venues, I remove any potential overlap associated with this particular category. I therefore assume that the intermediary for individuals that met their partner online is primarily and exclusively the Internet. The data in fact show little overlap of the first setting category with the other settings, with most of overlapping cases referring to a combination of Internet and leisure settings. This is potentially related to the fact that individuals that first get to know each other through online venues eventually decide to meet face-to-face in public places such as bars or restaurants (as detailed responses to the open-ended questions also confirm). However, as mentioned above, I assume the Internet as the only meeting setting and treat it as mutually exclusive with respect to the other categories. The other categories nonetheless remain unchanged and non-mutually exclusive with respect to one another[2].

The *pairfam/ DemoDiff* survey applied the following single-answer classification of seven meeting settings: Internet, friends, family, leisure, work & school, voluntary organizations, and others. As opposed to the German sample, the U.S. data allows the differentiation between the two partnership markets of school and work.

Other variables of interest in both U.S. and German surveys comprise of: respondent's age at the time of the survey, number of children in respondent's household, and the length of the relationship (in years). There are also three dichotomous variables indicating whether the respondent is part of a same-sex couple, a married couple, or had been previously married.

Analytical Strategy and Results

Descriptive statistics will be first presented to examine the key socio-demographic characteristics of the partnered individuals included in our samples, in connection to the various meeting settings. Using the *logmult* package (Bouchet-Valat 2014) in R, I then fit log-multiplicative uniform difference (hereafter: unidiff) models (Erikson and Goldthorpe 1992), also referred to as log-multiplicative layer effect model (Xie 1992), to examine variations in the strength of partners' association between meeting settings. The models represent a variant of log-linear models commonly used in the analysis of cross-tabulated data (Agresti 1996; Hout 1983). Emerged in the literature on comparative social mobility, the *unidiff* model is here applied to the context of couple endogamy and meeting settings. The model is based on three-way cross-classifications of both partners' characteristics and meeting settings (4 x 4 x 10 = 160 cells for the U.S. sample; 4 x 4 x 7 = 112 cells for the German sample). The weighted[3] cell distributions that form the basis for the analysis can be found in the Appendix (Tables A1A and A1B). *Unidiff* models require all cross-classified tables to display a common pattern of association (Xie 1992), meaning greater odds that partner's characteristics are the same rather than different. Within the *unidiff* framework, the strength of this association is allowed to vary across settings. The models therefore estimate setting-specific association parameters. A constraint is imposed that all log odds ratios (i.e., corresponding to all four educational/ ethno-racial/ religious groups) evenly increase or decrease compared to a reference meeting setting.

The mathematic description of the models is specified below:

$$\text{Log}(F_{ijk}) = \lambda_i + \lambda_j + \lambda_k + \lambda_{ik} + \lambda_{jk} + \exp(\omega_k)\beta_{ij},$$

where *i* indexes the categories of the row variable (i.e., partner *i*), *j* indexes the categories of the column variable (partner *j*), *k* indexes meeting setting, and F_{ijk} is the expected number of couples in each cell of the cross-classified tables. The λ_i and λ_j parameters adjust for the marginal distributions of partner's *i* and partner's *j* characteristics. In different-sex couples, the male partner is assigned partner *i*, while the female partner is assigned partner *j*. In same-sex couples, the respondent in the data set is partner *i*, while the respondent's partner is assigned partner *j*. The λ_k parameter adjusts for the numbers of couples associated with different meeting settings, while the λ_{ik} and λ_{jk} parameters control for the differences in partners' characteristics across all types of settings. Finally, β_{ij} represents the general pattern of association between partner *i* and partner *j*, and $\exp(\omega_k)$ is a multiplicative term that applies to all cells in the table and that represents the relative strength of the association at a particular level (or layer) *k*. The multiplier is specified as an exponential in order to ensure a nonnegative multiplicative interaction. The *unidiff* models estimated in this study specify a full-interaction baseline pattern of association (for details, see Hout 1983) between partner *i* and partner *j*. The parameter for the reference setting is constrained to zero, which means that the coefficients for each of the remaining nine (in the U.S. sample)/ six (in the German sample) settings represent deviations from the baseline category. Given this study's goal of examining the extent to which online venues promote endogamy, the Internet context is set as the reference level. I report exponential layer scores and goodness-of-fit statistics for each model. Given that the Bayesian Information Criterion (BIC; Raftery 1986) tends to favor more parsimonious models when dealing with small-size samples (Weakliem 1999), I mostly rely on the log-likelihood-ratio statistic (L^2) in selecting the model with the best fit.

Descriptive Results

Tables 1A and 1B present descriptive statistics for the U.S and German data used in the analyses of educational, racial/ ethnic, and religious endogamy, by meeting setting. Most U.S. respondents mention having met their partner via leisure settings (40.3%) or through friends (36.6%), whereas German respondents most often specify that they met their match via friends (33.3%).

Individuals who selected their partner through the Internet comprise 7 % of the U.S. sample, and 5.7% in the German sample. 70.5% of U.S. respondents who met their partner online have at least some college education, compared to only 44.1% in the case of those that were introduced to their partner through family members. In the German sample, individuals who met their partner through the Internet are mostly of medium education or currently enrolled. Whereas in the U.S. case, non-White respondents (particularly Hispanics) are greatly represented among those who met their match through online venues, in the German sample natives and ethnic Germans are highly numerous among those that met their partner online. In both U.S. and German samples, online settings are more frequently linked to same-sex couples, younger respondents and relationships of shorter duration. Finally, individuals who met their partner online are less likely to be married and have resident children, but also more likely to have been previously married.

TABLE 1A AND 1B HERE

Results from the Log-multiplicative Unidiff Models

First of all, to assess if the *unidiff* model provides the best fit to the data, I compare its goodness of fit to four benchmark models. First, I fit the null association (NA) model, which assumes that partners' characteristics are unrelated in each meeting setting. Second, the constant association model adds 9 = (4-1)*(4-1) extra parameters that estimate partner *i* by partner *j* association, but assumes the association to be constant across all meeting settings. Third, the endogamy model includes an interaction between meeting setting and an endogamy dichotomous term for whether the partners are similar or not, thus adding 10 = 1 + 1*(10-1) extra parameters to the NA model in the U.S. case, and 7 = 1 + 1*(7-1) extra parameters in the German case. Fourth, a scores' model introduces an interaction between meeting setting and a product score between each partners' educational score, also adding 10 (U.S.)/ 7 (Germany) extra parameters to the NA model. This model is suitable with data that have some ordering of categories, which means that it is fitted for education-related data only. Lastly, the *unidiff* model tests for between-setting differences in the strength of partners' association, therefore having 9 extra parameters in the

U.S. case and 6 extra parameters in the German case, in comparison to the constant association model. The formulas for the four additional models described above are as follows:

Null association model: $\text{Log}(F_{ijk}) = \lambda_i + \lambda_j + \lambda_k + \lambda_{ik} + \lambda_{jk}$

Constant association model: $\text{Log}(F_{ijk}) = \lambda_i + \lambda_j + \lambda_k + \lambda_{ik} + \lambda_{jk} + \lambda_{ij}$

Endogamy model: $\text{Log}(F_{ijk}) = \lambda_i + \lambda_j + \lambda_k + \lambda_{ik} + \lambda_{jk} + \delta_k$, where $\delta = 1$ if $i = j$, 0 otherwise.

Scores' model: $\text{Log}(F_{ijk}) = \lambda_i + \lambda_j + \lambda_k + \lambda_{ik} + \lambda_{jk} + \alpha_k$, where $\alpha = i * j$.

As results corresponding to U.S. data in Table 2A show, adjusting for the association between partner *i* and partner *j* in the constant association model produces a large and significant improvement in fit in connection to all three types of characteristics, reducing the goodness-of-fit chi-square drastically from 1680 to 201.7 (for education), from 3077.5 to 186.5 (for race/ ethnicity), and from 1501.9 to 226.6 (for religion). Both the endogamy model and the scores' model fit the data poorly, increasing the likelihood ratio chi-square. The *unidiff* models however further improve the fit to the data in comparison to the constant association model. For education, the goodness-of-fit chi-square is 134.8 (*df* = 72), a reduction of 66.9 on 9 *df*. For race, the likelihood ratio test statistic is 152.4 (*df* = 72), a decrease of 34.1 on 9 *df*. Finally, for religion, the chi-square statistic is 154.9 (*df* = 72), a reduction of 71.7 on 9 *df*. Even though according to the BIC test, the constant association models appear as the best-fitting models (i.e., have the smallest values), the *unidiff* models are the best fit to the data according to the likelihood ratio test, which is better suited for the small-size groups used in this study. Table 2B contains results corresponding to German data, which similarly indicate a good fit of *unidiff* models of educational and racial/ ethnic endogamy.

TABLE 2A AND 2B HERE

To investigate assortative mating patterns in online dating compared to other places of meeting and mating, I now proceed to analyzing the setting-specific patterns revealed by the multiplicative interactions. Tables 3A and 3B provide the exponential layer estimates based on the *unidiff* models of educational, racial/ ethnic, and religious endogamy. Recall that in conjunction with our theoretical discussion related to the supply side perspective of partnership

choices, the study put forth two competing hypotheses, namely that in comparison to offline conventional meeting settings, the Internet would promote either *more* or *less* educational, racial/ ethnic and religious endogamy. Findings in Tables 3A and 3B show that the data largely support the second hypothesis. Looking at education, results in Table 3A indicate that, compared to the Internet, friends, neighbors, religious venues and particularly school settings in the U.S. promote more similarity between partners in terms of educational attainment. With the exception of the category 'others', the remaining settings also display stronger associations between partners' educational level, but the differences are non-significant. In the German case, friends, work and school settings, and voluntary associations are linked to significantly more educational endogamy than online venues (Table 3B). Though non-significant, leisure settings display a slightly lower association between partners' educational level, compared to the Internet.

Findings also show that in both countries, online settings are associated with lower racial/ ethnic endogamy compared to all other meeting venues. Almost all differences are significant, with the largest racial/ ethnic endogamy scores encountered for religious venues, neighbors, and family in the U.S., and family and friends in Germany. Finally, in the U.S. the Internet is shown to have a significantly weaker association between partners' religion compared to all offline settings. Religious endogamy seems to be particularly favored by religious settings, as well as by family, or school settings.

TABLE 3A AND TABLE 3B HERE

Additional Analyses

Given that the two data-sets capture prevailing relationships at the time of the survey instead of recently formed partnerships, one needs to account for the fact that similarity might not be determined by assortative mating only. Partners in long-lasting relationships could also influence each other's characteristics (Kalmijn 2005). One way of controlling for subsequent adjustments after a partnership is formed is to include a factor of relationship duration. However, due to difficulty of including a high number of covariates in *unidiff* models and in log-linear analyses in general, I proceed with running additional *unidiff* analyses on a sub-group of respondents in short-duration partnerships[4]. This strategy is also meant to minimize the issue of selective relationship exists and the fact that exogamous couples have a higher risk of union dissolution

(Kalmijn, de Graaf, and Janssen 2005), which overstates the level of endogamy among long-term partnerships.

Table 4A and 4B reports layer estimates of educational and racial/ ethnic endogamy in the U.S. and Germany, for short-duration couples. Since respondent's and partner's religion were gauged by looking at religious affiliation at age 16, the possibility of partners' convergence in traits over time distorting results in the case of religious endogamy in the U.S. is excluded. Therefore, I only examine endogamy patterns for short-duration partnerships in connection to education and race/ ethnicity. There are certain deviations from patterns observed for the total sample when it comes to short-duration partnerships. Respondents in unions not longer than 5 years who met their partner online are significantly less endogamous with respect to education only compared to those who met their partner through school (in the U.S.) and workplace and school combined (in Germany). Furthermore, short-duration couples forged on the Internet in the U.S. are significantly less endogamous with respect to race/ ethnicity than those established through intermediaries such as leisure, family, and school. In Germany, online settings are associated with significantly lower racial/ ethnic endogamy only compared to family.

TABLE 4A AND TABLE 4B HERE

Due to the small sample size of the HCMST data set and the previously mentioned difficulty of including multiple covariates in *unidiff* models, I also estimate supplementary logistic regression models of endogamy, which include a series of continuous and categorical control variables. Educational, ethno-racial, and religious endogamy are dummy-coded variables with the value '1' indicating that partners share the same educational level, racial background, and religious affiliation respectively. For each characteristic I estimate a model that includes the effect of meeting settings, respondent's main characteristic (e.g., respondent's educational level for the educational endogamy model), and a series of controls measuring the following: type of couple (opposite-sex versus same-sex), being married, having been previously married, respondent's age at the time of the survey, number of children in respondent's household, and length of the relationship (in years). Recall the multiple-answer that meeting setting was measured with in the HCMST survey and that the 'Internet' category was the only one with no overlap with other categories. Therefore, for the U.S. model, I exclude the dummy variables measuring meeting over the Internet. Since the model controls for other meeting settings, the

estimated effect of ‘family’, for instance, is the net effect of family versus the Internet. Tables A2A and A2B (Appendix) report findings for these analyses and largely confirm previous results obtained when examining short-term partnerships only. Couples that met over the Internet in the U.S. are significantly less educationally endogamous than those that met via school and less racially endogamous than those that met through family members (Table A2A). Moreover, the Internet is associated with significantly lower religious endogamy compared to religious venues, school, and family. For Germany, Table A2B shows that partnerships formed in online settings display significantly lower educational endogamy than those formed via work and school combined, and lower racial/ ethnic endogamy compared to partnerships established via family and friends.

Discussion and Conclusions

This study revisited the supply perspective (Blau 1977, 1994; Feld 1984; Marsden 1990) on assortative mating by exploring the role played by digital marriage markets in breeding couples' socio-demographic similarity. More precisely, it focused on the educational, racial/ ethnic and religious endogamy of couples that met through online venues compared to couples formed through traditional intermediaries such as friends, family, neighbors, school, workplace, leisure, religious venues, voluntary organizations, and other settings. The study explored the importance of meeting venues for couples' endogamy among 2,970 partnered individuals in the U.S. and 8,144 partnered individuals in Germany. The two unique sources of survey data enabled an innovative test of assortative mating in online settings. The study put forward two opposing hypotheses about the link between the Internet as context of meeting and couples' similarity. Due to the particularities of its market (i.e., access to a large pool of prospective mates, possibilities of browsing along key socio-demographic traits and easily screening for partners with a similar background), I first anticipated that the Internet allow individuals to more effectively choose according to the universally assumed preference for similarity (Kalmijn 1998) and would thus promote more endogamy compared to conventional meeting settings. On the other hand, online venues represent an environment that ensures increased exposure to socio-demographic diversity and a reduced influence of third parties usually known to enforce endogamous norms (Rosenfeld & Thomas 2012; Schwartz 2013), which would lead to decreased levels of couple endogamy.

Using log-multiplicative uniform difference models that allows for the strength of partners' association to vary along meeting settings, I find that the data confirm the second hypothesis, but only to a certain extent. In both countries online settings display weaker endogamy patterns compared to conventional settings usually linked to high couple endogamy rates, such as school, personal networks of family (and friends to a lower extent), or religious venues. School settings are confirmed as contexts that promote high levels of positive sorting along education or religion (Kalmijn and Flap 2001). Family networks are also shown to promote more endogamy than online settings, especially with respect to the ascribed characteristics of race/ ethnicity and religion, reflecting the high level of homogeneity of family-based ties (Mcpherson, Smith-Lovin, and Cook 2001). Organized and highly homogenous

religious settings (Feld 1984) foster high levels of couple similarity as well, particularly when it comes to religion. When compared to other, generally more heterogeneous contexts of meeting and mating such as leisure, work (in the U.S.), or voluntary organizations, the Internet does not reveal significantly different patterns of couple endogamy.

First, these findings suggest that Internet's advantage of providing systemized tools and resources for meeting and connecting with similar others and an easily accessible supply of prospective partners do not translate into more endogamous partner choices. The fact that online venues favor less endogamy than school, family or religious venues contests the universal norm of similarity between partners. As Lampard (2007) suggests, individuals differ in how much they prefer to partner with similar others and also adjust their choice for meeting venues accordingly. Individuals who are open to matching with dissimilar others will self-select in contexts of meeting that allow for the realization of exogamous preferences. Benefiting from the diversity and lower social control that characterize online partnering markets (Rosenfeld and Thomas 2012), Internet users find it easier to choose partners with different socio-demographic profiles. Furthermore, the particularities of individuals who met their partner through the Internet (e.g., previously married) could play an additional role. Being divorced and facing the more restrictive second marriage market is presumed to alter standards for partner selection (Harknett 2008) and bring about more openness towards potential partners from different backgrounds. Moreover, traits like partner's education were previously shown to represent less conspicuous criteria in re-partnering choices, with educational endogamy being less common among second marital unions than first ones (Shafer 2013). Finally, it is possible that online mate selection de-emphasizes similarity with respect to socio-demographic characteristics while accentuating similarity in personality traits, lifestyle or leisure interests.

This study provides a novel test of assortative mating in connection to the recent and increasingly popular online settings of partner selection. In fostering lower forms of couple similarity than the traditional matchmakers of school, family, and church, the Internet plays a potential role in alleviating social barriers between groups and could contribute to the overall decreasing trends in couple endogamy in both U.S. and Germany. Despite refuting skeptics' point of view (Henry-Waring & Barraket 2008) in showing that online settings reduce the 'amount' of educational, racial/ ethnic and religious endogamy in comparison to certain (though

not all) marriage markets, results are still far from confirming Barlow's (1996) initial prediction according to which cyberspace would eventually eradicate boundaries of status and race.

Finally, there are certain limitations of this study that need to be acknowledged. As with previous other studies that try to examine the supply side perspective of mate choice (Kalmijn and Flap 2001; Mollenhorst, Völker, and Flap 2008a), this research also falls short in inspecting the actual composition of networks and contexts of interaction mediating the formation of couples. Furthermore, the modest size of the two data sets did not allow for a more refined examination of the endogamy (or off-diagonal) patterns of subgroups (e.g., lower educated versus higher educated, Whites versus Blacks). Future research should also address the potential interdependence between education and race-related partner choices and provide a test of status exchange theory (Merton 1941) in digital marriage markets. Other shortcomings refer to measurement limitations and include the impossibility to examine religious endogamy for German couples or to differentiate between different levels of already attained educational qualifications among the currently enrolled respondents in the German data set, as well as the inability to distinguish between various Internet settings, more precisely between online contexts specifically designed for partner selection (i.e., online dating platforms) and 'natural' online settings (Sprecher 2009, 767).

Notes

1. Throughout this study, 'online/ Internet dating' refers to finding a partner in either one of the following online settings: online dating platforms, Internet social networking, Internet gaming website, Internet chat, Internet community etc. When solely referring to dating websites that provide a platform for their members to select and get in contact with potential partners, the expression 'online/ Internet dating platforms' will be used.
2. I acknowledge that is a shortcoming of the data. The fact that offline settings are non-mutually exclusive introduces a certain bias to the analyses (e.g., lack of independence between observations, inflated sub-sample sizes for the offline settings, inability to compare offline settings due to overlapping cases). The author considered multiple solutions, such as randomly assigning a single setting to these multi-setting respondents (but that would have lead to loss of information), creating joint categories such as 'meeting through school AND friends' (but the combinations are too many and lead to very small sub-samples) or choosing one setting as primary setting based on individuals' open-ended responses (but this leads to rather arbitrary decisions). I therefore took up none of these solutions, also motivated by the main objective of the paper, which is not to make extensive comparisons between various settings, but rather focus on the online versus non-online settings comparison, which is also why the Internet is an exclusive category with no overlap with other settings.
3. For the *HCMST* data, the weights mainly adjust for the oversampling of self-identified gay and lesbian respondents, whereas the weights used in the analysis of German data correct for disproportionate sampling across cohorts. For U.S. data, applying the original weight lead to over-sized weighted counts and an effective sample size that is the same as the U.S. population of partnered individuals. To avoid the shrinking of standard errors and the inflation of the goodness of fit test, weights were rescaled to reflect the actual *HCMST* sample size. Moreover, I also ran additional analyses based on unweighted cross-tabulations with similar results for both U.S. and German samples.
4. Short-duration relationships are defined as partnerships not longer than five years. This cut-off point was chosen to ensure a proper sub-sample size that could allow for the estimation of *unidiff* models.

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Table 1A. Respondent and Couple Characteristics, by Meeting Setting (*U.S.*)

	Internet	Friends	Family	Neighbors	Leisure	Workplace	School	Religious venues	Voluntary organizations	Others
All couples	7	36.6	17.8	9.5	40.3	18.6	19.3	6.6	7.6	6.6
Respondent's education										
Less than high school	6.7	11.4	19.1	13.8	14.3	9.4	5.9	10.7	9.8	21.4
High school	22.9	33.1	36.9	28.0	33.8	37.8	19.8	24.0	26.7	31.1
Some college	36.7	24.3	23.1	23.8	24.1	26.4	28.1	23.5	28.0	29.1
Bachelor's degree or higher	33.8	31.2	21.0	34.4	27.8	26.4	46.2	41.8	35.6	18.4
Respondent's race										
White	63.8	72.7	74.3	81.6	69.3	73.6	74.0	79.6	73.0	69.2
Black	8.1	7.6	7.2	7.1	10.9	8.7	8.0	8.2	10.6	7.2
Hispanic	20.5	14.1	12.9	10.2	14.1	15.4	12.2	10.2	10.2	15.4
Other	7.6	5.6	5.7	1.1	5.6	2.4	5.8	2.0	6.2	8.2
Respondent's religion										
Catholic	24.3	27.3	30.8	23.3	30.0	29.8	23.4	14.3	28.3	26.2
Other Christian	55.7	54.2	52.6	64.7	52.0	52.8	60.2	80.1	60.2	52.8
Non-Christian	8.1	4.6	6.2	3.2	5.2	3.8	4.5	3.6	2.7	10.3
No religion	11.9	13.8	10.4	8.8	12.9	13.6	11.9	2.0	8.8	10.8
Same-sex couple	6.7	1.2	0.4	1.4	1.8	2.0	1.2	0.5	3.6	1.0
Married couple	46.9	72.9	78.3	75.9	73.0	75.0	80.8	88.2	66.8	82.1
Previously married	41.6	23.0	26.0	22.3	28.5	33.8	7.2	19.4	24.4	32.7
					Mean (Standard Deviation)					
Respondent's age (range: 19-95)	36.82 (11.99)	44.75 (16.25)	47.35 (16.64)	44.96 (16.44)	48.13 (16.45)	46.57 (15.1)	40.03 (16.52)	44.79 (18.77)	44.85 (17.9)	52.67 (17.42)
Number of children in respondent's household (range: 0-7)	0.47 (0.87)	0.52 (0.89)	0.58 (0.96)	0.48 (0.83)	0.51 (0.94)	0.60 (0.96)	0.66 (1.06)	0.63 (1.03)	0.49 (0.93)	0.47 (0.89)
Length of relationship (range: 0.05-76)	4.41 (4.49)	18.49 (15.67)	21.44 (16.86)	19.95 (16.02)	20.32 (16.58)	18.15 (14.74)	19.25 (16.49)	19.24 (16.44)	16.17 (15.11)	26.10 (19.48)
N (unweighted)	*280*	*1,052*	*449*	*268*	*1,200*	*549*	*532*	*198*	*291*	*187*

Note: Values weighted using rescaled survey design weights (*weight2*).
Source: HCMST, wave I.

Table 1B. Respondent and Couple Characteristics, by Meeting Setting (*Germany*)

	Internet	Friends	Family	Leisure	Workplace & school	Voluntary organizations	Others
All couples	5.7	33.3	5	17.7	22.5	8.8	7
Respondent's education							
Currently enrolled	34.8	26.7	12.9	11.9	28.0	22.2	18.1
Low	7.1	8.4	31.3	8.3	4.7	3.2	11.7
Medium	40.0	44.8	42.6	56.7	35.7	46.3	48.1
High	18.2	20.1	13.2	23.1	31.5	28.3	22.2
Respondent's race/ ethnicity							
German	78.7	72.6	38.5	76.7	78.7	85.9	71.5
Ethnic German	6.4	7.0	7.0	5.4	3.8	1.7	6.8
Turkish background	1.9	4.6	25.1	3.6	2.2	1.1	4.7
Other	13.0	15.8	29.4	14.3	15.2	11.3	17.1
Same-sex couple	4.7	0.6	0.3	0.8	1.0		0.8
Married couple	18.2	44.2	69.4	57.6	44.2	47.9	48.0
Previously married	7.8	2.4	2.2	2.4	2.8	2.3	5.6
				Mean (Standard Deviation)			
Respondent's age (range: 14-39)	26.12 (7.97)	27.94 (7.86)	30.01 (7.06)	30.73 (6.61)	28.59 (8.11)	29.16 (7.94)	29.98 (7.53)
Number of children in respondent's household (range: 0-10)	0.37 (0.75)	0.82 (1.07)	1.46 (1.28)	1.00 (1.05)	0.83 (1.06)	0.83 (1.03)	1.01 (1.19)
Length of relationship (range: 0.00-35.5)	2.43 (2.58)	6.63 (6.01)	8.74 (6.64)	8.45 (6.19)	6.87 (6.29)	7.68 (6.44)	7.24 (6.13)
N (unweighted)	*448*	*2,691*	*395*	*1,513*	*1,808*	*700*	*589*

Note: Values weighted using survey design weights (*d1weight*).
Source: pairfam/DemoDiff, wave I.

Table 2A. Goodness-of-Fit Statistics for Selected Models of Educational, Racial/ Ethnic and Religious Endogamy (*U.S.*)

Model	*df*	L^2	*p*	*BIC*
Educational endogamy				
Null association model (NA)	90	1680.0	0.0	912.7
Constant association model (NA + partners' association)	81	201.7	0.0	-488.8
Endogamy model (NA + endogamy * setting)	80	715.6	0.0	33.6
Scores' model (NA + score * setting)	80	313.3	0.0	-368.8
Unidiff model (NA + partners' association * setting)	72	134.8	0.0	-479.0
Racial/ ethnic endogamy				
Null association model (NA)	90	3077.5	0.0	2310.2
Constant association model (NA + partners' association)	81	186.5	0.0	-504.1
Endogamy model (NA + endogamy * setting)	80	535.8	0.0	-146.3
Unidiff model (NA + partners' association * setting)	72	152.4	0.0	-461.5
Religious endogamy				
Null association model (NA)	90	1501.9	0.0	734.6
Constant association model (NA + partners' association)	81	226.6	0.0	-464.1
Endogamy model (NA + endogamy * setting)	80	306.7	0.0	-375.4
Unidiff model (NA + partners' association * setting)	72	154.9	0.0	-459.0

Note: 160 cells. *df* represents residual degrees of freedom. L^2 is the likelihood ratio chi-square for goodness of fit. *p* is the probability $P(\chi^2_{df}) \geq L^2$. *BIC* is the Bayesian Information Criterion statistic.

Table 2B. Goodness-of-Fit Statistics for Selected Models of Educational, and Racial/ Ethnic Endogamy (*Germany*)

Model	*df*	L^2	*p*	*BIC*
Educational endogamy				
Null association model (NA)	63	3491.1	0.0	2929.8
Constant association model (NA + partners' association)	54	95.1	0.0	-385.9
Endogamy model (NA + endogamy * setting)	56	1301.5	0.0	802.6
Scores' model (NA + score * setting)	56	367.5	0.0	-131.4
Unidiff model (NA + partners' association * setting)	48	63.6	0.1	-364.0
Racial/ ethnic endogamy				
Null association model (NA)	63	2407.4	0.0	1846.2
Constant association model (NA + partners' association)	54	65.6	0.1	-415.5
Endogamy model (NA + endogamy * setting)	56	405.2	0.0	-93.7
Unidiff model (NA + partners' association * setting)	48	53.2	0.3	-374.4

Note: 112 cells. *df* represents residual degrees of freedom. L^2 is the likelihood ratio chi-square for goodness of fit. *p* is the probability $P(\chi^2_{df}) \geq L^2$. *BIC* is the Bayesian Information Criterion statistic.

Table 3A. Layer Estimates Based on *Unidiff* Models of Educational, Racial and Religious Endogamy (*U.S.*)

	Educational endogamy	Racial/ ethnic endogamy	Religious endogamy
Meeting setting:			
Internet (reference)	1.00 (0.00)	1.00 (0.00)	1.00 (0.00)
Friends	1.59 (0.22)*	1.34 (0.14)*	3.67 (0.48)**
Family	1.31 (0.23)	1.72 (0.14)***	4.55 (0.48)**
Neighbors	1.82 (0.23)**	1.71 (0.17)**	2.60 (0.50)†
Leisure	1.33 (0.22)	1.38 (0.13)*	3.59 (0.48)**
Workplace	1.04 (0.24)	1.20 (0.15)	2.91 (0.48)*
School	2.13 (0.22)***	1.55 (0.14)**	4.36 (0.48)**
Religious venues	1.56 (0.25)†	1.84 (0.19)**	6.19 (0.49)***
Voluntary organizations	1.08 (0.26)	1.36 (0.17)†	4.00 (0.49)**
Others	0.68 (0.36)	1.19 (0.18)	3.97 (0.49)**

Note: Standard errors are in parentheses.
† $p<.10$ * $p<.05$ ** $p<.01$ *** $p<.001$ (two-tailed tests)

Table 3B. Layer Estimates Based on *Unidiff* Models of Educational, and Ethnic Endogamy (*Germany*)

	Educational endogamy	Racial/ ethnic endogamy
Meeting setting:		
Internet (reference)	1.00 (0.00)	1.00 (0.00)
Friends	1.20 (0.09)*	1.37 (0.13)*
Family	1.07 (0.14)	1.50 (0.14)**
Leisure	0.97 (0.11)	1.27 (0.14)†
Workplace & school	1.36 (0.09)**	1.28 (0.14)†
Voluntary organizations	1.25 (0.11)*	1.24 (0.17)
Others	1.30 (0.11)*	1.27 (0.15)

Note: Standard errors are in parentheses.
† $p<.10$ * $p<.05$ ** $p<.01$ *** $p<.001$ (two-tailed tests)

Table 4A. Layer Estimates Based on *Unidiff* Models of Educational, and Racial/ Ethnic Endogamy, for Short-Duration Couples (*U.S.*)

	Educational endogamy	Racial/ ethnic endogamy
Meeting setting:		
Internet (reference)	1.00 (0.00)	1.00 (0.00)
Friends	1.30 (0.24)	1.29 (0.19)
Family	1.17 (0.30)	1.51 (0.21)†
Neighbors	1.11 (0.36)	1.12 (0.34)
Leisure	1.12 (0.25)	1.51 (0.18)*
Workplace	0.68 (0.41)	1.00 (0.26)
School	2.18 (0.25)**	1.49 (0.22)†
Religious venues	1.07 (0.42)	1.05 (0.30)
Voluntary organizations	0.46 (0.67)	1.37 (0.28)
Others	0.12 (4.14)	0.90 (0.38)

Note: Standard errors are in parentheses.
† $p<.10$ * $p<.05$ ** $p<.01$ *** $p<.001$ (two-tailed tests)

Table 4B. Layer Estimates Based on *Unidiff* Models of Educational, and Racial/ Ethnic Endogamy, for Short-Duration Couples (*Germany*)

	Educational endogamy	Racial/ ethnic endogamy
Meeting setting:		
Internet (reference)	1.00 (0.00)	1.00 (0.00)
Friends	1.15 (0.11)	0.95 (0.14)
Family	1.03 (0.20)	1.37 (0.18)†
Leisure	0.96 (0.14)	1.02 (0.16)
Workplace & school	1.32 (0.11)*	1.00 (0.16)
Voluntary organizations	1.19 (0.14)	1.18 (0.20)
Others	1.23 (0.15)	0.71 (0.23)

Note: Standard errors are in parentheses.
† $p<.10$ * $p<.05$ ** $p<.01$ *** $p<.001$ (two-tailed tests)

APPENDIX

TABLE A1A. Cross-tabulations of Partners' Characteristics by Meeting Setting (*U.S.*)

	Education				Race				Religion			
	I.	*II.*	*III.*	*IV.*	*I.*	*II.*	*III.*	*IV.*	*I.*	*II.*	*III.*	*IV.*
Internet												
I.	0	3	3	6	119	8	16	5	15	19	3	8
II.	1	21	14	10	3	11	0	0	28	64	10	9
III.	6	16	38	26	13	2	12	3	2	11	2	2
IV.	1	3	21	39	2	5	2	8	9	16	2	10
Friends												
I.	47	53	27	11	737	2	44	35	141	107	10	38
II.	45	152	78	41	7	69	7	2	94	424	10	33
III.	29	89	119	57	69	10	52	4	12	8	23	8
IV.	3	34	74	227	26	0	0	22	42	72	6	59
Family												
I.	48	45	18	6	375	2	19	16	103	42	6	8
II.	32	71	44	22	3	35	3	0	44	209	0	16
III.	10	64	40	26	14	1	41	1	1	4	18	7
IV.	2	17	31	53	9	0	0	12	11	37	11	14
Neighbors												
I.	13	24	4	4	217	0	10	2	32	25	1	8
II.	13	29	18	6	0	20	0	0	38	122	2	11
III.	3	36	26	19	18	0	12	2	3	5	2	0
IV.	1	3	20	66	1	0	0	1	7	17	4	6
Leisure												
I.	56	58	23	14	779	11	35	27	185	111	11	32
II.	54	178	94	51	15	93	20	1	128	444	10	44
III.	37	105	130	72	64	9	74	8	6	15	26	8
IV.	10	46	74	194	14	2	5	40	57	59	8	53
Workplace												
I.	10	18	17	4	381	1	23	10	79	53	9	16
II.	14	89	36	37	10	38	5	1	64	191	9	23
III.	7	59	62	33	46	1	27	0	3	8	9	3
IV.	3	32	43	89	8	2	0	1	19	42	1	24
School												
I.	16	13	16	1	407	0	13	14	71	37	3	10
II.	15	39	44	13	2	41	2	1	55	270	1	23
III.	4	21	74	45	27	0	26	8	7	8	10	5
IV.	0	7	48	214	16	3	0	11	8	32	2	28
Religious venues												
I.	4	6	0	6	148	0	4	6	21	9	0	0
II.	3	21	10	4	0	10	6	1	4	138	1	5
III.	7	15	27	10	7	0	10	0	0	2	3	2
IV.	1	9	11	61	2	0	0	0	2	9	0	0
Voluntary organizations												
I.	5	9	4	2	149	2	1	8	31	15	2	3
II.	6	15	26	9	3	16	1	0	28	97	1	11
III.	8	18	25	16	17	5	5	4	2	1	4	0
IV.	2	15	13	53	4	0	0	11	3	14	2	9
Others												
I.	1	20	6	1	118	0	7	17	35	17	0	1
II.	17	23	11	4	1	12	7	1	13	71	11	3
III.	11	24	22	12	11	1	6	2	3	2	10	3
IV.	4	13	11	14	5	0	1	5	1	16	0	11

Note: Education: I = less than high school; II = high school; III = some college; IV = bachelor's degree or higher. Race: I = White; II = Black; III = Hispanic; IV = other. Religion: I = Catholic; II = Other Christian; III = Non-Christian; IV = no religion.

TABLE A1B. Cross-tabulations of Partners' Characteristics by Meeting Setting (*Germany*)

	Education				Race/ ethnicity			
	I.	*II.*	*III.*	*IV.*	*I.*	*II.*	*III.*	*IV.*
Internet								
I.	53	12	11	5	294	16	1	32
II.	32	12	11	2	13	10	0	6
III.	35	17	117	18	6	0	2	1
IV.	6	5	47	39	23	3	1	14
Friends								
I.	258	47	55	10	1669	63	18	151
II.	172	81	83	9	61	111	1	34
III.	117	153	774	174	28	3	64	10
IV.	20	20	244	245	116	16	5	113
Family								
I.	14	7	2	0	136	4	6	24
II.	17	54	30	3	2	18	1	12
III.	14	61	94	11	11	0	74	2
IV.	2	5	33	22	16	7	3	56
Leisure								
I.	49	17	22	6	919	37	5	74
II.	19	32	52	7	27	35	0	17
III.	44	79	528	107	16	0	27	4
IV.	10	18	189	129	87	14	2	45
Workplace & school								
I.	244	54	45	19	1216	40	12	117
II.	55	36	31	8	32	29	1	16
III.	44	53	393	102	9	1	19	0
IV.	12	10	194	364	80	19	2	70
Voluntary organizations								
I.	70	5	11	4	535	12	3	41
II.	32	9	8	5	8	4	1	5
III.	19	21	195	56	0	0	3	1
IV.	8	3	105	104	25	3	0	13
Others								
I.	44	12	7	4	330	13	3	44
II.	14	27	18	2	14	21	0	7
III.	13	39	172	30	8	1	13	3
IV.	6	6	58	64	28	6	0	25

Note: Education: I = currently enrolled; II = low; III = medium; IV = high. Race/ ethnicity: I = German; II = Ethnic German; III = Turkish background; IV = other.

TABLE A2A. Logistic Regression Coefficients Predicting Educational, Racial/ Ethnic and Religious Endogamy (*U.S.*)

	Educational endogamy		Racial/ ethnic endogamy		Religious endogamy	
Meeting setting:						
Friends	0.17	(0.11)	-0.15	(0.17)	0.09	(0.11)
Family	-0.26	(0.14)	0.59*	(0.25)	0.33*	(0.15)
Neighbours	-0.06	(0.17)	0.16	(0.31)	-0.27	(0.18)
Leisure	0.12	(0.11)	0.29	(0.19)	0.14	(0.12)
Workplace	0.11	(0.14)	-0.10	(0.21)	-0.02	(0.15)
School	0.49***	(0.14)	0.30	(0.22)	0.48***	(0.14)
Religious venue	0.33	(0.19)	-0.02	(0.34)	1.03***	(0.24)
Voluntary organizations	-0.31	(0.18)	-0.28	(0.33)	0.09	(0.20)
Others	-0.46*	(0.22)	-0.67*	(0.30)	0.39	(0.24)
Respondent's education: (ref. less than high school)						
High school	0.27	(0.18)	0.43	(0.29)	0.04	(0.18)
Some college	0.27	(0.19)	0.15	(0.31)	-0.02	(0.19)
Bachelor's degree or higher	0.95***	(0.19)	0.24	(0.31)	-0.29	(0.19)
Respondent's race (ref. White)						
Black	-0.19	(0.20)	-1.31***	(0.25)	0.32	(0.19)
Hispanic	-0.38*	(0.16)	-3.36***	(0.20)	-0.14	(0.17)
Other	0.36	(0.30)	-2.96***	(0.33)	-0.19	(0.28)
Respondent's religion: (ref. Catholic)						
Other Christian	0.12	(0.13)	-0.33	(0.20)	0.67***	(0.13)
Non-Christian	0.32	(0.24)	-0.17	(0.38)	-0.72**	(0.26)
No religion	0.08	(0.18)	-0.41	(0.31)	-0.74***	(0.19)
Respondent's gender	-0.09	(0.10)	0.29	(0.17)	-0.10	(0.11)
Same-sex couple	0.33	(0.22)	-0.02	(0.41)	0.06	(0.27)
Married couple	0.15	(0.14)	0.45*	(0.20)	0.16	(0.14)
Previously married	-0.24*	(0.12)	0.06	(0.19)	0.08	(0.12)
Relationship length	-0.01*	(0.00)	0.01	(0.01)	0.01*	(0.00)
Number of children in respondent's household	0.16**	(0.06)	0.09	(0.09)	0.03	(0.06)
Intercept	-0.61*	(0.28)	1.62***	(0.47)	-0.24	(0.29)
χ^2	142.626***		382.283***		195.883***	

Notes: Models weighted using rescaled survey design weights (*weight2*). Standard errors are in parentheses.
* $p<.05$ ** $p<.01$ *** $p<.001$ (two-tailed tests)

TABLE A2B. Logistic Regression Coefficients Predicting Educational, and Racial/ Ethnic Endogamy (*Germany*)

	Educational endogamy		Racial/ ethnic endogamy	
Meeting setting:				
Internet (reference)				
Friends	0.08	(0.11)	0.40*	(0.18)
Family	-0.02	(0.16)	1.08***	(0.23)
Leisure	-0.03	(0.12)	0.03	(0.19)
Workplace & school	0.42***	(0.12)	0.24	(0.18)
Voluntary organizations	0.11	(0.14)	0.31	(0.20)
Others	0.22	(0.14)	0.06	(0.22)
Respondent's education: (ref. currently enrolled)				
Low	0.04	(0.11)	0.40*	(0.18)
Medium	1.14***	(0.08)	0.14	(0.12)
High	0.51***	(0.08)	0.03	(0.13)
Respondent's race (ref. German)				
Ethnic German	-0.27*	(0.11)	-2.43***	(0.12)
Turkish background	-0.36**	(0.14)	-2.58***	(0.15)
Other	-0.07	(0.07)	-3.64***	(0.10)
Respondent's gender	-0.11*	(0.05)	-0.09	(0.08)
Same-sex couple	-0.12	(0.27)	-0.71*	(0.32)
Married couple	-0.03	(0.07)	0.04	(0.12)
Previously married	0.02	(0.14)	-0.01	(0.21)
Relationship length	0.00	(0.01)	0.04***	(0.01)
Number of children in respondent's household	0.03	(0.03)	0.04	(0.05)
Intercept	-0.25	(0.14)	2.09***	(0.21)
χ^2	398.756***		1646.042***	

Notes: Models weighted using rescaled survey design weights (*d1weight*). Standard errors are in parentheses. * $p<.05$ ** $p<.01$ *** $p<.001$ (two-tailed tests)