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Educational Assortative Mating among Unmarried and
Married Couples
in Japan and the United States

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Abstract

This study is the first systematic attempt to distinguish the pattern of educational assortative mating between married and unmarried couples in Japan. As far as we know, none of the previous research investigated the pattern of educational association among unmarried couples. The most significant finding of our analysis is the difference in the pattern of educational assortative mating between married and courtship couples in Japan. Educational homogamy at the top and the bottom of the educational hierarchy characterizes the educational association among both unmarried and married partners. However, among married couples, there is apparently a stronger educational homogamy for couples who graduated from four-year universities and a propensity for women with junior college educations to marry men with B.A. degrees. Japanese unmarried couples seem to place less emphasis on the educational level of their partners than married couples. We speculate that Japanese youth hold different standards of mate selection for courtship than for marriage. To highlight the distinctive patterns of Japanese couples, we present the results of comparative analyses of the United States. Regardless of the type of partnership, Americans appear to take serious account of their partners' educational level. There is a much smoother transition from cohabitation to marriage in the United States. The difference in the pattern of educational assortative mating between pre-marital and marital couples in Japan may reflect a discontinuous transition from courtship to marriage.

Keywords: educational assortative mating, cross-national comparison, marriage, courtship

1. INTRODUCTION

The study of social stratification investigates similarity of class positions (class inheritance) across and within generations in order to determine the degree to which a society is closed or open. Similarities between partners in matched couples function to maintain the boundaries between social groups, and the barriers to inter-marriage constitute one of the most important factors contributing to closure in societies. Couples frequently marry on the basis of various matched characteristics, producing a pattern of marriage homogamy and assortative mating. A variety of demographic and socio-economic factors, including race, religion, sexual orientation, class background, education, and occupation, are taken into account when couples form a union. Among these factors, education is one of the most well established indicators to have emerged from studies of assortative mating (Blossfeld 2009; Kalmijin 1998; Schwartz 2013). Education imparts skills which determine socio-economic success as well as cultural resources that influence lifestyles and partner preferences.

The conventional approach to the study of educational assortative mating examined married couples. The main research question concerned educational assortative mating among married couples: who marries whom? Among Japanese scholars who have studied social inequality, Shirahase (1999) and Shida et al. (2000) represent early systematic attempts to analyze educational association among married couples. These studies report a strong tendency toward educational homogamy among married couples with both partners having either a low or a high level of education. Miwa (2005) examines the trends in educational homogamy in post-war Japan and concludes that educational homogamy was stable until the 1970s but shows a declining trend since then.

The past decades have seen the tremendous increase of cohabitation among unmarried couples in the United States and European countries (Heuveline and Timberlake 2004; Kiernan 2001; Seltzer 2000; Smock 2000; Thornton, Axinn and Xie 2007), a well-documented fact which motivated researchers to examine the difference in the pattern of assortative mating between married couples and unmarried couples (Blackwell and Lichter 2000, 2004; Hamplova 2009; Qian 1998; Schoen and Weinick 1993; Schwartz 2010). Recent progress in data gathering on unmarried couples led to this new development, particularly in the United States. Researchers can now reframe the

research question as follows: who mates with whom among dating, cohabitating, and married couples?

Japanese society has not experienced the dramatic increase of cohabitation as observed in the United States or Europe. According to the 14th Japanese National Fertility Survey conducted in 2010, only two percent of unmarried male and female respondents aged 18 to 50 reported that they were cohabitating with a partner at the time of the survey, and another five to six percent of respondents had cohabitated in the past (National Institute of Population and Social Security Research 2012b). These figures underestimate the prevalence of cohabitation, because the survey excluded married respondents. The first National Survey on Population, Family, and Generations in Japan, conducted in 2004, included both married and unmarried female respondents aged 20 to 49, and put the proportion of cohabitation at about 20 percent (Iwasawa 2005). The International Survey of Attitudes on Low Fertility Society conducted in 2005 reported that 14 percent of respondents aged 20 to 49 including both married and unmarried people had experience with cohabitation (Cabinet Office of Japan 2006), and the same survey conducted again in 2010 reported the figure to be 22 percent (Cabinet Office of Japan 2011). While these statistics may point to a rising trend of cohabitation in Japan, although at a much smaller scale than in the West, Raymo et al. (2009, p. 785) claim that cohabitation in Japan is “best viewed as an emerging prelude to marriage rather than as an alternative to marriage or singlehood.”

Unmarried couples and courtship as a partnership status, however, are no longer uncommon in contemporary Japan. Contrary to the situation several decades ago, when the predominant form of marriage occurred through introductions arranged by relatives and superiors (“arranged marriages”), today most marriages are “love marriages” (*ren-ai kekkon*) based on spontaneous romantic encounters. The majority of marriages were “arranged marriages” until the mid-1960s, but “love marriages” have since become much more common, as shown in Figure 1; these data come from the calculations by the National Institute of Population and Social Security Research (2012a). Today 87 percent of married couples report their marriages as “love-marriages” while only six percent report that they are in “arranged marriages.” This change implies that many married couples must have experienced romantic relationships and the courtship state prior to marriage. Although cohabitation is not widespread, courtship has become an important life stage for

Japanese youth. We therefore examine the topic of assortative mating by expanding our scope to include unmarried couples into the analysis of Japanese data. To our knowledge, there is no previous research which distinguishes the patterns of educational assortative mating between married and unmarried couples in Japan. The first contribution of this study is, therefore, to present the systematic account on educational assortative mating among both unmarried and married couples in Japan.

Comparison between Japanese married and unmarried couples will contribute to our understanding of marriage behavior in Japan. Courtship behavior of unmarried couples including the pattern of assortative mating is one of the most under-explored topics in Japanese sociological studies in general and marriage studies in particular, despite the potential importance of its role as the transitory state leading to marriage. Our explicit distinction of couples by partnership status will highlight the dynamic process from courtship to marriage.

2. CROSS-NATIONAL COMPARISON WITH THE UNITED STATES

The second contribution of this study comes from the cross-national comparison. This study focuses on the examination of Japanese society, but also offers some comparative evidence from the analysis of U.S. society. Cross-national studies comparing Japan and other nations have been conducted on the topics of social mobility (Erikson and Goldthorpe 1992; Ishida 1993) and educational attainment (Blossfeld and Shavit 1993; Shavit and Muller 1998; Shavit, Arum, and Gamoran 2007). However, studies dealing with educational assortative mating are limited.

Smits and his colleagues' studies on comparative educational homogamy (Smits 2003; Smits and Park 2009; Smits et al. 1998, 2000) include Japan as one of many countries. Designated as the "Confucian" block, East Asian nations including Japan generally show a higher extent of educational homogamy compared with other nations (see also Raymo and Xie 2000). Smits and Park (2009) show that Japan is located in the middle of the group of ten East Asian nations in terms of its degree of educational homogamy. The main objective of these studies is to explain the differences among societies and their trends using macro sociological variables, such as modernization and expansion of education, but these studies have rarely paid attention to the institutional features of individual nations.

Furthermore, most of these studies concentrate on educational homogamy, the association with partners who have the same level of education. We will examine the detailed pattern of association of educational level of partners, including homogamy, hypergamy (association with people with higher educational level), and hypogamy (association with people with lower educational level).

In this paper, we present comparative analyses of sociological data from the United States and Japan in order to highlight the distinct patterns of educational assortative mating in Japan. The two societies are both advanced industrial nations, but they are different in many respects. In addition to the differences in patterns of cohabitation and courtship described above, the two societies differ in their educational upgrading and gender differences in educational attainment. The higher education system has been more extensively developed in the United States than in Japan. More importantly, the gender gap in participation in higher education is completely reversed, and women are more likely to obtain undergraduate degrees than men in contemporary American society (DiPrete and Buchmann 2013). In Japan, women still lag far behind men in educational attainment. The attendance rate at four-year universities is over fifty percent (54%) among men, and only about 40 percent among women. The gender gap has been gradually closing since the 1990s, primarily because more women are choosing to attend four-year universities rather than two-year junior colleges (Ishida 2007; Matsui 1997).

These differences imply that the educational distributions of partners (that is, the marginal distributions of the cross-classified table showing male and female partners' education) should look more equal in the United States. In Japan, the difference in the educational distribution of male and female partners should be more apparent. Due to the more equal participation of both genders in higher education in the United States, we expect that the proportion of couples that have the same level of education (educational homogamy) should be higher in the United States. However, this finding does not necessarily mean that the association is stronger in the United States. For example, even if the tendency for college graduates to choose partners with the same level of education is the same between the two societies, American college graduates will still show a higher proportion of educationally homogamous couples because there are more college graduates in the United States. We will employ log-linear and log-multiplicative models to estimate the pattern and strength of association between partners' education levels after controlling for

the difference in educational attainment between male and female partners. Our analyses will allow us to compare the two societies based on the pattern and the strength of association in partners' educational matching.

3. LIFE COURSE TRANSITION FRAMEWORK

The third contribution of this study comes from the life course transition framework, which is used to study educational assortative mating. Previous research often juxtaposed the pattern of educational association between unmarried and married couples. However, there is a dynamic life course transition from courtship to marriage. We aim to take this dynamic process into account.

Figure 2 shows our analytical framework for the analysis of the process of transition from courtship relationships to marriage. We begin with the figure for Japan (top part). In Japan, in addition to the distinction between married couples and unmarried couples, we are able to disaggregate unmarried couples into different premarital relationships. First, by taking advantage of the panel nature of the data set, we can differentiate between couples whose relationship continued and those whose relationship ended during the observation period. If we assume a sequence of courtship to marriage, those couples whose romantic relationships ended will not experience a transition to marriage. The comparison of these two types of couples gives us information about the transition from courtship to dissolution: which kinds of couples are likely to end their relationships. The solid line from courtship to dissolution indicates that we are able to evaluate this transition using our data.

In order to examine the transition process from continuing courtship to marriage, we introduce the notion of "marriage intention." We assume that couples who continued their relationships and have a strong intention of getting married are more likely to experience a transition to marriage, thereby showing a more similar pattern of educational assortative mating to married couples than couples who continued their relationships and have a relatively weak intention of getting married. We use the notion of marriage intention as an indicator of the pathway from courtship to marriage. The solid lines from courtship to "strong marriage intention" and to "weak marriage intention" indicate that we will examine the difference in the association pattern between the two groups. Because we had a

limited observation window (six years) to detect the occurrence of marriage among those who formed courtships during the earlier waves of our Japanese data set, we do not have a sufficient sample of unmarried couples who got married. The dotted lines in Figure 2 indicate that our analysis is unable to address the question of transition to marriage due to this data limitation.

As shown in the bottom part of Figure 2, in the United States, we will first make the following distinctions among unmarried relationships: dating couples and cohabitation couples. The successful transition of intimate relationships implies the pathway from a sexually intimate dating relationship to cohabitation to marriage, so we will compare the educational associations among all three groups: dating, cohabitating, and married couples. With regards to the pathway from cohabitation to marriage, the notion of “marriage intention” will be introduced. The pattern of educational assortative mating in cohabitating couples with strong marriage intention will be compared with those with weak intention.

Finally, we focus on the pathway out of marriage. We distinguish married couples into those who continued to live with the spouse and those who had separated from the spouse and compare the pattern of educational association between these two types of married unions.

The strategy to focus on the dynamic process of transition follows the exemplary study by Schwartz (2010) who proposed a stock-and-flow framework for the study of educational homogamy of partners (see also Schwartz and Mare 2005, 2012). Schwartz (2010) examines the dynamic process of flows into and out of cohabitation and marriage, and argues that the stock of cohabitating and married couples in the population at any given time is the result of selective entries and exits from cohabitation and marriage. We are able to compare the pattern of educational assortative mating between unmarried couples who continued their relationships and those who exited from courtship based on Japanese data.¹ The U.S. data set does not allow us to study the exit from dating or cohabitation.

¹ Unlike Schwartz (2010), our analyses do not compare new entrants (such as newly-formed courtship couples and newly-wed married couples) with couples with long duration. The Japanese data set used in our analyses enable us to distinguish both unmarried and married couples by the duration of courtship or marriage, so analyses similar to Schwartz can be conducted. However, the number of cases reduced significantly.

However, we will conduct a supplementary analysis on comparisons of the educational association between married couples who lived together and those who were separated in the United States. The analysis provides indirect evidence of exit from marriage.

A key idea in understanding the dynamic process of transition from courtship to marriage is the winnowing hypothesis (Blackwell and Lichter 2000, 2004). The winnowing hypothesis claims that, as the intimate relationships progress, “transitions from dating to cohabiting to marital unions are marked by increasing selectivity in the mate selection or matching process” (Blackwell and Lichter 2004, p.719). In the process of partner selection, courtship couples tend to use less stringent criteria than married couples because courtship requires less emotional and financial commitment than marriage. Education is used as a crucial criterion as it represents future socio-economic potential as well as shared values and lifestyles.

With regard to educational assortative mating, the winnowing hypothesis argues that the association between two partners' education becomes stronger as more commitment becomes necessary from courtship to marriage. We posit that the association is not limited to the resemblance of education (homogamy) but includes other types of association such as hypergamy (marrying up) and hypogamy (marrying down). If the pattern of educational association is the same (such as homogamy at the top and bottom levels of education), the hypothesis predicts that the strength of association is stronger among married than unmarried couples. The winnowing hypothesis also predicts that there may be more structuring of association among married couples; both homogamy and women's hypergamy may characterize marriage partnership while courtship partners may simply show homogamy without the tendency of hypergamy. In other words, it can be assumed that the winnowing process involves not only the increased resemblance in education of couples but also the increased structuring of educational matching of partners.

Among unmarried couples, this hypothesis predicts that couples who continued their relationships show stronger association than couples who ended their relationships. Finally, the hypothesis predicts unmarried couples with strong marriage intention to show stronger association of partners' education than those with weak marriage intention. In summary, as the degree of commitment among couples becomes more demanding, the

criterion of matching becomes more stringent, and the educational association among the partners becomes more structured.

4. DATA AND METHODS

(1) Data

To characterize the distinct patterns of educational assortative mating, we use datasets which allow us to specify different partnership types and educational levels for both married and unmarried couples. We use the Japanese Life Course Panel Survey (JLPS) for the analysis of Japanese couples. The JLPS is a nationally representative panel survey conducted annually by the Center for Social Research and Data Archives at the University of Tokyo. The sample design included men and women between the ages of 20 to 34 (youth sample) and 35 to 40 (middle-aged sample) living in Japan during the first wave of the survey conducted in 2007². For our analyses, we combined the youth and middle-aged samples. We use the information collected in wave 1 (2007) through wave 6 (2012) when the respondents were between the ages of 25 to 45.

The data for couples in the United States come from the National Survey of Family Growth (NSFG). The NSFG is a nationally representative survey conducted by the National Center for Health Statistics for the U.S. Department of Health and Human Services. The survey is cross-sectional in design but conducted periodically. The sample design included men and women in the United States between the ages of 15 to 45 during the survey period. We use the 2006-2010 survey, which was conducted from June 2006 to June 2010³.

(2) Variables

Education Level

We employ three categories of education level for both Japanese and American couples: (1) “high school or less,” (2) “junior college” (JLPS) or “some college” (NSFG), and (3) “B.A. or more.” Category 2 needs further clarification; “junior college” in the JLPS includes

² For more detailed information about the JLPS, please refer to the website <http://ssjda.iss.u-tokyo.ac.jp/en/panel/purpose/>.

³ We restricted our analyses to include only respondents aged 20 to 45 at the time of the survey in order to assure comparability of the age range with the JLPS. We obtained the data set from the website of the NSFG (<http://www.cdc.gov/nchs/nsfg.htm>).

those who attended technical colleges (*senmon gakko*) or two-year junior colleges. For the NSFG, “some college” includes those who attended a two-year college but not a four-year college as well as those who dropped out of college.

Partnership Types

To investigate the differing pattern and strength of educational assortative mating in the process of couples’ transition from unmarried to married, our approach specifies relevant partnership types for each nation.

Japanese Partnership Types: For Japanese couples, we specify three distinctions between partnership types. The first distinction is between unmarried couples and married ones. The analysis of this comparison is denoted as “JP Analysis 1” in the analyses section. Unmarried couples are defined as both partners being unmarried at the time of the survey of the JLPS. Married couples consist of two married partners at the time of the JLPS survey. We cross-classify the male partner’s education by the female partners’ education, and present a two-way table for unmarried and married couples in Table 1A.

Second, we consider the possibility of distinguishing among unmarried couples. The analysis is denoted as “JP Analysis 2.” We distinguish between unmarried couples who continued their relationship and those whose relationship dissolved over the study period. The longitudinal aspect of the JLPS enables us to identify whether an unmarried respondent had an unmarried partner at the time of the survey and how long the relationship persisted. We use these pieces of information to determine whether unmarried couples maintained their relationships or dissolved them. Let us consider an example in which an unmarried respondent had an unmarried partner during the 2010 survey. If the respondent stayed unmarried and had no partner during the 2011 survey, her or his relationship was judged to be dissolved. It was also judged to be dissolved if the respondent had an unmarried partner but the relationship persisted for less than one year. Having a partner over two consecutive years does not necessarily mean that it was the same partner. If the relationship lasted for less than one year, the partners in the two consecutive years are judged to be different. Moreover, if the unmarried respondent did not participate in the 2011 survey (attrition), the relationship was judged to have continued in our analysis. Cross-classification of educational level of partners for couples who

continued their relationships and for couples who ended their relationships are shown in Table 1B.

The third distinction is concerned with the intention of getting married among unmarried couples who continued their relationships during the observation period. We call this set of analysis “JP Analysis 3.” The JLPS asks an unmarried respondent how strong her or his marriage intention is on an ascending scale of 1 to 5. Using this information, we classify those who chose the top two scale points as having a “strong intention” and those who chose the other three as having a “weak intention.” We show the cross-classification of partners’ education for these two types of couples in Table 1C.

U.S. Partnership Types: We specify four kinds of categories of partnership types in our analysis of couples in the United States. We use each of the differences as a layer variable in our analysis of educational assortative mating.

First, we examine the difference between unmarried couples and married couples (US-Analysis 1). Note that the NSFG distinguishes two categories of unmarried couples; unmarried couples who are in a sexually intimate relationship but not living together, and cohabitating couples. We call the first one “dating” and the second “cohabitating.” Thus, the “unmarried couple” category in our analysis is an aggregated category which consists of both “dating” and “cohabitating” couples. Cross-classifications of the male partner’s education by the female partners’ education for unmarried and married couples are shown in Table 2A.

The second distinction involves the disaggregation of unmarried couples into either “dating” or “cohabitating.” We call this set of analysis “US-Analysis 2.” US-Analysis 2 consists of two parts. The first part is the examination of the difference between dating couples and cohabitating couples, and the second part examines the difference between cohabitating couples and married couples. Cross-classifications of educational level of partners for dating couples and cohabitating couples are shown in Table 2B.

The third difference is concerned with the disaggregation of cohabitating couples into two types of partnership by marriage intention (US-Analysis 3). The first one consists of those with a strong intention to marry and the latter consists of couples with a relatively weak

intention to marry. The NSFG asks unmarried respondents who have cohabitating partners about their marriage intention on an ascending scale of 1 to 5. As for the JLPS data, we classify those who chose the top two points as having a “strong intention” and those who chose the lower three as having a “weak intention.” We show the cross-classification of partners’ education for these two types of couples in Table 2C.

Fourth, we examine the difference among married couples: those who stayed together and those who got separated (US-Analysis 4). We show the cross-classification of spouses’ education for these two types of married couples in Table 2D.

(3) Log-linear and Log-multiplicative Models

Given the cross-classified tables, we apply log-linear and log-multiplicative models to the data for Japanese couples and for couples in the United States separately. The greatest advantage of these models is that we can estimate the likelihood of couple formation based on specific educational combinations by setting interaction parameters, while controlling for different marginal distributions of education for men and women.

We assign female education as a row variable and male education as a column variable, and we use partnership type as a layer variable⁴. For each partnership type, we ran separate analyses: JP-Analysis 1 to 3 for Japanese couples and US-Analysis 1 to 4 for couples in the United States. Thus, our models are estimated for the three-way table (row by column by layer).

The same analytical strategy is applied to both the JLPS and the NSFG data. In each specific analysis, we start from a benchmark model. We then apply different log-linear models to the three-way table and search for the model that best fits the data, which is used to describe the pattern of association between men’s and women’s education. Each of the models we apply differs in the specifications of interaction parameters. We also estimate log-multiplicative models, which allow the strength of association to be uniformly

⁴ Previous research found a salient tendency of racial homogamy in the United States. This might suggest that our analysis should control for race as another layer variable. This approach may complicate the analysis, but can be useful when we attempt to analyze detailed features of educational assortative mating. However, since our focus is on the differences of educational assortative mating in the process of couples’ transition from an unmarried state to a married state, rather than a detailed feature of the mating, we do not consider race in our analysis.

different between different types of partnerships while holding the pattern of association constant across different types⁵. The differences among the models can be demonstrated conveniently in a design matrix form, which we display in Table 3 for the JLPS and in Table 4 for the NSFG. Note that ϕ in matrix JP8 in Table 3 and matrix US8 in Table 4 indicates a uniform-difference parameter in log-multiplicative model.

5. RESULTS

(1) Descriptive Results for Japanese Couples

The analysis begins with a review of descriptive statistics of couples in Japan based on their partnership type (Table 5). Unmarried couples tend to be more educated than married couples, both for male and female partners. On the other hand, married couples tend to be more educationally homogamous (0.534) than unmarried couples (0.481). This result is consistent with the prediction of the winnowing hypothesis. However, we need to be cautious in interpreting this result because the proportion of educationally homogeneous couples is affected by the distribution of education of partners. Consider the following example: If those with low education are more educationally homogamous than others, the greater proportion of those with low education among married couples will increase the overall proportion of educational homogamy. In order to control for the impact of the marginal distributions, we need to resort to log-linear and log-multiplicative models. Shifting to the difference within unmarried couples, couples who continued their relationships tend to be slightly more educated than couples who dissolved their relationships, both for male and female partners. The former also shows a higher proportion of educationally homogamous couples (0.555) than in the latter (0.497).

(2) Patterns of Educational Assortative Mating in Japan

The following section contains the analyses of using log-linear and log-multiplicative models. Table 6 presents the results of fitting various models to the Japanese data set.

Japanese Analysis 1: Unmarried (A) and Married Couples (B)⁶

⁵ See Xie (1992) for a detailed explanation of the class of log-multiplicative models used in our analysis.

⁶ A and B correspond to the types of partnership (Category A and Category B) in Table 3.

We begin our analysis with an examination of the difference in educational assortative mating between married and unmarried couples using observed frequencies reported in Table 1A. Before we examine the transition process to marriage by disaggregating the unmarried couples, we first contrast married couples with unmarried couples overall. We ran six hierarchically related log-linear models (Table 6, Analysis 1). The first model (Model 1-1) allows the strength of educational homogamy to be different both among the three educational categories (high school or lower, junior college, and B.A. or higher) and partnership type (unmarried or married). The design matrix (JP1) is shown in Table 3. This model fits the data ($p = 0.218$) but leaves only two degrees of freedom. The second model (Model 1-2) constrains the three homogamy parameters to be the same between unmarried and married couples (matrix JP2). The comparison of fit statistics between the first two models suggests that some of the homogamy parameters are identical between unmarried and married couples.

It turns out that not only are the homogamy parameters for the junior college category nearly identical across the two couple types, but they are also non-significant. Therefore, the following models ignore the tendency of educational homogamy among those with a mid-level education. Model 1-3 (matrix JP3) deletes the homogamy parameter for the junior college category and sets the homogamy parameters for high school or lower and B.A. or higher categories to be different across the two types. Model 1-4 (matrix JP4) also deletes the homogamy parameter for junior college but sets the other two homogamy parameters to be the same for unmarried and married couples. Model 1-5 (matrix JP5) modifies the previous model and allows the homogamy parameter for university graduates to be different between unmarried and married couples. According to the comparison of fit statistics among these three models, Model 1-5 is the model that best fits the data. Finally, Model 1-6 (matrix JP6) adds the tendency for marriage hypergamy for women who completed junior college. These women show a propensity to marry men who reached undergraduate education or higher. The same propensity was not found among unmarried couples. This model provides an excellent fit to the data ($p = 0.702$) and still retains four degrees of freedom. The parameter estimates from Model 1-6, which is our best fitting model, are shown in Figure 3.

We use the same notation for the following Japanese analyses.

Figure 3 shows the matching combinations of education among the couples, and the bars represent the presence of significant associations. Among unmarried couples (Figure 3A), the tendency for educational homogamy is found at the top (B.A. or higher) and the bottom (high school or lower) levels of education, and the degree of homogamy is apparently stronger at the higher level of education. Among married couples, the same pattern of educational homogamy at the upper and lower levels of education is observed. In addition, there is a tendency for hypergamy (marrying up) among women with junior college education.⁷

A comparison of Figures 3A and 3B highlights the difference in educational assortative mating between unmarried and married couples. We observe that the strength of association between partners' education is much stronger among married couples than unmarried couples, because the bar indicating homogamy among university graduates is significantly higher among married couples and there is an additional tendency for women who completed junior college to marry with men with a university education. In summary, there is more structuring along educational lines among married couples than unmarried couples.

Japanese Analysis 2: Unmarried Couples who Continued Relationship (A) and who Dissolved Relationship (B)

The second set of analysis focuses on unmarried couples and distinguishes between those whose relationships continued and those whose relationships ended. Since the Japanese data set is composed of panel-type data, we can determine whether the unmarried couples continued or ended their relationship during the observation period. We used the observed frequencies reported in Table 1B.

The baseline model for this set of analysis is Model 2-1, and the matrix form of this model is shown in JP4 in Table 3. We already know from the previous analysis that there is a tendency for educational homogamy at the upper and lower levels of education among unmarried couples. Model 2-1 imposes identical degrees of homogamy at the upper and lower levels across the two partnership types: relationship continued and relationship

⁷ The second level of education includes women who attended technical colleges (*senmon gakko*) in addition to junior college. However, the tendency of hypergamy is observed only among women with junior college diplomas.

dissolved. This model fits the data well (L-square = 7.449, df = 6, p = 0.281). When we allow the degree of homogamy among university graduates to differ between the two types of partnership (matrix JP5), the model (Model 2-2) improves the fit (L-square = 4.387, df = 5, p = 0.495). The improvement in L-square is 3.062 with one degree of freedom, and it is significant at the ten percent level, but not at the five percent level. On the other hand, when we allow the degree of homogamy at the lower level of education (high school or less) to be different between the two types of partnership (matrix JP7), the model (Model 2-3) shows little improvement in fit (L-square = 6.484, df = 5, p = 0.262).

Finally, we tested the model (matrix JP8) which allows the strength of association to be uniformly different between the two types of partnership (Model 2-4) while holding the pattern to be the same across partnership types. This model has an adequate fit to the data (L-square = 4.330, df = 5, p = 0.503). The uniform-difference (uni-diff) parameters are 1.000 for unmarried couples whose relationship continued and 0.6298 for unmarried couples whose relationship dissolved. These parameters imply that the association is weaker among unmarried couples with dissolved relationships. There is a significant improvement in fit by allowing the degree of homogamy at the upper level of education to differ across partnership status, while there is a minimal improvement in fit by adjusting the lower level of education across partnership status. From this, we conclude that the degree of homogamy is not uniformly different at the upper and lower levels of education and we are inclined to select Model 2-2 as the best fitting model for this set of analysis.

Figure 4 shows the parameter estimates from this model. Both types of partnership show a similar pattern of association: men and women with high school or lower education are more likely to partner with each other and men and women with four-year university education are more likely to partner with each other than are people with different combinations of education. However, the strength of homogamy among those with a university education is much stronger among couples whose relationship continued (1.5458) than those whose relationship ended (0.7758). These results suggest that unmarried couples are more likely to continue their partnership when the degree of educational homogamy is strong. In particular, couples who are both highly educated have a clear propensity to maintain the relationship.

Japanese Analysis 3: Unmarried Couples with Strong (A) and Weak Marriage Intention (B)

The third set of analysis conducted using the Japanese data set involves the disaggregation of unmarried couples whose relationship continued. We distinguish ongoing courtship couples into two groups: couples with a strong intention to get married and those with a relatively weak intention to get married.

The baseline model for this set of analysis is Model 3-1, and the matrix form of this model is shown in JP4 in Table 3. It is the same baseline model used in the previous analysis, and the model imposes the same degree of educational homogamy at the upper and lower education levels across the two groups differentiated by marriage intention. The model fits the data well (L-square = 7.777, df = 6, p = 0.2549). When we allow the degree of educational homogamy either at the top or the bottom to differ between couples with strong intention and those with weak intention (Model 3-2 and Model 3-3 respectively), neither model improves the fit over the baseline model.

Finally, when we fit a log-multiplicative model (Model 3-4) which imposes the same pattern of educational homogamy but allows the strength of association to be uniformly different between the two groups, the model fits the data (L-square = 7.252, df = 5, p = 0.203). However, the fit does not improve significantly over the baseline model. Although the uniform-difference parameters are not significant, they are nonetheless informative: couples with strong intentions to marry (1.000) show a stronger association than those with weak intentions (0.7678). Indeed, if we compare the strength of association among married couples, couples with a strong marriage intention, and couples with a weak marriage intention using the log-multiplicative model (analysis not shown), the order of association is as follows: married couples show the strongest association, unmarried couples with a weak marriage intention show the weakest association, while unmarried couples with a strong marriage intention are in the middle. These results suggest that the resemblance of couple's education tends to increase as the couples go through the pathway from courtship to marriage.

(3) Descriptive Results for Couples in the United States

We first review descriptive results of couples by their partnership type in the United States (Table 7). Married couples tend to be more educated than unmarried couples both for male partners and female partners. Table 7 also shows that married couples tend to be more educationally homogamous (0.610) than unmarried couple (0.601) but by a very

small margin. Table 7 presents descriptive statistics for two disaggregated types of unmarried couples: dating couples and cohabitating couples. Dating couples tend to be more educated than cohabitating couples, both for male partners and female partners. However, cohabitating couples are more educationally homogamous (0.644) than dating couples (0.582). Educational levels of the couples and the resemblance of education among couples are not uniformly related across different types of partnerships. The effect of the marginal distributions needs to be controlled to estimate the propensity of homogamy among different partnerships.

(4) Patterns of Educational Assortative Mating in the United States

We next present the results of applying log-linear and log-multiplicative models to the U.S. data in Table 8.

US Analysis 1: Unmarried (A) and Married Couples (B)⁸

We first examine the difference in educational assortative mating between unmarried couples and married couples. We use observed frequencies reported in Table 2A. Nine log-linear models are estimated (Table 8, US-Analysis 1). Each of the nine models is presented in the design matrix form shown in Table 4. The first model (Model 1-1) allows the strength of educational homogamy to vary both among the three educational categories (high school or lower, some college, and B.A. or higher) and partnership type (unmarried or married). The second model (Model 1-2) constraints the three homogamy parameters to be the same between the two partnership types (matrix US2). The comparison of fit statistics between Model 1-1 and 1-2 indicates that some of the three homogamy parameters are identical between unmarried and married couples, as was the case for Japanese couples.

The results show that the homogamy parameters for the middle level (“some college”) category are identical across the two types, and the coefficient is negative and significant. The negative coefficient implies that people with some college education tend to marry heterogamously, that is, they marry partners with either a higher level or lower level of education. This suggests that the pattern of educational heterogamy should be examined among those with some college education in the following models. Before focusing on

⁸ A and B correspond to the types of partnership (Category A and Category B) in Table 4. We use the same notation for the following US analyses.

heterogamy, we first need to confirm whether the homogamy parameters for high school or lower and B.A. or higher categories are different across the two types. Model 1-3 (matrix US3) allows the homogamy parameters for high school or lower and B.A. or higher categories to vary across the two types while tentatively ignoring the “some college” category. Model 1-4 (matrix US4) constrains the homogamy parameters for high school or lower and B.A. or higher to be identical between unmarried and married couples with no parameter set for some college. Model 1-5 (matrix US-5) sets the single homogamy parameter for high school or lower and B.A. or higher across unmarried and married couples. The comparison of fit statistics among these models confirms that Model 1-4 best fits the data. We next examine educational heterogamy among those with some college education. Model 1-6 (matrix US6) and Model 1-7 (matrix US7) examine the possibilities of marriage hypergamy and hypogamy for women with some college education. The former sets different parameters for marrying up and marrying down, and the latter constrains the parameters to be identical for marriage hypergamy and hypogamy. The model comparison shows that Model 1-7 fits better than Model 1-6. Therefore, we choose Model 1-7 as the best-fitting model in US-Analysis 1⁹. The estimated parameters from Model 1-7 are shown in Figure 5.

The bars in Figure 5 indicate the presence of a significant association. It should be noted that Figure 5 represents the result for both unmarried and married couples, since the best-fitting Model 1-7 shows no significant difference between unmarried and married couples. The tendency for educational homogamy is found among couples with high school or lower education and those with B.A. or higher education in both unmarried and married couples. The parameter estimates are 1.855 for homogamy of couples with high school or lower education and 2.141 for couples with B.A. or higher education. Women with some college education tend to marry either upward or downward for both partnership types, and the likelihoods of hypergamy and hypogamy are the same (the parameter estimate of 0.536). These results suggest that there is no differential structuring along educational lines between married couples and unmarried couples.

US Analysis 2A: Dating Couples (A) and Cohabiting Couples (B)

⁹ Model 1-7 is statistically equivalent to Model 1-2. The reason we chose Model 1-7 over 1-2 is that Model 1-7 allows us to represent hypergamy and hypogamy as design matrix even though the strengths of hypergamy and hypogamy are set identical.

The second set of analysis consists of two parts (US-Analysis 2A and 2B). The first part (US-Analysis 2A) examines more detailed differences among unmarried couples by disaggregating them into two partnership types: “Dating” or “Cohabiting.” Observed frequencies are reported in Table 2B. The second part (US-Analysis 2B) compares the difference in educational assortative mating between cohabiting couples and married couples. We use the observed frequencies reported in Table 2A (married couples) and Table 2B (cohabiting couples) for US-Analysis 2B.

We first estimate Model 2A-1 as the baseline model for US-Analysis 2A. Table 4 gives the matrix form of this model. Given the result from US-Analysis 1, we can reasonably assume that the pattern of educational assortative mating among unmarried couples is characterized by a tendency for educational homogamy at the upper and lower levels of education and by the tendency for heterogamy among women with a mid-level education. Model 2A-1 sets as identical both the homogamy parameters for the upper and lower education levels and the heterogamy parameters for women with some college education across dating and cohabiting couples. Model 2A-2 and Model 2A-3 can be characterized as extensions of Model 2A. Model 2A-2 adds a uniform-difference parameter to Model 2A. Model 2A-3 allows each of the parameters in Model 2A-1 to vary across the partnership types. Model comparison using fit statistics shows that Model 2A-2 is the best fitting model ¹⁰.

Figures 6A and 6B report the parameter estimates from the best-fitting Model 2A-2. Both types of partnership show a very similar pattern of educational assortative mating. We find in both figures that couples with high school or lower education and those with a four-year university education show a tendency for homogamy, and women with some college education show the same likelihood for both hypergamy and hypogamy. The bars in Figure 6B are uniformly higher than those in Figure 6A. The estimated uniform-difference (uni-diff) parameters imply that cohabiting couples (1.1323) exhibit a uniformly stronger association than dating couples (1.0000). Unlike Analysis 1, Analysis 2A shows that there is a difference in the strength of couple formation between cohabiting and dating couples, although the pattern of association is identical. It should be noted,

¹⁰ Compared to Model 2A-1, Model 2A-2 provides a better fit to the data (L-square = 2.666, df = 4, p = 0.615). The improvement in L-square is 4.801 with one degree of freedom and is significant at the five percent level.

however, that the difference is not substantial (0.1323) despite its statistical significance.

US Analysis 2B: Cohabiting Couples (A) and Married Couples (B)

We learned that cohabitating and dating couples differ with respect to their strength of association. We would like to test whether cohabitating couples and married couples show the same pattern and strength of association; to do this, we apply the same strategy used in US-Analysis 2A. Comparison of the models using fit statistics shows that Model 2B-1 is the best fitting model. This model finds that there is no significant difference in the pattern and strength of association between cohabitating and married couples. The parameter estimate is 1.878 for homogamy at the lower educational level, 2.212 for homogamy at the upper level, and 0.5737 for hypergamy and hypogamy among women with a mid-level education.

US-Analysis 3: Cohabiting Couples and Strong (A) or Weak Marriage Intention (B)

US-Analysis 3 disaggregates cohabitating couples into two groups based on the difference in their intention to get married: cohabitating couples with a strong marriage intention and those with a relatively weak intention. We follow the same procedure as for previous analyses. Model 3-1 shows the best fit based on the fit statistics. This model assumes no difference in educational assortative mating by marriage intention; both couples with a strong marriage intention and those with a weak intention show the same pattern and strength of association. The parameter estimates are 2.006 for the propensity of homogamy among couples at the lower education level and 2.196 for the propensity of homogamy among couples at the upper level. There is a propensity (0.584) for hypergamy and hypogamy in women with a mid-level education.

US-Analysis 4: Married Couples Living Together (A) and Those Separated (B)

In the fourth set of analysis (US-Analysis 4), we disaggregate married couples into two types: married couples who remained living together and those who became separated. As in previous analyses, we follow the same procedure and apply the same set of models to this data set. The results of model comparison indicate that Model 4-1 is the best fitting model. This model finds no significant difference in educational assortative mating between the two types of married couples. The parameter estimates are similar to those reported in Figure 5. The result from Model 4-2 tells us that the uniform-difference parameter estimates are 1.000 for married couples who remained living together and 0.917

for those who became separated. This result is consistent with the notion that the strength of association tends to be weaker for married couples who chose to separate, but Model 4-2 is not significantly better than Model 4-1. Therefore, we have no evidence to claim that the pattern and strength of educational assortative mating among married couples are different when the couple no longer lives together.

By taking the results of the US analyses together, we conclude that the pattern of couples' educational association is the same across all three types of partnerships: married, cohabitating, and dating. However, the strength of association is slightly weaker among dating couples than cohabitating or married couples. Marriage intention among cohabitating couples does not make a difference in the pattern or strength of association of couples. Living together or separately does not affect the pattern or strength of association among married couples, either. By and large, we are impressed with the uniformity of the pattern and the strength in educational assortative mating across different types of partnerships in the United States.

6. DISCUSSION AND CONCLUSION

This study is the first systematic attempt to distinguish the pattern of educational assortative mating between married and unmarried couples in Japan. As far as we know, none of the previous research investigated the pattern of educational association among unmarried couples. The most significant finding of our analysis is the difference in the pattern of educational assortative mating between married and courtship couples in Japan. Educational homogamy at the top and the bottom of the educational hierarchy characterizes the educational association among both unmarried and married partners. However, educational levels of the couples show a more structured pattern among married ones: there is apparently a stronger educational homogamy among married couples who graduated from four-year universities and a propensity for women with junior college educations to marry men with B.A. degrees.

With regards to the tendency of women's hypergamy, it should be noted that women who attended junior colleges but not technical schools (*senmon gakko*) are more likely to marry men who graduated from four-year universities even though the attendants of both types of school are included in the "junior college" category. Junior colleges are predominantly

attended by women, and their graduates are known to have distinct advantage in the marriage market because of the reputation of being “good wives and wise mothers” (Matsui 1997). The tendency of hypergamy among women with junior college educations is probably supported by the persistent norm of gender division of labor in contemporary Japanese society (Osawa 2011; Shirahase 2011, 2014).

In summary, unmarried couples seem to place less emphasis on the educational level of their partners than married couples in the process of mate selection. It is, therefore, possible to speculate that education and other characteristics of the partner are taken more seriously in deciding on a marriage partner than in selecting a courtship partner. Japanese people may draw a clear distinction in mate selection procedure between courtship and marriage. The overall results of the Japanese analyses are consistent with the winnowing hypothesis. More stringent sorting criteria are used to select marriage partners than unmarried partners. The importance of coupling of educational level of the partners increases as couples move from courtship to marriage.

The comparison with American couples highlights cross-national similarities and differences between the two nations. In contrast to Japan, in the United States, the same pattern of educational association characterized three types of couples: dating, cohabitation and married couples. Our results show that the pattern of association in the United States resembles but not identical to that among married couples in Japan. First, there is a strong tendency for people with B.A. degrees to form partnerships with the equally educated, and their level of educational homogamy is almost the same as Japanese married couples. Second, at the lowest level of education, there is also a tendency of educational homogamy: those with no more than a high school education tend to form partnerships with the equally least educated. The extent of homogamy is significantly stronger than that found in Japan. The reason for their strong degree of homogamy derives from the fact that more than 40 percent of people with no post-secondary education in the United States are high school dropouts. The corresponding figure in Japan is only seven percent. High school dropouts constitute the lowest level of educational attainment, and tend to have difficulty in finding partners with higher levels of education. Those with high school diploma also tend to form partnership with those with a similar level of education, but the extent of homogamy is weaker than that of high school dropouts. The difference in the composition of respondents with high

school or less category explains the cross-national difference in the degree of homogamy among the least educated.

Third, women with AA degrees have a tendency of marrying up or forming partnership with those with BA degrees in the United States. In addition, unlike Japan, women with some college have a tendency to find partners who have education lower than themselves. Because women with some college are composed of those with AA degrees and those who dropped out of the college, the two groups show two contradictory propensities (matching with partners with higher education and those with lower education). The presence of both hypergamy and hypogamy is related to the internal difference among the “some college” category in the United States. In Japan, very few college dropouts are in our sample, and, as noted above, those who attended technical schools (not junior colleges) do not show any tendency of hypergamy or hypogamy. The cross-national difference in the composition of the mid-level educational category probably explains the presence of hypogamy in the United States.

Regardless of the type of partnership, Americans appear to take serious account of their partners' educational level. Dating couples tend to show slightly weaker educational association than other couples, but their association is clearly stronger than that found among unmarried couples in Japan. In the United States, there is a clear propensity to find partners with the same level of education at the top and the bottom of the educational hierarchy, and the difference between marriage mating and cohabitation matching is not clearly marked as far as partner's educational association is concerned. Unlike Japan, marriage partnership in the United States may not be clearly distinguishable from other long-term unmarried relationships. Previous research in the United States shows a continuous transition from pre-marital to marital stage. Manning and Smock (2002) claim that the majority of cohabitation couples plan to marry their partners. Thornton, Axinn and Xie (2007, p.86) report that about three-fifths of young people “who had cohabited reported that they planned to marry their partner before they started to live together” (emphasis added). Cohabitations tend to occur with clear plans for marriage. Our data also suggest a similar finding; 26 percent of the Japanese married couples had experience of cohabitation with their marriage partners prior to marriage, while 54 percent of the American married couples had done so. There is a much smoother transition from cohabitation to marriage in the United States. The difference in the pattern of educational

assortative mating between pre-marital and marital couples in Japan may reflect a discontinuous transition from courtship to marriage.

The discontinuous transition from courtship to marriage in Japan may be related to the propensity of divorce. Divorce rates vary tremendously between the two nations. In Japan, there is recent increase in divorce rate, but the rate is still relatively low: 1.87 per 1,000 population in 2011. The comparable figure in the United States is 3.40 in 2009 (Ministry of Health, Labour and Welfare 2013). The difference probably has implications for people's intention to enter into marriage. If it is hard to end a marriage, young people are likely to be more cautious when selecting their marriage partner than they are about the selection of a courtship partner. In short, we speculate that Japanese youth hold different standards of mate selection for courtship than for marriage. In particular, for couples who are highly educated, the cost of a "bad" marriage may be high. Since the 1980s, the divorce rate has been consistently lower among people with higher education levels, while the rate increased rapidly among those with the lowest level of education in Japan (Raymo, Iwasawa, and Bumpass 2004; Raymo, Fukuda, and Iwasawa 2013). Divorce may not be a viable option for highly educated people, at least according to their expectations. The cross-national differences in marriage persistence seem to have significant implications for the transition from courtship to marriage in Japan and the United States.

References

Blackwell, Debra L. and Daniel T. Lichter. 2000. "Mate Selection among Married and Cohabiting Couples." *Journal of Family Issues* Vol. 21(2): 275-302.

Blackwell, Debra L. and Daniel T. Lichter. 2004. "Homogamy among Dating, Cohabiting, and Married Couples." *Sociological Quarterly* Vol. 45(4): 719-737.

Blossfeld, Hans-Peter. 2009. "Educational Assortative Marriage in Comparative Perspective." *Annual Review of Sociology* Vol.35: 513-530.

Blossfeld, Hans-Peter and Yossi Shavit (eds.) 1993. *Persisting Inequality: Changing Educational Attainment in Thirteen Countries*. Boulder, CO.: Westview Press.

Cabinet Office of Japan. 2006. *Shoshika Shakai ni kansuru Kokusai Ishiki Chosa Hokokusho* (Report on the International Survey of Attitudes on Low Fertility Society). Tokyo: Cabinet Office of Japan.

Cabinet Office of Japan. 2011. *Shoshika Shakai ni kansuru Kokusai Ishiki Chosa Hokokusho* (Report on the International Survey of Attitudes on Low Fertility Society). Tokyo: Cabinet Office of Japan.

DiPrete, Thomas A. and Claudia Buchmann. 2013. *The Rise of Women: The Growing Gender Gap in Education and What It Means for American Schools*. New York: Russell Sage Foundation.

Erikson, Robert and John H. Goldthorpe. 1992. *The Constant Flux: A Study of Class Mobility in Industrial Societies*. Oxford: Clarendon Press.

Hamplova, Dana. 2009. "Educational Homogamy among Married and Unmarried Couples in Europe: Does Context Matter?" *Journal of Family Issues* Vol. 30(1): 28-52.

Heuveline, P. and J. M. Timberlake. 2004. "The Role of Cohabitation in Family Formation: The United States in Comparative Perspective," *Journal of Marriage and Family*

66:1214-30.

Ishida, Hiroshi. 1993. *Social Mobility in Contemporary Japan*. Stanford: Stanford University Press.

Ishida, Hiroshi. 2007. "Japan: Educational Expansion and Inequality in Higher Education." Pp. 63-86 in *Stratification in Higher Education: A Comparative Study*, edited by Yossi Shavit, Richard Arum, and Adam Gamoran. Stanford: Stanford University Press.

Iwasawa, Miho. 2005. "Nihon no Dosei" (Cohabitation in Japan). Pp. 69-104 in *Choshoshika Jidai no Kazoku Ishiki: Dai 1-kai Jinko Kazoku Sedai Yoron Chosa Hokokusho* (Family Attitudes in the Period of Very Low Fertility: Report of the 1st National Survey on Population, Family, and Generations in Japan), edited by Mainichi Shimbun Population Research Council.

Kalmijin, Matthijs. 1998. "Intermarriage and Homogamy: Causes, Patterns, Trends." *Annual Review of Sociology* 24:395-421.

Kiernan, Kathleen. 2001. "The Rise of Cohabitation and Childbearing outside Marriage in Western Europe." *International Journal of Law, Policy and the Family* 15:1-21.

Manning, Wendy D. and Pamela J. Smock. 2002. "First Comes Cohabitation and Then Comes Marriage? A Research Note." *Journal of Family Issues* Vol. 23:1065-01087.

Matsui, Machiko. 1997. *Tandai wa Dokoeyuku* (Where Are Junior Colleges Going?). Tokyo: Keiso Shobo.

Ministry of Health, Labour and Welfare. 2013. *Wagakuni no Jinko Dodai* (Vital Statistics in Japan). Tokyo: Health, Labour and Welfare Statistics Association.

Miwa, Satoshi, 2005, "Educational Homogamy in Contemporary Japan," *Social Science Japan* No. 33 (December): 9-11.

National Institute of Population and Social Security Research. 2012a. *Wagakuni Fufu no*

Kekkon Katei to Shushoryoku: Dai-14-kai Shusho Douko Kihon Chosa (Marriage Process and Fertility of the Married Couple in Japan: The 14th Japanese National Fertility Survey). Tokyo: Kousei Toukei Kyokai.

National Institute of Population and Social Security Research. 2012b. *Wagakuni Dokushinso no Kekkonkan to Kazokukan: Dai-14-kai Shusho Douko Kihon Chosa* (Views on Marriage and Family of the Unmarried People in Japan: The 14th Japanese National Fertility Survey). Tokyo: Kousei Toukei Kyokai.

Osawa, Mari. 2011. *Social Security in Contemporary Japan: A Comparative Analysis*. London and New York: Routledge/University of Tokyo Series.

Qian, Zhenchao. 1998. "Changes in Assortative Mating: The Impact of Age and Education, 1970-1990." *Demography* Vol. 35(3): 279-292.

Raymo, James M., Miho Iwasawa, and Larry Bumpass. 2004. "Marital Dissolution in Japan: Recent Trends and Patterns." *Demographic Research* Vol. 11: 395-420.

Raymo, James M., Miho Iwasawa and Larry Bumpass. 2009. "Cohabitation and Family Formation in Japan." *Demography* 46 (4): 785-803.

Raymo James M., Setsuya Fukuda, and Miho Iwasawa. 2013. "Educational Differences in Divorce in Japan." *Demographic Research* Vol. 28: 177-206.

Raymo, James M. and Yu Xie. 2000. "Temporal and Regional Variation in the Strength of Educational Homogamy." *American Sociological Review* Vol. 65(5): 773-781.

Schoen, Robert and Robin M. Weinick. 1993. "Partner Choice in Marriages and Cohabitations." *Journal of Marriage and the Family* Vol. 55(2): 408-414.

Schwartz, Christine R. 2010. "Pathways to Educational Homogamy in Marital and Cohabiting Unions," *Demography* Vol.47 (3): 735-753.

Schwartz, Christine R. 2013. "Trends in Variation in Assortative Mating: Causes and

Consequences." *Annual Review of Sociology* Vol.39: 23.1-23.20.

Schwartz, Christine R. and Robert D. Mare. 2005. "Trends in Educational Assortative Marriage from 1940 to 2003." *Demography* Vol.42 (4): 621-646.

Schwartz, Christine R. and Robert D. Mare. 2012. "The Proximate Determinants of Educational Homogamy: The Effects of First Marriage, Marital Dissolution, Remarriage, and Educational Upgrading." *Demography* Vol.49 (2): 629-650.

Seltzer, Judith. A. 2000. "Families Formed Outside of Marriage." *Journal of Marriage and the Family* Vol. 62(4): 1247-268.

Shavit, Yossi and Walter Muller (eds.) 1998. *From School to Work: A Comparative Study of Educational Qualifications and Occupational Destinations*. Oxford: Clarendon Press.

Shavit, Yossi, Richard Arum, and Adam Gamoran (eds.) 2007. *Stratification in Higher Education: A Comparative Study*. Stanford: Stanford University Press.

Shida, Kiyoshi, Kazuo Seiyama, and Hideki Watanabe. 2000. "Kekkon Shijo no Henyo" (Changes in the Marriage Market). Pp.159-176, in *Nihon no Kaiso Shisutemu 4: Jenda, Shijo, Kazoku*, (Social Stratification System in Japan 4: Gender, Market, and Family) edited by Kazuo Seiyama. Tokyo: University of Tokyo Press.

Shirahase, Sawako. 1999. "Kaikyū-Kaisō, Kekkon to Jenda: Kekkon ni Itaru Patan" (Social Stratification, Marriage, and Gender: A Study of the Pattern of Association in Marriage), *Riron to Hoho* (Sociological Theory and Methods) 14(1): 5-18.

Shirahase, Sawako. 2011. "Unequal Japan: Implications for Households and Gender." Pp. 46-75 in *Demographic Change and Inequality in Japan*, edited by Sawako Shirahase. Melbourne: Trans Pacific Press.

Shirahase, Sawako. 2014. *Social Inequality in Japan*. London and New York: Routledge.

Smits, Jeroen. 2003. "Social Closure among the Higher Educated: Trends in Educational

Homogamy in 55 Countries." *Social Science Research* Vol. 32(2): 251–277.

Smits, Jeroen, Wout Ultee, and Jan Lammers. 1998. "Educational Homogamy in 65 Countries: An Explanation of Differences in Openness Using Country-Level Explanatory Variables." *American Sociological Review* Vol. 63(2): 264-285.

Smits, Jeroen, Wout Ultee, and Jan Lammers. 2000. "More or Less Educational Homogamy? A Test of Different Versions of Modernization Theory Using Cross-Temporal Evidence for 60 Countries." *American Sociological Review* Vol. 65(5): 781-788.

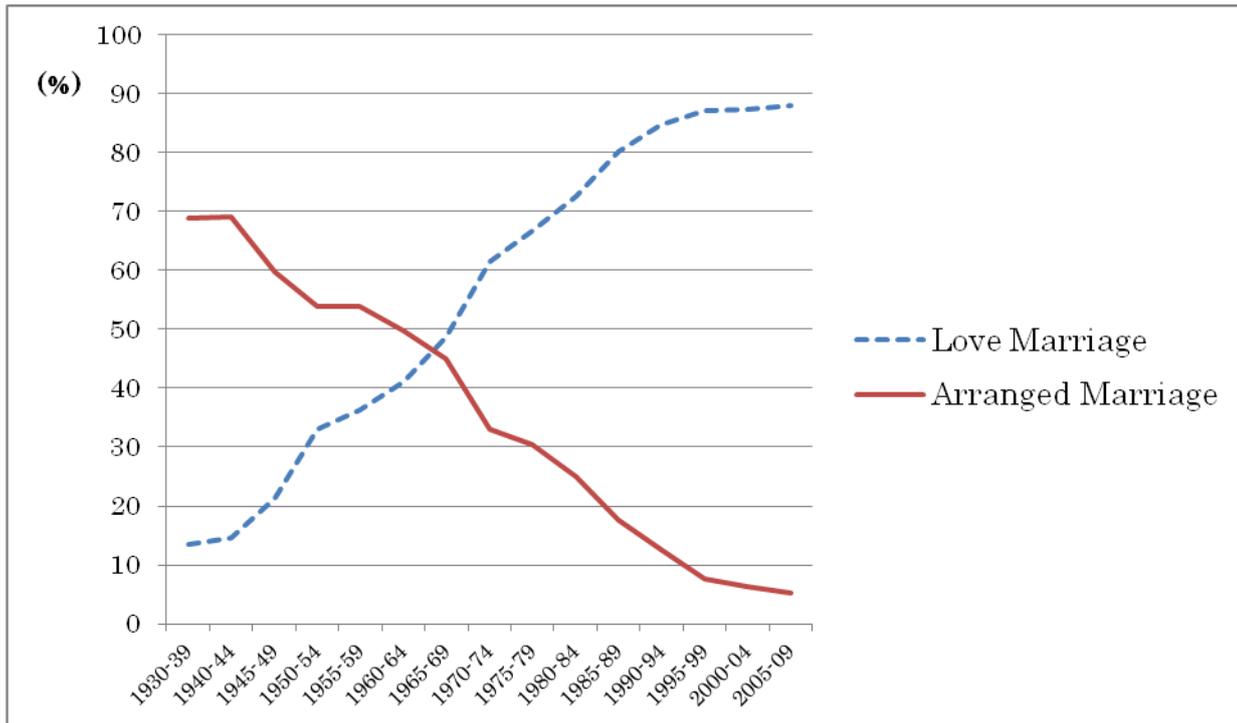
Smits, Jeroen, and Hyunjoon Park. 2009. "Five Decades of Educational Assortative Mating in 10 East Asian Societies." *Social Forces* Vol. 88(1): 227-255.

Smock, Pamela J. 2000. "Cohabitation in the United States: An Appraisal of Research Themes, Findings, and Implications." *Annual Review of Sociology* Vol. 20: 1-20.

Thornton, Arland, William G. Axinn, and Yu Xie. 2007. *Marriage and Cohabitation*. Chicago: University of Chicago Press.

Xie, Yu. 1992. "The Log-Multiplicative Layer Effect Model for Comparing Mobility Tables." *American Sociological Review* Vol. 57(3): 380-395.

Figure 1. Trends in Arranged Marriage and Love Marriage from 1930 to 2009 in Japan



Note:

- Horizontal axis represents years in which marriage took place.
- Vertical axis represents proportion of “Arranged Marriage” or Love “Marriage” to Total Marriages.

Figure 2. Analytical Framework for the Process of Transition from Courtship Relationships to Marriage

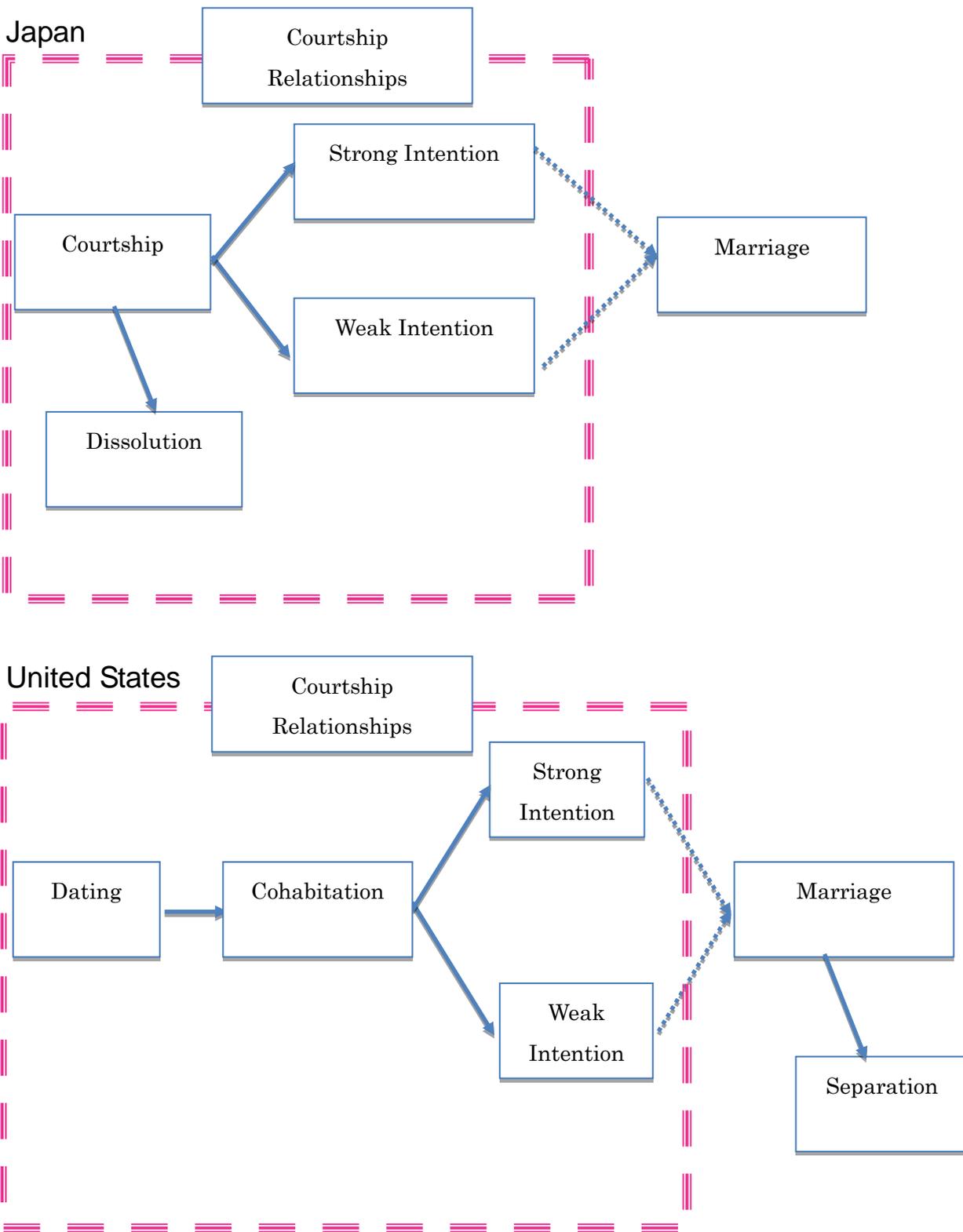
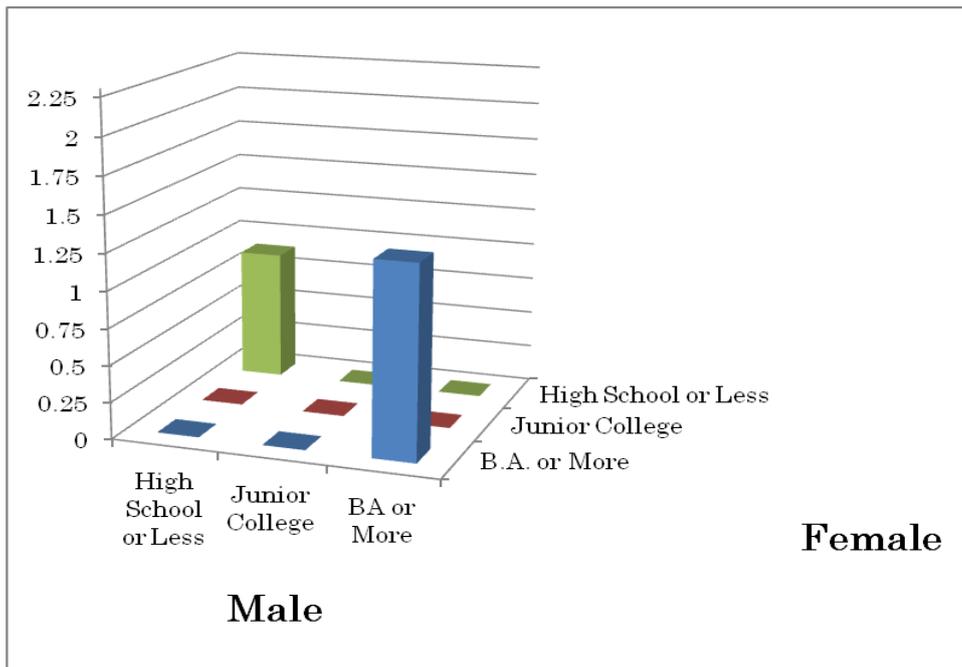


Figure 3. Pattern of Educational Assortative Mating among Japanese Couples (JP-Analysis 1)

3A. Unmarried Couples



3B. Married Couples

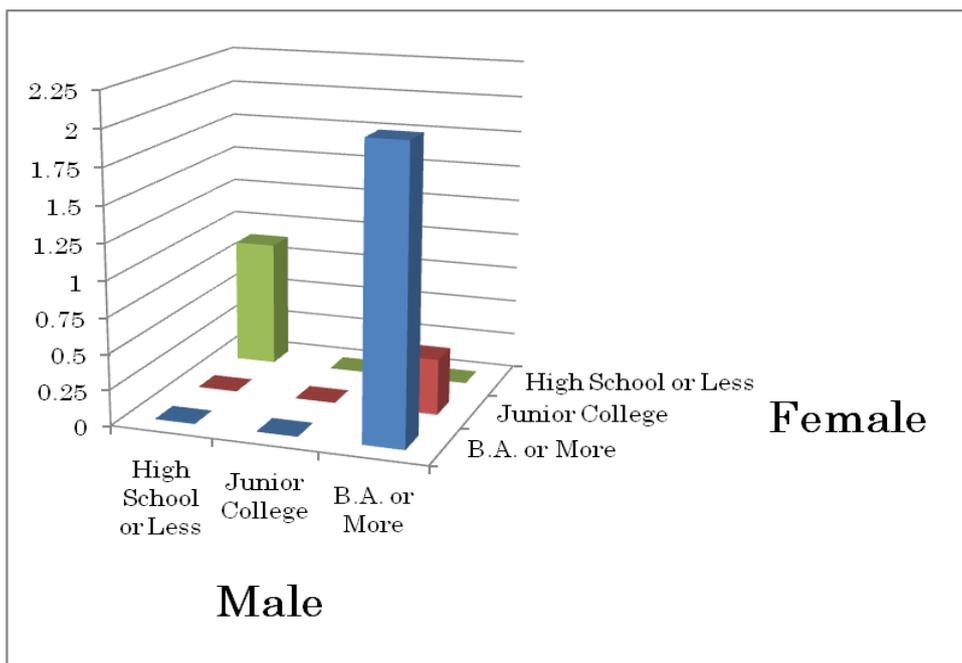
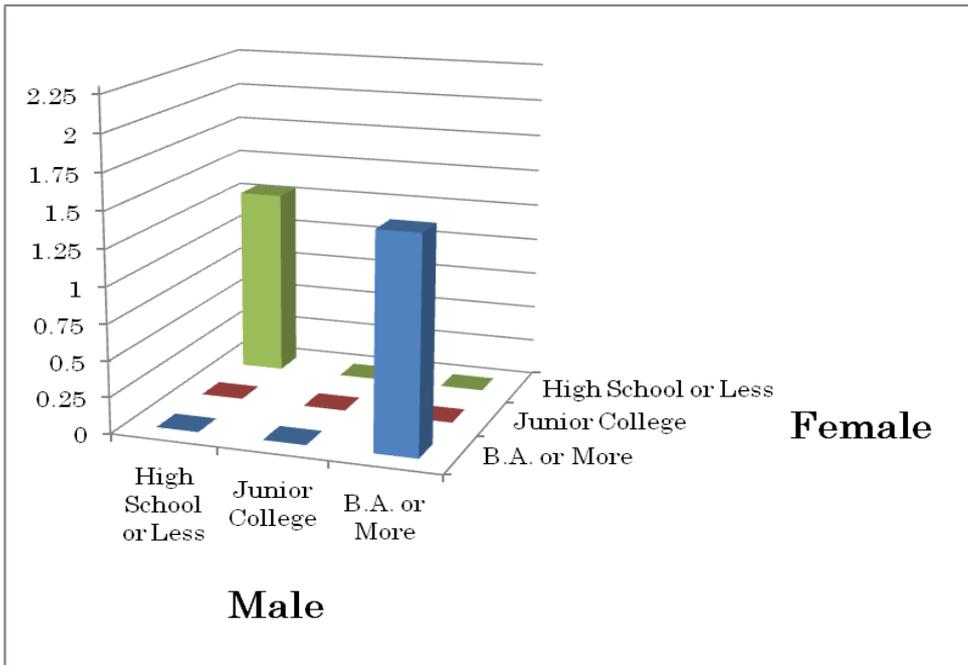


Figure 4. Pattern of Educational Assortative Mating among Japanese Unmarried Couples (JP-Analysis 2)

4A. Unmarried Couples – Relationship Continued



4B. Unmarried Couples – Relationship Dissolved

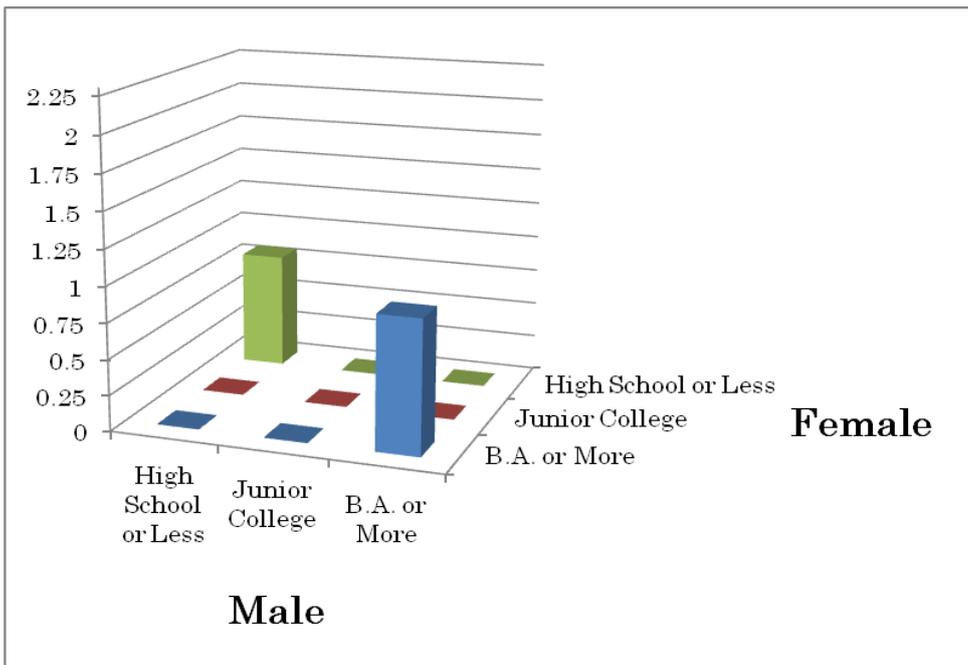
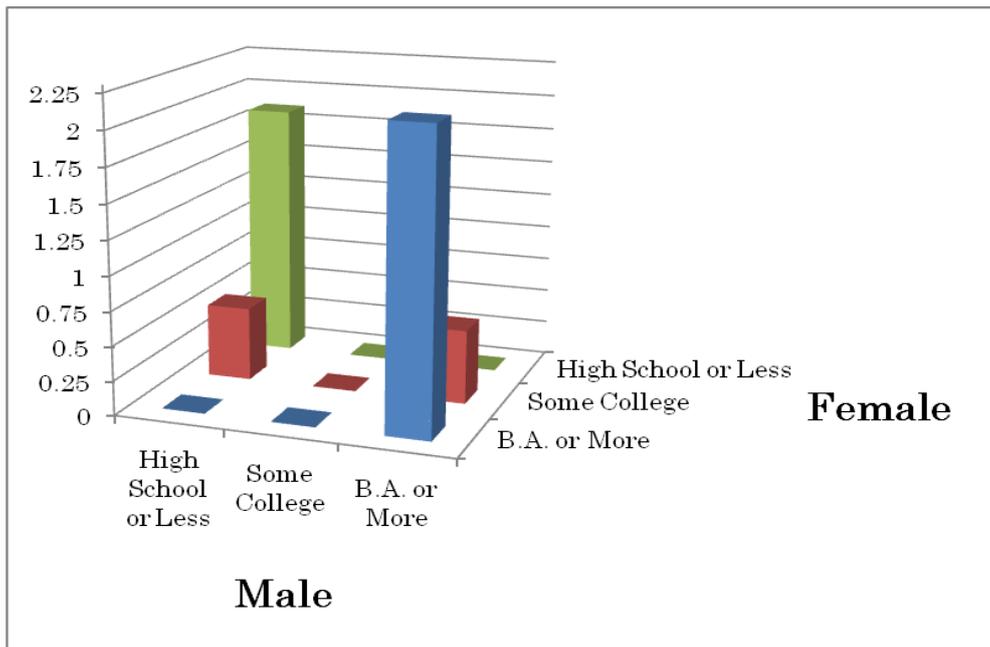


Figure 5. Pattern of Educational Assortative Mating among Couples in the United States (US-Analysis 1)

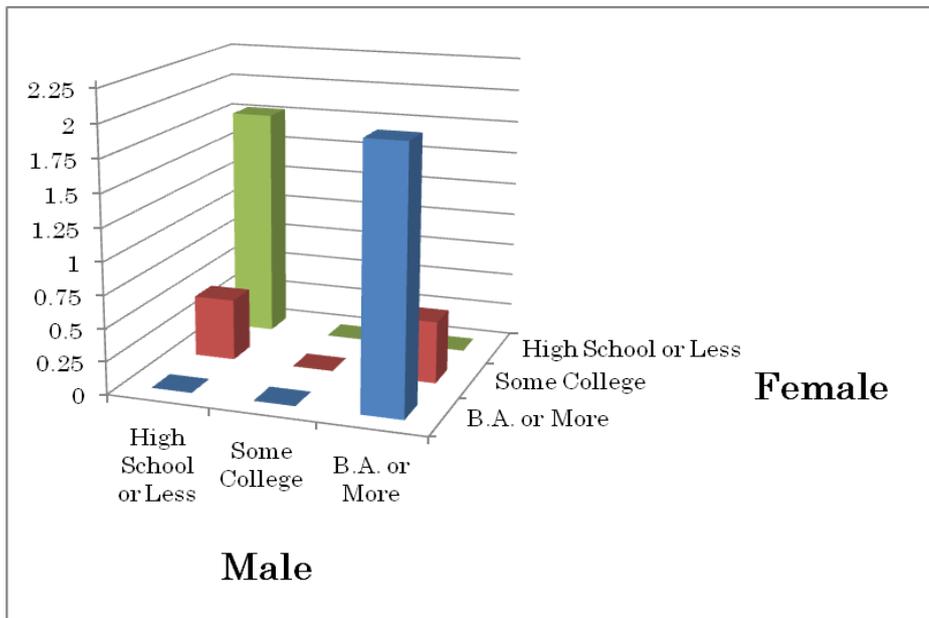
Unmarried Couples and Married Couples



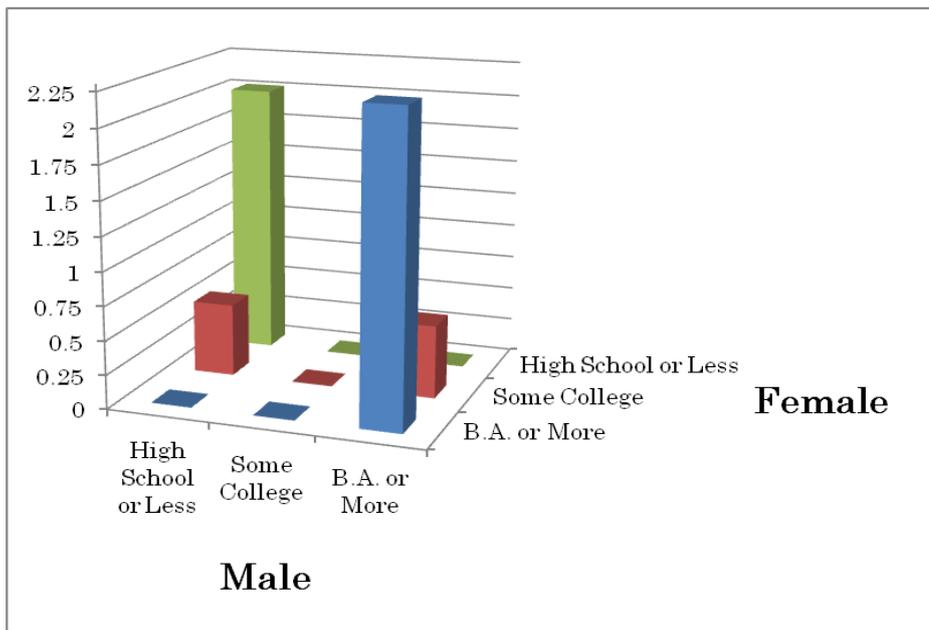
Note: Since we found no significant difference between unmarried couples and married couples, Figure 5 represents the pattern for both partnership types.

Figure 6. Pattern of Educational Assortative Mating among Unmarried Couples in the United States (US-Analysis 2A)

6A. Dating Couples



6B. Cohabiting Couples



**Table 1. Class-classification of Educational Levels of Female and Male Partners
by Partnership Type in Japan ^{*1}**

1A. Observed Frequencies for Unmarried and Married Couples

Unmarried Couples				Married Couples			
Female	Male			Female	Male		
	High School or Less	Junior College	B.A. or More		High School or Less	Junior College	B.A. or More
High School or Less	58	20	38	High School or Less	558	197	216
Junior College	38	48	67	Junior College	419	340	572
B.A. or More	20	25	132	B.A. or More	74	66	535

1B. Observed Frequencies for Unmarried Couples who Continued their Relationships and Unmarried Couples who Dissolved their Relationships

Unmarried Couples - Relationship Continued				Unmarried Couples - Relationship Dissolved			
Female	Male			Female	Male		
	High School or Less	Junior College	B.A. or More		High School or Less	Junior College	B.A. or More
High School or Less	38	13	18	High School or Less	20	7	20
Junior College	25	27	45	Junior College	13	21	22
B.A. or More	12	12	91	B.A. or More	8	13	41

1C. Observed Frequencies for Unmarried Couples with Strong Marriage Intention and Unmarried Couples with Weak Marriage Intention

Couples - Strong Intention				Couples - Weak Intention			
Female	Male			Female	Male		
	High School or Less	Junior College	B.A. or More		High School or Less	Junior College	B.A. or More
High School or Less	29	10	16	High School or Less	9	3	2
Junior College	19	26	37	Junior College	6	1	8
B.A. or More	10	8	79	B.A. or More	2	4	12

*1 The dataset comes from the Japanese Life Course Panel Survey.

**Table2. Class-classification of Educational Levels of Female and Male Partners
by Partnership Type in the United States ^{*1}**

2A. Observed Frequencies for Unmarried and Married Couples

Unmarried Couples				Married Couples			
Female	Male			Female	Male		
	High School or Less	Some College	B.A. or More		High School or Less	Some College	B.A. or More
High School or Less	2060	579	142	High School or Less	1790	496	153
Some College	758	850	299	Some College	673	648	364
B.A. or More	200	405	681	B.A. or More	287	488	1405

2B. Observed Frequencies for Dating Couples and Cohabiting Couples

Dating Couples				Cohabiting Couples			
Female	Male			Female	Male		
	High School or Less	Some College	B.A. or More		High School or Less	Some College	B.A. or More
High School or Less	1241	422	109	High School or Less	819	157	33
Some College	512	644	232	Some College	246	206	67
B.A. or More	142	308	518	B.A. or More	58	97	163

2C. Observed Frequencies for Cohabiting Couples with Strong Marriage Intention and Cohabiting Couples with Weak Marriage Intention

Cohabiting Couples - Strong Intention				Cohabiting Couples - Weak Intention			
Female	Male			Female	Male		
	High School or Less	Some College	B.A. or More		High School or Less	Some College	B.A. or More
High School or Less	472	101	24	High School or Less	347	56	9
Some College	171	161	54	Some College	75	45	13
B.A. or More	43	79	132	B.A. or More	15	18	31

2D. Observed Frequencies for Married Couples who Remained Living Together and Married Couples who Got Separated

Married Couples who Remained Living Together				Married Couples who Got Separated			
Female	Male			Female	Male		
	High School or Less	Some College	B.A. or More		High School or Less	Some College	B.A. or More
High School or Less	1599	466	141	High School or Less	191	30	12
Some College	629	617	357	Some College	44	31	7
B.A. or More	278	480	1389	B.A. or More	9	8	16

*1 The dataset comes the National Survey of Family Growth 2006-2010.

Table 3. Specification of Interaction Parameters in Design Matrix Forms for the Analyses of Japanese Couples^{*1 *2}

Matrix = JP1		Category A			Category B		
		Male			Male		
Female	High School or Less	Junior College	B.A. or More	Female	High School or Less	Junior College	B.A. or More
High School or Less	1	0	0	High School or Less	4	0	0
Junior College	0	2	0	Junior College	0	5	0
B.A. or More	0	0	3	B.A. or More	0	0	6

Matrix = JP2		Category A			Category B		
		Male			Male		
Female	High School or Less	Junior College	B.A. or More	Female	High School or Less	Junior College	B.A. or More
High School or Less	1	0	0	High School or Less	1	0	0
Junior College	0	2	0	Junior College	0	2	0
B.A. or More	0	0	3	B.A. or More	0	0	3

Matrix = JP3		Category A			Category B		
		Male			Male		
Female	High School or Less	Junior College	B.A. or More	Female	High School or Less	Junior College	B.A. or More
High School or Less	1	0	0	High School or Less	3	0	0
Junior College	0	0	0	Junior College	0	0	0
B.A. or More	0	0	2	B.A. or More	0	0	4

Matrix = JP4		Category A			Category B		
		Male			Male		
Female	High School or Less	Junior College	B.A. or More	Female	High School or Less	Junior College	B.A. or More
High School or Less	1	0	0	High School or Less	1	0	0
Junior College	0	0	0	Junior College	0	0	0
B.A. or More	0	0	2	B.A. or More	0	0	2

Matrix = JP5		Category A			Category B		
		Male			Male		
Female	High School or Less	Junior College	B.A. or More	Female	High School or Less	Junior College	B.A. or More
High School or Less	1	0	0	High School or Less	1	0	0
Junior College	0	0	0	Junior College	0	0	0
B.A. or More	0	0	2	B.A. or More	0	0	3

Matrix = JP6		Category A			Category B		
		Male			Male		
Female	High School or Less	Junior College	B.A. or More	Female	High School or Less	Junior College	B.A. or More
High School or Less	1	0	0	High School or Less	1	0	0
Junior College	0	0	0	Junior College	0	0	4
B.A. or More	0	0	2	B.A. or More	0	0	3

Matrix = JP7		Category A			Category B		
		Male			Male		
Female	High School or Less	Junior College	B.A. or More	Female	High School or Less	Junior College	B.A. or More
High School or Less	1	0	0	High School or Less	3	0	0
Junior College	0	0	0	Junior College	0	0	0
B.A. or More	0	0	2	B.A. or More	0	0	2

Matrix = JP8 ^{*3}		Category A			Category B		
		Male			Male		
Female	High School or Less	Junior College	B.A. or More	Female	High School or Less	Junior College	B.A. or More
High School or Less	1	0	0	High School or Less	1*φ	0	0
Junior College	0	0	0	Junior College	0	0	0
B.A. or More	0	0	2	B.A. or More	0	0	2*φ

*1 Each number in a cell represents a distinctive interaction parameter within a design matrix.

*2 Cells sharing zeros are assigned no interaction parameters within the matrix.

*3 φ represents the uniform difference parameter.

Table 4. Specification of Interaction Parameters in Design Matrix Forms for the Analyses of Couples in the United States^{*1 *2}

Matrix = US1		Category A			Category B			
	Female	Male High School or Less	Male Some College	Male B.A. or More	Female	Male High School or Less	Male Some College	Male B.A. or More
High School or Less		1	0	0	High School or Less	4	0	0
Some College		0	2	0	Some College	0	5	0
B.A. or More		0	0	3	B.A. or More	0	0	6

Matrix = US2		Category A			Category B			
	Female	Male High School or Less	Male Some College	Male B.A. or More	Female	Male High School or Less	Male Some College	Male B.A. or More
High School or Less		1	0	0	High School or Less	1	0	0
Some College		0	2	0	Some College	0	2	0
B.A. or More		0	0	3	B.A. or More	0	0	3

Matrix = US3		Category A			Category B			
	Female	Male High School or Less	Male Some College	Male B.A. or More	Female	Male High School or Less	Male Some College	Male B.A. or More
High School or Less		1	0	0	High School or Less	3	0	0
Some College		0	0	0	Some College	0	0	0
B.A. or More		0	0	2	B.A. or More	0	0	4

Matrix = US4		Category A			Category B			
	Female	Male High School or Less	Male Some College	Male B.A. or More	Female	Male High School or Less	Male Some College	Male B.A. or More
High School or Less		1	0	0	High School or Less	1	0	0
Some College		0	0	0	Some College	0	0	0
B.A. or More		0	0	2	B.A. or More	0	0	2

Matrix = US5		Category A			Category B			
	Female	Male High School or Less	Male Some College	Male B.A. or More	Female	Male High School or Less	Male Some College	Male B.A. or More
High School or Less		1	0	0	High School or Less	1	0	0
Some College		0	0	0	Some College	0	0	0
B.A. or More		0	0	1	B.A. or More	0	0	1

Matrix = US6		Category A			Category B			
	Female	Male High School or Less	Male Some College	Male B.A. or More	Female	Male High School or Less	Male Some College	Male B.A. or More
High School or Less		1	0	0	High School or Less	1	0	0
Some College		3	0	4	Some College	3	0	4
B.A. or More		0	0	2	B.A. or More	0	0	2

Matrix = US7		Category A			Category B			
	Female	Male High School or Less	Male Some College	Male B.A. or More	Female	Male High School or Less	Male Some College	Male B.A. or More
High School or Less		1	0	0	High School or Less	1	0	0
Some College		3	0	3	Some College	3	0	3
B.A. or More		0	0	2	B.A. or More	0	0	2

Matrix = US8 ^{*3}		Category A			Category B			
	Female	Male High School or Less	Male Some College	Male B.A. or More	Female	Male High School or Less	Male Some College	Male B.A. or More
High School or Less		1	0	0	High School or Less	1*ϕ	0	0
Some College		3	0	3	Some College	3*ϕ	0	3*ϕ
B.A. or More		0	0	2	B.A. or More	0	0	2*ϕ

Matrix = US9		Category A			Category B			
	Female	Male High School or Less	Male Some College	Male B.A. or More	Female	Male High School or Less	Male Some College	Male B.A. or More
High School or Less		1	0	0	High School or Less	4	0	0
Some College		3	0	3	Some College	6	0	6
B.A. or More		0	0	2	B.A. or More	0	0	5

*1 Each number in a cell represents a distinctive interaction parameter within a design matrix.

*2 Cells sharing zeros are assigned no interaction parameters within the matrix.

*3 ϕ represents a uniform difference parameter.

Table 5. Descriptive Statistics for Japanese Couples by Partnership Types ^{*1}

	Married Couples		Unmarried Couples	
	Total	Total	Relationship Continued	Relationship Dissolved
Male Partner's Educational Level (%)				
High School or Less	0.353	0.260	0.267	0.248
Junior College	0.203	0.209	0.185	0.248
B.A. or More	0.444	0.531	0.548	0.503
Female Partner's Educational Level (%)				
High School or Less	0.326	0.260	0.246	0.285
Junior College	0.447	0.343	0.345	0.339
B.A. or More	0.227	0.397	0.409	0.376
Homogamous Couples (%)	0.534	0.481	0.555	0.497
Sample Size	2977	446	281	165

*1 The dataset comes from the Japanese Life Course Panel Survey.

Table 6. Model Comparison using Fit Statistics for the Analyses of Japanese Couples

Model	Design Matrix	L-squared ^{*1}	D.F. ^{*2}	p-value	BIC ^{*3}
Analysis 1					
Model 1-1	JP1	3.051	2	0.218	-13.225
Model 1-2	JP2	9.701	5	0.084	-30.990
Model 1-3	JP3	13.589	4	0.009	-18.964
Model 1-4	JP4	17.168	6	0.009	-31.662
Model 1-5	JP5	13.614	5	0.018	-27.078
Model 1-6 <i>*our best fitting model</i>	JP6	2.184	4	0.702	-30.369
Analysis 2					
Model 2-1	JP4	7.449	6	0.281	-29.153
Model 2-2 <i>*our best fitting model</i>	JP5	4.387	5	0.495	-26.114
Model 2-3	JP7	6.484	5	0.262	-24.018
Model 2-4	JP8	4.330	5	0.503	-26.171
Analysis 3					
Model 3-1 <i>*our best fitting model</i>	JP4	7.777	6	0.255	-26.054
Model 3-2	JP5	6.809	5	0.235	-21.383
Model 3-3	JP7	7.773	5	0.169	-20.419
Model 3-4	JP8	7.252	5	0.203	-20.940

*1 L-squared stands for the Likelihood Ratio Chi-squared Statistics.

*2 D.F. stands for the degrees of freedom.

*3 BIC stands for Bayesian Information Criteria.

Table 7. Descriptive Statistics for Couples in the United States by Partnership Types ^{*1}

	Married Couples		Unmarried Couples	
	Total	Total	Dating Couples	Cohabiting Couples
Male Partner's Educational Level (%)				
High School or Less	0.436	0.505	0.459	0.608
Junior College	0.259	0.307	0.333	0.249
B.A. or More	0.305	0.188	0.208	0.142
Female Partner's Educational Level (%)				
High School or Less	0.387	0.466	0.429	0.547
Junior College	0.267	0.319	0.336	0.281
B.A. or More	0.346	0.215	0.234	0.172
Homogamous Couples (%)	0.610	0.601	0.582	0.644
Sample Size	6304	5974	4128	1846

*1 The dataset comes from the National Survey of Family Growth 2006-2010.

Table 8. Model Comparison using Fit Statistics for the Analyses of Couples in the United States

Model	Design Matrix	L-squared ^{*1}	D.F. ^{*2}	p-value	BIC ^{*3}
Analysis 1					
Model 1-1	US1	2.580	2	0.275	-16.251
Model 1-2	US2	5.734	5	0.333	-41.344
Model 1-3	US3	101.769	4	0.000	64.106
Model 1-4	US4	103.726	6	0.000	47.233
Model 1-5	US5	131.859	7	0.000	65.950
Model 1-6	US6	4.837	4	0.304	-32.825
Model 1-7 *our best fitting model	US7	5.734	5	0.333	-41.344
Model 1-8	US8	5.612	4	0.230	-32.050
Model 1-9	US9	2.580	2	0.275	-16.251
Analysis 2A					
Model 2A-1	US7	7.467	5	0.188	-36.009
Model 2A-2 *our best fitting model	US8	2.666	4	0.615	-32.114
Model 2A-3	US9	2.376	2	0.305	-15.015
Analysis 2B					
Model 2B-1 *our best fitting model	US7	4.089	5	0.537	-40.940
Model 2B-2	US8	2.215	4	0.696	-33.808
Model 2B-3	US9	0.829	2	0.661	-17.183
Analysis 3					
Model 3-1 *our best fitting model	US7	1.692	5	0.890	-35.912
Model 3-2	US8	1.673	4	0.796	-28.410
Model 3-3	US9	0.962	2	0.618	-14.079
Analysis 4					
Model 4-1 *our best fitting model	US7	5.373	5	0.372	-38.372
Model 4-2	US8	4.928	4	0.295	-30.067
Model 4-3	US9	1.611	2	0.447	-15.887

*1 L-squared stands for the Likelihood Ratio Chi-squared Statistics.

*2 D.F. stands for the degrees of freedom.

*3 BIC stands for Bayesian Information Criteria.

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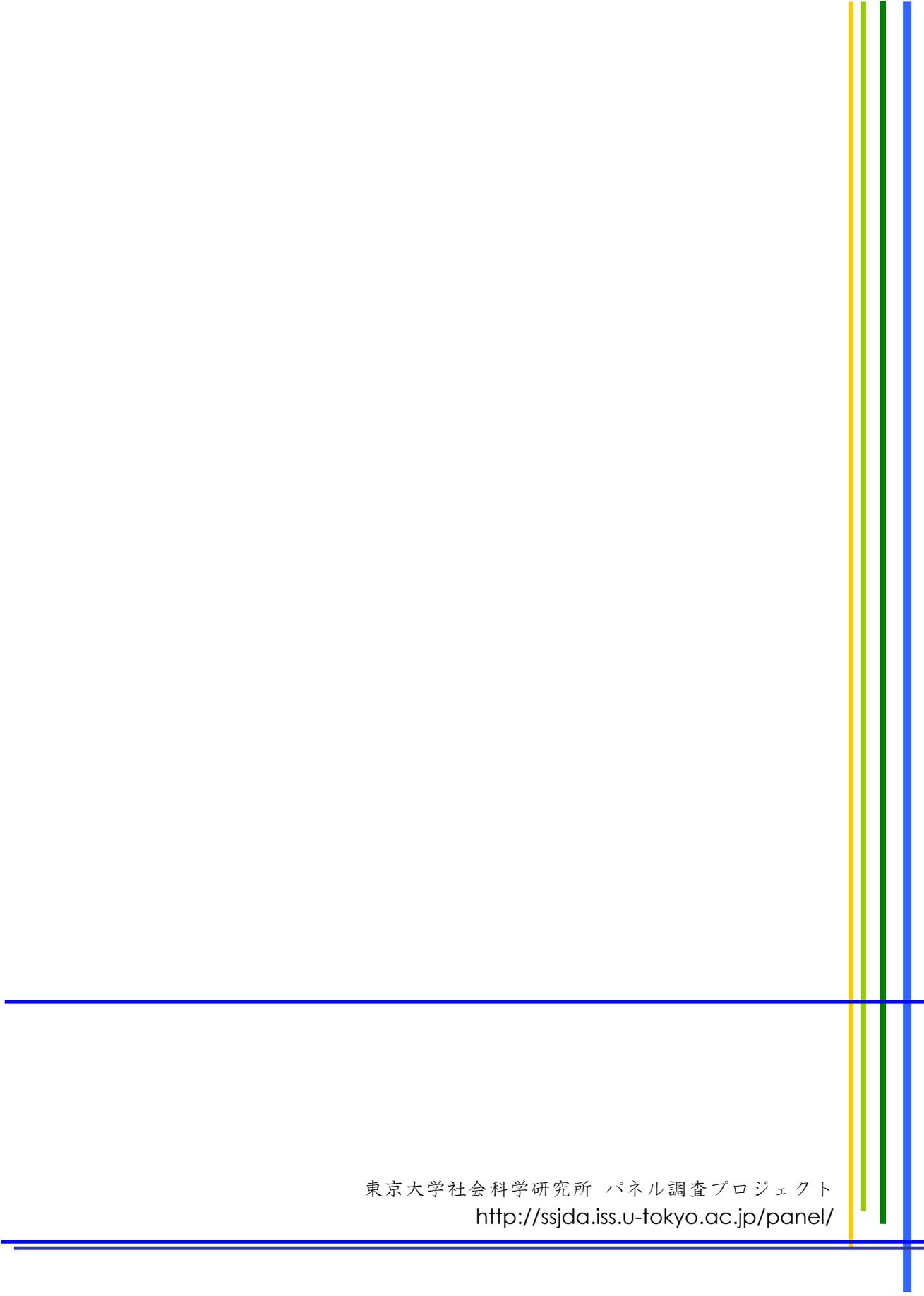
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