

Educational Differences in Divorce in Japan

1. Introduction

Prominent theories of family change suggest that educational differences in marital dissolution should become less pronounced as divorce becomes more prevalent. For example, classic theories of modernization posit that marital dissolution is more common among the highly educated when its legal, social, and economic costs are high, but becomes increasingly common at lower levels of education as divorce becomes more widespread and normatively accepted, and thus more “affordable” (Goode 1963, 1966, 1993). As the legal, social, and economic barriers to divorce wane, and financial stress emerges as a primary reason for marital dissolution, the educational gradient may become negative (Goode 1963). More recent theorization about the “second demographic transition” suggests a similar pattern of change, with new family behaviors such as divorce emerging first among highly-educated innovators before diffusing throughout the population (Lesthaghe and Surkyn 1988).

Empirical evidence is largely consistent with these theorized patterns of change. For example, a recent comparative study by Härkönen and Dronkers (2006) found that educational differences in the risk of divorce declined over time in 9 of 17 countries examined. Similarly, a meta-analysis conducted by Matysiak, Styrac, and Vignoli (2011) demonstrated that the positive educational gradient in divorce has weakened over time. Importantly, both of these studies concluded that the relationship between educational attainment and divorce continues to be positive in countries where divorce is relatively rare and its social and economic costs are presumably high (e.g., Italy, Spain) but not in countries where the prevalence of divorce is highest and its costs are presumably low (e.g., Sweden, United States). Recent research on the U.S. is also consistent with the posited emergence of a negative educational gradient in divorce in settings where divorce is common and its costs are relatively low (Martin 2006; Raley and Bumpass 2003).

In light of these theoretical expectations and empirical findings, fragmentary evidence of a strong negative educational gradient in divorce in Japan presents an interesting theoretical puzzle. While it is true that legal barriers to marital dissolution in Japan are minimal (Fuess 2004) and that rates of marital dissolution have increased markedly since the 1970s (Raymo, Iwasawa, and Bumpass 2004), it is also clear that the social and economic costs of divorce remain substantial. Divorce continues to be socially stigmatized (Ono 2006) and its economic costs are severe, especially for women (Ezawa and Fujiwara 2005). The rarity of joint custody arrangements and limited child support from non-custodial fathers (Zhou 2008) also highlight the potential costs of divorce for children’s well-being.

In this context, evidence of a negative educational gradient in divorce (Katō 2005; Ono 2009), that appears to have become more pronounced in recent years (Ono 2009; Raymo, Iwasawa, and Bumpass 2004), is theoretically unexpected. However, existing research does suggest several potential explanations for this seemingly anomalous pattern. These explanations (discussed below) emphasize distinctive features of public policy, gender relations, and culture, thus making Japan a potentially rich source of insights into the ways in which the predictions of standard theories of family change may need to be modified to account for distinctive features of national context. Unfortunately, however, such insights are difficult to extract from the relatively limited body of existing research on divorce in Japan.

Most of what we know about educational differences in divorce in Japan (and change therein) is based either on data from cross-sectional surveys that appear to seriously underrepresent divorce or on census data that require major, untestable assumptions to produce estimates of trends in education-

al differences (Raymo 2008). In this paper, we seek to address these limitations by using two new sources of data on divorce. We first use data from a large nationally-representative survey conducted in 2005 to document trends in educational differences in divorce. These trend analyses also facilitate initial, indirect evaluation of hypotheses about mechanisms that may underlie relationships between women's educational attainment and divorce. We then use data on married women from an ongoing panel survey to examine correlates of divorce in an effort to shed further light on posited explanations for observed educational differences.

2. Background

2.1 *Divorce trends in Japan*

Japanese marriages are increasingly likely to end in divorce and it is clear that Japan should no longer be viewed as a low-divorce society. Using vital statistics data, Raymo, Iwasawa, and Bumpass (2004) showed that the proportion of marriages dissolving within ten years increased from 12% for marriages taking place in 1980 to 17% for marriages taking place in 1990. More striking, their synthetic cohort estimates based on duration-specific dissolution rates for 2002 indicate that the lifetime probability of divorce is approximately one-third. This is similar to the level observed in many European countries (Andersson and Philipov 2001) and among college-educated women in the U.S. (Raley and Bumpass 2003). It is also much higher than in the Southern European countries with which Japan shares many other demographic similarities (Dalla Zuanna, Atoh, Castiglioni, and Kojima 1998; Raymo, Mencarini, Iwasawa, and Moriizumi 2010). The increasing prevalence of divorce in Japan is well documented (Beppu 2002, 2006; Ikenoue and Takahashi 1994; Ishikawa 2006; Kaneko and Shiraishi 1998; Katō 2005), but information about the correlates of divorce and how they may have changed over time is limited.

2.2 *Educational differences in divorce*

Table 1 summarizes the existing evidence on educational differences in divorce in Japan. With the exception of Ogawa and Ermisch (1994), these studies have all found higher education to be associated with a lower risk of divorce. Raymo and colleagues concluded that women in the lowest educational category (junior high school graduates) have a substantially higher risk of divorce than their counterparts who completed high school (Raymo 2008; Raymo, Iwasawa, and Bumpass 2004). Others who have examined the characteristics of couples find that husbands' education (but not wives') is inversely related to the risk of divorce (Katō 2005; Ono 2009). Estimates of temporal change in the relationship between education and marital dissolution suggest that the concentration of divorce at lower levels of education is a relatively recent phenomenon (Ono 2009; Raymo 2008; Raymo, Iwasawa, and Bumpass 2004).

Evidence of a negative educational gradient in divorce in a country like Japan, where the economic and social costs of divorce remain high, is not consistent with the predictions of prominent theories of family change and suggests that low-cost divorce is not a necessary condition for the emergence of a negative educational gradient in certain contexts. The extreme economic costs of divorce for Japanese women are evidenced by the fact that the proportion of single-mother families (the large majority of which are headed by divorced mothers) in poverty (54%) is higher in Japan than in any other OECD country (OECD 2011). The high rate of poverty among single mothers reflects a combination of low wages for the large majority of single mothers who are employed, limited social expenditures on families in general, and limited public income support for single-mother families in particular (Abe and Oishi 2005; Ezawa and Fujiwara 2005). Perhaps reflecting financial stress and the difficulty of balancing work and parenthood, single mothers also appear to have worse health than their married counterparts (Abe 2008). Furthermore, the social costs of divorce are relatively high. Social dis-

approval of divorce in Japan has declined over time (Atoh 2001) but remains higher than in most other industrialized countries (Yodanis 2005). In this context, standard theories of family change suggest that marital dissolution should be relatively more common among couples possessing the necessary resources to offset the high social and economic costs of divorce and that reductions over time in the positive educational gradient in divorce should be limited. The fragmentary empirical evidence summarized above stands in contrast to these expectations.

2.3 Possible explanations

Existing research suggests several possible contextual modifications to standard theories of family change that might account for a negative relationship between education and divorce in a setting such as Japan where the costs of divorce remain high. For example, one recent study finds that the emergence of a negative relationship between education and divorce is less likely in countries where social expenditures are relatively high and posits that “welfare state generosity helps in stabilizing marriages amongst those with less human capital and more economic-based marital strain” (Härkönen and Dronkers 2006: 514). In Japan, public expenditures on families amounted to only 0.8% of GDP in 2007, one of the lowest values among OECD countries.¹ The combination of economic strain and limited public support may play a particularly important role in destabilizing marriages at the lower end of the Japanese educational spectrum, where the impact of the prolonged economic downturn of the 1990s and 2000s has been most pronounced (Kosugi 2004). This focus on the interactive effects of economic strain and limited public support for families suggests that the negative educational gradient in divorce in Japan should become stronger among marriages occurring subsequent to the economic downturn. It also suggests that the negative relationship between education and divorce at the individual (or couple) level should be explained primarily by indicators of economic stress that are more prevalent at lower levels of education (e.g., lower family income, husband’s marginal employment).

A second set of possible explanations focuses on the distinctive gender division of labor characterizing Japanese marriages. The posited link between higher education and divorce in settings where the economic costs of divorce for women are high (Goode 1963) is based on an assumption that women’s educational attainment is positively associated with their earnings potential, access to resources, and economic independence. This assumption is central to standard economic theories of marital dissolution (e.g., Becker 1991) and is presumably valid in many countries. In the Japanese context, however, the validity of this assumption is questionable given that a large proportion of women (at all educational levels) exit the labor force at marriage or childbirth and that opportunities for subsequent labor market reentry are largely limited to low-skill, low-pay, non-standard employment (Yu 2002). Because the employment of married women in Japan has been motivated primarily by economic necessity (Ogawa and Ermisch 1994), highly-educated women (who tend to be married to well-educated men with relatively high earnings) have actually had relatively low rates of labor force participation (Choe, Bumpass, and Tsuya 2004; Waldfogel, Higuchi, and Abe 1999). Higher employment rates (especially in full-time jobs that could provide a basis for economic independence) and greater spousal similarity in earnings among women without a college education suggest that economic independence might actually be inversely associated with educational attainment among married women in Japan. In this context, highly-educated women’s relatively lower risk of divorce may be explained by lower levels of full-time employment and more limited contributions to family income. This same logic suggests that the negative educational gradient in divorce may be less pro-

¹ This figure comes from the OECD Social Expenditure (SOCX) database available at http://www.oecd.org/document/9/0,3746,en_2649_34637_38141385_1_1_1_1,00.html.

nounced among more recent marriage cohorts, reflecting a weakening of the negative relationship between women's educational attainment and employment (Raymo and Lim 2011) as more highly-educated women remain in the labor force and pursue jobs with opportunities for career advancement (Nagase 2003).

The distinctive gender division of labor among Japanese couples may also contribute to an inverse relationship between wives' education and divorce by increasing the stress associated with balancing work and family among women with lower levels of education. In contrast to the U.S., and many other countries where husbands' participation in domestic work has increased over time (Bianchi, Robinson, and Milkie 2006), the gender division of household labor in Japan remains highly asymmetric. Reflecting long work hours, lengthy commutes, and entrenched gender norms, husbands contribute less than 10% of couples' total housework time and about one-third of married men do no housework at all (Tsuya, Bumpass, Choe, and Rindfuss 2005). Evidence that husbands' housework is positively associated with wives' (and husbands') educational attainment (Tsuya et al. 2005), combined with relatively high employment rates among women at the lower end of the educational spectrum, suggests that stress associated with the "second shift" may contribute to an inverse relationship between educational attainment and marital instability. Evidence of a negative educational gradient in divorce may thus be explained by longer combined employment, commuting, and housework hours among wives at the lower end of the educational distribution. In terms of trends, the weakening negative relationship between wives' education and employment suggests that the negative educational gradient in divorce should be less pronounced among more recent marriage cohorts.

A third possible explanation for the negative educational gradient in divorce emphasizes the role of "face" and the cultural importance of family reputation. Japan has been described as a group-oriented society (Nakane 1970) and a "shame" culture (Lebra 1976) in which identification with family is central and the importance of family status and reputation is strong. In this context, divorce continues to be stigmatized (Ono 2006) and the social costs of a "failed" marriage are potentially greater for families at the higher end of the socioeconomic distribution. This hypothesis was put forth long ago by Goode (1966) who argued that the social control exerted by kin and social networks over individuals (and couples) in patriarchal societies is stronger at higher levels of socioeconomic status where damage to reputation and social standing is more costly. Other scholars have made similar arguments specific to Japan, reflecting an understanding that marriage is a "rigid social institution involving the interests of and influences from the extended family and kinship" (Bumpass and Choe 2004: 20). The influences of kin and social networks may contribute to a negative gradient in divorce either directly – by limiting the likelihood of divorce among the more highly educated, or indirectly – by reducing the likelihood that well-educated women (and men) engage in non-normative family behaviors associated with marital instability (e.g., early marriage, marriage in response to pregnancy, marriage in which the wife is older or more highly educated than the husband). This focus on "face" is based on an assumption that women's educational attainment is a good proxy for family socioeconomic status – an assumption for which there is abundant empirical support in Japan (e.g., Hara and Seiyama 2005). This cultural explanation suggests that the negative relationship between women's educational attainment and divorce should decline over time (as intergenerational influences weaken) and that the lower risk of divorce among the highly educated is explained (in part) by their parents' higher socioeconomic status and by their lower likelihood of engaging in other nonnormative family behaviors associated with marital instability.

2.4 Limitations of existing research

These alternative explanations highlight the potential value of Japan as a source of insights into contextual modification of hypotheses derived from standard theorization regarding relationships be-

tween educational attainment and divorce (and change therein). Unfortunately, however, our confidence in the evidence summarized in Table 1 is limited by the data and methods upon which it is based. Of particular importance is the fact that the two surveys used in many of these studies substantially underrepresent divorce. Comparing the prevalence of divorce across marriage cohorts, Raymo (2008) showed that the retrospective marital histories in the 2000-2003 Japan General Social Surveys (JGSS) and the 2001 National Family Research of Japan (NFRJS01) survey produce estimates of cumulative divorce probabilities that are far lower than those based on registration data in the vital statistics. Indeed, the proportions of marriages ending in divorce (at various durations) in the two sample surveys are less than half of the level estimated using vital statistics data (Raymo 2008). Retrospective marital histories are known to understate divorce, especially at longer durations (Bumpass and Raley 2007), but the degree of understatement in the Japanese surveys begs further explanation. It would not be surprising if response rates among divorced women were low given the high labor force participation rates and work-family stress among single mothers. Underreporting of previous marital dissolution among those who did participate in the surveys is also plausible given the lingering stigma associated with divorce.

Underrepresentation of divorce poses no problem for assessing educational differences in divorce (and change therein) if non-response or underreporting is unrelated to educational attainment (and marriage cohort). Unfortunately, there is no solid empirical basis for evaluating the extent of differential underreporting by education, and the fact that observed educational differences in divorce vary substantially across the JGSS and NFRJS01 (Raymo 2008) is cause for concern.

Evidence of increasing educational differences based on these data (Ono 2009; Raymo 2008) is subject to the same concerns. A relatively high likelihood of non-response or underreporting among older, less-educated divorced women (or younger, better-educated divorcees) could produce spurious evidence of an increasing negative educational gradient in divorce. Recognizing that divorce is substantially underreported in both the NFRJS01 and JGSS, Raymo, Iwasawa, and Bumpass (2004) used education-specific marital status distributions of 35-39 year old women from published tabulations of census data to indirectly evaluate trends in educational differentials. They found a large increase in the relative likelihood of divorce among women in the lowest educational categories (less than high school and high school graduates) but cautioned that their approach relied on potentially problematic, but untestable, assumptions about educational differences in remarriage.

Another limitation of existing research is that no efforts have been made to identify the factors that account for educational differences in the risk of divorce. Existing research has focused on describing educational differences (Raymo, Iwasawa, and Bumpass 2004), often net of other key correlates of divorce (Ono 2009), or has presented results of descriptive multivariate models in which educational attainment is one of many covariates (Katō 2005; Ogawa and Ermisch 1994). Given these limitations, it is safe to say that we know relatively little about the magnitude of educational differences in divorce, even less about change over time in educational differences, and almost nothing about the factors that may contribute to educational differences in divorce. We use two new sources of data to address these limitations.

3. Data and methods

To examine trends in educational differences, we use retrospective marital history data from the 13th Japanese National Fertility Survey (JNFS) conducted in 2005. To evaluate the various explanations for educational differences in divorce posited above, we use data from the Japanese Panel Survey of Consumers (JPSC). Because both the JNFS and JPSC are surveys of women, we are limited to analyses of divorce based on data provided by currently and formerly married women.

3.1 *The Japanese National Fertility Survey*

The JNFS is a nationally representative sample of 18-49 year-old women conducted every five years by the National Institute for Population and Social Security Research. The JNFS has regularly asked respondents if they were previously married, but the 13th survey was the first to ascertain the timing of first marriage and first marital dissolution for those who reported a previous marriage. The 13th JNFS is comprised of separate samples of 4,241 unmarried women and 6,836 married women, with response rates of 70% and 86%, respectively. After excluding never-married women, we are left with a base analytic sample of 7,391.² Excluding those who married prior to 1980 (and thus married at relatively young ages) and those who married after 2000 (and thus have had limited exposure to the risk of divorce) leaves a sample of 5,740 first marriages. Further elimination of 312 women with missing marital history information (e.g., date of marriage, date of divorce) and 46 women missing information on educational attainment reduces our sample to 5,382 (92% of the total sample of women for whom year of first marriage either fell between 1980 and 1999 or was not ascertained).

Use of listwise deletion implies an assumption that missingness is random with respect to marriage cohort, educational attainment, and divorce experience. Simple tabulations suggest that this assumption is not warranted. Women who report having divorced are much more likely than those in their first marriage to be excluded as a result of missing data on the timing of marriage and/or divorce and this relationship is stronger for women with a high school education or less, relative to their more educated counterparts. To assess the sensitivity of our results to violation of the assumption that data are missing at random, we imputed values of missing marriage and divorce dates using median values of age at marriage and duration to divorce and widowhood.³ More specifically, we first imputed missing data on the century month of first marriage by adding observed birth cohort- and education-specific median ages at first marriage (in months) to observed century month of birth. We then imputed missing data on duration to divorce by using observed marriage cohort- and education-specific median durations to divorce. To provide a bound for our estimates, we also made the extreme assumption that all of the 106 currently married respondents with missing information on marital history experienced divorce.

To examine educational differences in divorce, and changes therein, we estimated two sets of proportional hazard models for divorce. We first estimated a model that included educational attainment and marriage cohort and then proceeded to allow educational differences to vary by marriage cohort. We estimated both models for the subset of respondents with no missing data and the full sample with missing data on marital history imputed. We defined marriage cohort by splitting the sample into those who married in the 1980s (44% of total) and those who married in the 1990s (56% of total). Educational attainment is a four-category measure: junior high school, high school, junior college or vocational school, and university. Because the longest exposure to the risk of divorce in the second cohort is 15 years, we censored intact marriages in the first cohort at a duration of 180 months. Because the second cohort is comprised of marriages with lower average exposure to the risk of divorce, we also estimated models using data in which intact marriages were censored at shorter intervals (e.g., 10 years), but doing so did not substantively alter our results.

3.2 *Japanese Panel Survey of Consumers*

² We also excluded 103 unmarried respondents who did not answer the question about previous marriage experience.

³ This procedure resulted in 12 imputed marriage years outside of the period 1980-1999. The sample size for the imputed data is thus 5,662 rather than 5,674.

The JPSC is an ongoing annual survey of a nationally representative sample of women conducted by the Institute for Research on Household Economics. The original sample was stratified by marital status, with 1,002 married women and 498 unmarried women between the ages of 24 and 34 surveyed in the first wave in 1993. A second cohort consisting of 201 married and 299 unmarried women was added in wave 5 (1997) and a third cohort consisting of 351 married and 485 unmarried women was added in wave 11 (2003). The response rate at the first interview in 1993 was low (41%), but characteristics of the resulting baseline sample closely resemble national data and retention across subsequent waves has been about 95% (Higuchi, Iwata, and Nagai 1999).

Our analytic subsample is comprised of person-year records for women in their first marriages, and thus includes those who were married at initial observation in 1993, 1997, or 2003 as well as those who married subsequently.⁴ In this sample, 1,928 individual women contributed 14,304 person-years of exposure to the risk of divorce. Most of these women ($n=1,529$ or 79%) were married at the first observation – wave 1 for the original cohort and waves 5 and 11 for the second and third cohorts, respectively. Marital histories for these women are thus left-truncated but we do know the year of marriage and thus marital duration at initial observation. Marriages of similarly aged women that dissolved prior to the initial survey are left-censored because marital history information was not collected from women who were not married at initial observation.

To evaluate the alternative explanations for educational differences in the risk of divorce summarized above, we used this sample of women in their first marriages to estimate a series of discrete-time hazard models for marital dissolution. Because a significant proportion of women were lost to follow-up during the study and because failure to account for non-random panel attrition may affect estimates for coefficients of interest, we treated loss to follow-up as a competing risk, using the person-year data to estimate multinomial logistic regression models. In the baseline model, we included only educational attainment, a linear measure of marital duration, and a categorical indicator of the presence of children (no children, one child, two or more children). Educational attainment was measured using the same four categories as in the JNFS, but in the analyses presented below we collapsed women in the two highest categories into a single group given small sample size and the similarity of estimated coefficients for women with 2-year and 4-year college degrees.

We then proceeded to incorporate a range of individual and family characteristics that may account for observed educational differences in divorce. To evaluate the role of economic stress, we included measures of family income and husband's employment status. Continuous measures of husbands' and wives' income have been collected at every wave of the survey and we summed these values to construct a measure of total income which we standardized to have a mean of zero and a standard deviation of one. Husband's employment status is a three-category measure distinguishing those in

⁴ We limit our analyses to women in their first marriages given the small number of higher-order marriages observed in our sample ($n = 35$, 2% of all marriages) and evidence that correlates of divorce may differ for first marriages and remarriages (Booth and Edwards 1992). Because women who were married at first observation were not asked about previous marriages, we made the assumption that women living with a child whose age was greater than current marital duration were remarried. This assumption is based on evidence that mothers receive sole custody of children in most divorce cases (Raymo, Iwasawa, and Bumpass 2004) and that premarital births remain very uncommon (National Institute of Population and Social Security Research 2011). This approach obviously precludes identification of remarriages involving women who either did not have children in their first marriage or did not live with children from their first marriage.

regular employment from those who were marginally employed (part-time, contract employees, not working), and those who were self-employed or working in a family business.

To evaluate the role of women's economic independence, we constructed a measure of dependency calculated as husband's income minus wife's income divided by the sum of husband's and wife's income (Sorensen and McLanahan 1987). This measure thus ranges from 1 (total dependency on husband's earnings) to -1 (total dependency on wife's earnings). Women's employment is measured by a dichotomous indicator of regular employment, with all other employment statuses (part-time, contract, self-employed, family worker, not working) coded as zero.

To assess the hypothesized relevance of work-family stress associated with the second shift, we constructed measures of women's time spent on commuting, employment, childcare, and housework on a typical weekday. This information comes from a time use module that has asked women to allocate their time (and their husband's time) across several activities at each wave of the survey.⁵ As with income, we standardized this measure of time use to have a mean of zero and standard deviation of one.

Finally, to assess the role of educational differences in the relevance of "face," we included several measures of nonnormative family outcomes, including early marriage (defined as marriage prior to age 22), an approximation of marriage in response to pregnancy (childbirth and marriage in the same year), and indicators of female age hypogamy (wife older than husband) and educational hypogamy (wife more highly educated than husband).⁶ To the extent that all of these family behaviors are associated with both lower education and the risk of divorce, we expect them to explain some part of the negative educational gradient in divorce. To assess direct associations between family background and the risk of divorce, we included a categorical measure of respondents' fathers' education. The three categories for this measure are less than high school, high school or vocational school, and university.

A total of 1,598 person-year records (11% of the total sample) had missing information on one or more of the covariates. The prevalence of missing values was highest for respondent's income and husband's income, at 8% and 7%, respectively. To avoid the loss of observations, we used the routine for multivariate imputation via chained equations (ICE) in Stata to impute missing values. Descriptive statistics and coefficient estimates presented below are based on five imputed data sets. Other approaches to dealing with missing data (listwise deletion, mean imputation) produced substantively similar results.

4. Results

4.1 Trends in educational differences

Table 2 summarizes the JNFS data, presenting the proportions divorced within 15 years, by educational attainment and marriage cohort. Figures for the sample with missing dates imputed are presented in the lower panel. The overall proportion divorcing within 15 years increased from .08 for the 1980s marriage cohort to .10 for the 1990s cohort despite the shorter average duration of exposure for the second cohort. The figure of .08 for the 1980-89 cohort is substantially lower than the value

⁵ We also considered husbands' participation in childcare and domestic work but this was unrelated to the risk of divorce.

⁶ Because respondents were not asked to provide both the month and year of marriage and first childbirth, it is not possible to construct a standard measure of bridal pregnancy or "shotgun marriage" (i.e., first birth within seven months of marriage).

of .17 for the 1985 cohort based on vital statistics data (Raymo, Iwasawa, and Bumpass 2004), reflecting a level underreporting similar to that in the NFRJS01 and JGSS data. In both cohorts, the small group of women who did not complete high school was, by far, the most likely to divorce. Tabulations that include the imputed data (bottom panel) are similar to those in the upper panel, but the levels of divorce are higher (reflecting our assumptions about missing marital histories). This is particularly true in the 1980-89 cohort among women in the lower two educational categories, reflecting the fact that many of the imputed divorces involved less-educated women in the 1980s marriage cohort.

Table 3 presents the results of proportional hazards models for divorce using the JNFS data. Estimates using the sample with no missing data are on the left and those using imputed values for missing data are on the right. These estimates allow for statistical inference regarding tabulations presented in Table 2. As in Table 2, results of these models show that the risk of divorce is inversely related to educational attainment and increased sharply in the more recent marriage cohort. Relative to high school graduates, the risk of divorce is 33% lower for women with a two-year degree and about 50% lower for those with a four-year college degree. The risk of divorce within fifteen years is 74% higher in the 1990s marriage cohort than in the 1980s cohort.

The estimates of primary interest are the hazard ratios associated with the interaction between educational attainment and marriage cohort. These estimated interaction terms are not large, none approach statistical significance, and their inclusion does not improve model fit. In contrast to earlier research (Ono 2009; Raymo, Iwasawa, and Bumpass 2004), we thus find no evidence that the negative educational gradient in divorce has increased, at least when comparing marriages that took place in the 1980s and 1990s. Conclusions are unchanged when we use the imputed data. Hazard ratios for different levels of educational attainment (relative to high school graduates) are similar in the two sets of models and the cohort increase is smaller (reflecting the relatively high prevalence of imputed divorces in the first cohort).

4.2 Correlates of divorce

Table 4 presents descriptive statistics for the JPSC sample (averaged across the five imputed data sets). We present figures for the full sample of person-years (column 1) and for each of the three educational categories (columns 2-4). Looking first at the outcome variable – marital status at wave t+1 conditional on being in one's first marriage at wave t – we see that divorce occurred in 1% of person-years of exposure and that 4% of respondents were lost to follow-up, on average. The annual probability of divorce is much higher for women in the lowest educational group (.03) than in the other two groups (.01). Although women who do not finish high school are an increasingly small and selective group in Japan, they do comprise 6% of our analytical sample. Clear educational differences exist in most of the variables, with education inversely related to the number of children and positively related to couple's income, husband's regular employment, and women's time spent commuting, working, and engaged in childcare and housework. Contrary to our speculation that highly educated women may be more economically dependent, education is inversely related to income dependence and positively related to regular employment in this sample, perhaps reflecting recent changes in the nature of married women's employment in Japan (Raymo and Lim 2011). As expected, early marriage and bridal pregnancy are much more common among women at the lower end of the educational spectrum, but age hypogamy is unrelated to women's education and educational hypogamy is much more common in the highest educational group (reflecting both ceiling effects and the fact that many women with a two-year degree marry high school graduates). Finally, it is clear that father's education is strongly associated with daughter's education.

Tables 5a and 5b present results for the five models described above. As in our analyses of the JNFS data, the baseline model shows a strong negative educational gradient in divorce. In fact, the odds ratios for the different educational categories in Table 5a are remarkably similar to those presented in Table 3, with the odds of divorce relative to high school graduates three times higher among junior high school graduates and roughly half as large among women with a tertiary education. We also see that women with two or more children are significantly less likely to divorce than their counterparts with no children. Importantly, Table 5b shows that there are no significant educational differences in the risk of panel attrition, and estimated educational differences in the risk of divorce in these models are nearly identical to those in models that do not treat loss to follow-up as a competing risk (not shown).

Results for Model 2 show that, consistent with expectations, lower income and husband's marginal employment are both strongly associated with an elevated risk of divorce. Relative to couples with the mean level of income, the odds of divorce are 41% higher for those whose income falls one standard deviation below the mean (i.e., $1.00/0.71 = 1.41$). Similarly, women whose husbands are employed part-time, in contract work, or not working have odds of divorce that are nearly three times larger than those with husbands in regular employment. Controlling for these measures of economic stress reduces the estimated educational differences in divorce somewhat, but the negative educational gradient remains pronounced and statistically significant.

In Model 3, the relationship between divorce and the measure of women's economic independence is consistent with expectations. The odds of divorce for women whose income is equal to their husbands are over twice as likely to divorce as those who are completely dependent on husband's income (i.e., $1.00/0.45 = 2.22$). Similarly, women who are in regular employment appear to have a higher risk of divorce than those who are not, but this difference is not statistically different from zero. However, as noted above, higher education is associated with greater economic independence in this sample, and inclusion of these indicators of women's economic (in)dependence does little to alter the estimated educational differences in divorce.

Model 4 provides no evidence to support the "second shift" hypothesis, as women's total work hours are unrelated to the risk of divorce. The results of Model 5 are interesting and partially inconsistent with the hypotheses developed above. Consistent with expectations, non-normative family behaviors are strongly associated with divorce. The odds of divorce are roughly twice as large for women who married a man younger than themselves, married in response to pregnancy, and married before age 22. However, contrary to the "face" hypothesis elaborated above, fathers' education is positively related to the risk of daughters' divorce. Relative to those whose fathers did not complete high school, the odds of divorce are 49% higher for women whose father completed high school or vocational school and 83% higher for those whose father graduated from university. Presumably, parental economic resources and access to housing and other forms of financial support following divorce are more important than "face" in predicting divorce (unless, of course, loss of face associated with divorce is more important for lower SES families). Higher paternal education offsets the marriage destabilizing behaviors concentrated among women with lower education so that the educational differences in divorce in this final model are similar to those observed in the previous models. Thus, none of our posited explanations accounts for the pronounced negative educational gradient in divorce in Japan.

5. Discussion

Our goal in this paper was to provide the first comprehensive analysis of educational differences in divorce in Japan. To this end, we used data from a large survey with retrospective marital history in-

formation to estimate educational differences in divorce and their change across two marriage cohorts and data from an ongoing panel survey to examine individual and family factors that may account for observed educational differences in divorce.

In the first set of analyses, we found a strong negative educational gradient in the risk of divorce, with women who completed a two-year or four-year college degree 30-50% less likely than high school graduates to divorce within the first 15 years of marriage. The small group of women who did not complete high school also had a far higher likelihood of divorce than any other group. In these analyses, we found no evidence that the negative educational gradient in divorce has grown over time. Our results thus provide no support for the one scenario in which we expected a stronger negative gradient in the second cohort (economic stress) or for the three scenarios in which we expected the negative educational gradient to weaken over time (women's independence, work-family stress, and face).

Our second set of analyses confirmed the strong negative educational gradient in divorce, with estimated educational differences very similar to those found in our analyses of the JNFS data. We also found that, with two exceptions, the posited correlates were related to the risk of divorce in expected ways. The exceptions were women's total time spent on work, commuting, childcare, and housework, which was unrelated to the risk of divorce, and father's education, which was positively related to the risk of divorce. Contrary to our expectations, however, inclusion of these variables did little to explain the large estimated educational differences in the risk of divorce. Indeed, the only result consistent with our hypotheses was evidence that the negative educational gradient was partially explained by lower combined income and husband's marginal employment among women with lower levels of education. The concentration of early marriage and bridal pregnancy (included in Model 5) also explained a small part of the high relative likelihood of divorce among the least educated women.

The theoretical puzzle motivating our analyses thus remains unsolved. The relative insensitivity of the educational gradient to control for posited mediators suggests three possibilities. The first is that we have not adequately measured the key concepts of economic hardship, wives' economic dependence, work-family stress, and the role of "face." However, most of the measures used in our analyses are standard and straightforward, thus suggesting that incorporation of additional measures of the same concepts would presumably not alter our results. It is possible that there are other dimensions of "face" or reputation that we have not measured. Examples might include the role of family, friends, and coworkers in bringing couples together or the importance of family stability for husband's reputation at work. If couples introduced by family, friends, or work colleagues are less likely to divorce, and if such pairings are more common among the highly educated (or more stable among the highly educated), we would expect a negative relationship between education and divorce. Similarly, if stable marriage is relevant for men's promotion prospects (or successful social interactions more generally), higher opportunity costs of divorce may contribute to the observed negative educational gradient. Unfortunately, the data needed to evaluate these hypotheses do not exist.

A second possibility is that our data are problematic, with divorces among highly-educated women underrepresented. Although both surveys produce predicted levels of divorce that are lower than those based on vital statistics data, the estimated educational differences in the two surveys are nearly identical. This similarity reduces our concerns about data quality somewhat.

The third, and most interesting, possibility is that the four explanations we have offered are indeed largely irrelevant and some other form of contextual modification to standard theorization is required to understand the strong negative relationship between educational attainment and divorce in Japan. Possible examples might include patterns of selection into marriage or the central importance of in-

vestment in children's educational success in Japan's highly competitive educational system. Evidence that highly-educated women are less likely to ever marry (e.g., Raymo 2003) suggests the possibility that those who do marry may be more selective than their less educated counterparts with respect to effort invested in the spouse search process, marital commitment, or other unobservable factors associated with marital stability. Alternatively, the observed negative educational gradient may reflect stronger commitment to, and familial investment in, children's educational success among more highly-educated women (and their husbands) in a context where private expenditures on education are large, competition for entrance into more prestigious schools is fierce, and educational success is a powerful predictor of life outcomes.

Subsequent efforts to understand the theoretically unexpected relationship between educational attainment and divorce in Japan should seek to employ richer data (that cover a longer period of historical time and do not suffer from the same degree of underrepresentation of divorce that characterizes the JNFS and JPSC). Another potentially useful strategy is the evaluation of similar questions in societies like Japan where divorce has increased rapidly while the social and economic costs remain substantial. Interestingly, Park and Raymo (2009) find evidence of a strong negative educational gradient in divorce in Korea, another setting where such a relationship is not predicted by standard theoretical frameworks. Better understanding the conditions that contribute to a concentration of divorce at the lower end of the socioeconomic spectrum despite limited reduction in its social and economic costs has potentially important implications for the evaluation of linkages between family change and processes of stratification in other countries in Asia (and elsewhere) where divorce is currently uncommon but family change is occurring rapidly.

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Table 1: Evidence on educational differences in divorce in Japan

Author (Year)	Data source	Unit of analysis	Findings
Ogawa and Ermisch (1994)	1988 Mainichi Family Survey	Women	No educational differences
Raymo, Iwasawa, and Bumpass (2004)	1980, 1990, 2000 Japanese Censuses	Women	Negative educational gradient in recent years
Katō (2005)	National Family Research Japan 2001	Couples	Husband's education negatively associated with divorce
Raymo (2008)	National Family Research Japan 2001	Women	Negative educational gradient, no evidence of change across marriage cohorts
Raymo (2008)	2000-2003 Japan General Social Surveys	Women	Negative educational gradient, no evidence of change across marriage cohorts
Ono (2009)	2000-2002 Japan General Social Surveys	Couples	Husband's education negatively associated with divorce in recent marriage cohorts

Table 2: Proportion divorced within 15 years of marriage, by marriage cohort and educational attainment (13th Japanese National Fertility Survey)

Educa- tion	Marriage cohort = 1980-1989			Marriage cohort = 1990-1999		
	Did not divorce	Divorced	Total	Did not divorce	Divorced	Total
Junior High School						
n	82	24	106	73	36	109
%	0.77	0.23	1.00	0.67	0.33	1.00
High School						
n	1,055	105	1,160	1,131	152	1,283
%	0.91	0.09	1.00	0.88	0.12	1.00
Junior College/Vocational School						
n	753	46	799	1,086	98	1,184
%	0.94	0.06	1.00	0.92	0.08	1.00
Univer-						
n	272	16	288	426	27	453
%	0.94	0.06	1.00	0.94	0.06	1.00
Total						
n	2,162	191	2,353	2,716	313	3,029
%	0.92	0.08	1.00	0.91	0.10	1.00

Educa- tion	Marriage cohort = 1980-1989*			Marriage cohort = 1990-1999*		
	Did not divorce	Divorced	Total	Did not divorce	Divorced	Total
Junior High School						
n	83	43	126	77	47	124
%	0.66	0.34	1.00	0.62	0.38	1.00
High School						
n	1,065	173	1,238	1,146	205	1,351
%	0.86	0.14	1.00	0.85	0.15	1.00
Junior College/Vocational School						
n	765	73	838	1,095	127	1,222
%	0.91	0.09	1.00	0.90	0.10	1.00
Univer-						
n	276	21	297	429	37	466
%	0.93	0.07	1.00	0.92	0.08	1.00
Total						
n	2,189	310	2,499	2,747	416	3,163
%	0.88	0.12	1.00	0.87	0.13	1.00

Note: * indicates sample that includes observations with missing data imputed

Table 3: Hazard ratios from Cox regression models for divorce within 10 years of marriage

Variable	Listwise deletion of missing data		Imputation of missing data	
	Model 1	Model 2	Model 1	Model 2
<i>Education</i>				
	*	*	*	*
Junior high school	2.98 *	2.78 *	2.90 *	2.88 *
High school (omitted)	1.00	1.00	1.00	1.00
	*		*	*
Junior college/Vocational school	0.67 *	0.62 *	0.65 *	0.61 *
	*		*	
University	0.53 *	0.60 #	0.51 *	0.49 *
<i>Marriage cohort</i>				
1980-89 (omitted)	1.00	1.00	1.00	1.00
	*		*	
1990-99	1.74 *	1.69 *	1.41 *	1.36 *
<i>Interaction</i>				
Junior high school x 1990-99		1.15		1.01
Junior college/Vocational school x 1990-99		1.12		1.13
University x 1990-99		0.83		1.05
N	5,382	5,382	5,662	5,662
df	4	7	4	7
log-likelihood	-4,196	-4,195	-6,084	-6,084

** p< .01, * p<.05, # p<.10

Table 4: Descriptive statistics for the JPSC sample, by educational attainment

Variable	Total	Junior high school	High school	Jr. college/ Voc. school/ University
<i>Status at wave t+1</i>				
Married	0.95	0.92	0.95	0.95
Divorced	0.01	0.03	0.01	0.01
Lost to follow-up	0.04	0.05	0.04	0.04
<i>Education</i>				
Junior high school	0.06	1.00	0.00	0.00
High school	0.63	0.00	1.00	0.00
Jr. college/Vocational School/University	0.31	0.00	0.00	1.00
<i>Marital duration (years)</i>				
	9.33	10.8	9.62	8.45
(s.d)	(5.2	(5.44	(5.25)	(5.16)
<i>Number of children</i>				
Zero	0.13	0.06	0.11	0.19
One	0.23	0.21	0.20	0.28
Two or more	0.64	0.73	0.69	0.53
<i>Couple income (standardized)</i>				
	0.00	-0.36	-0.08	0.22
(s.d)	(1.0	(0.87	(0.96)	(1.05)
<i>Husband's employment status</i>				
Regular employee	0.85	0.75	0.83	0.90
Part-time/contract/not working	0.04	0.07	0.04	0.03
Self-employed/family worker	0.11	0.17	0.12	0.07
<i>Income dependency</i>				
	0.72	0.78	0.72	0.69
(s.d)	(0.3	(0.35	(0.36)	(0.40)
<i>Regular employment^a</i>				
	0.19	0.12	0.17	0.23
<i>Total work, commuting, and domestic hours (standardized)</i>				
	0.00	-0.07	0.00	0.01
(s.d)	(1.0	(1.06	(0.99)	(1.00)
<i>Early marriage^a</i>				
	0.09	0.45	0.09	0.01
<i>Bridal pregnancy^a</i>				
	0.06	0.16	0.07	0.03
<i>Educational hypogamy^a</i>				
	0.16	0.00	0.10	0.32
<i>Age hypogamy^a</i>				
	0.14	0.14	0.13	0.15
<i>Father's education</i>				
Less than high school	0.44	0.63	0.51	0.23
High school/vocational school	0.44	0.33	0.42	0.49
University	0.13	0.04	0.05	0.28
N	14,3	832	9,001	4,471

a: 1=yes, 0=no

Table 5a: Odds ratios from competing risks models of divorce (divorce vs. remaining mar-

<i>Variable</i>	Model 1	Model 2	Model 3	Model 4	Model 5
<i>Education</i>					
Junior high school	3.16 *	2.74 *	2.94 *	2.94 *	2.26 **
High school (omitted)	1.00	1.00	1.00	1.00	1.00
Jr. college/Vocational /University	0.53 *	0.61 *	0.61 *	0.60 *	0.48 **
<i>Marital duration</i>					
	1.01	1.01	1.01	1.01	1.02
<i>Number of children</i>					
Zero (omitted)	1.00	1.00	1.00	1.00	1.00
One	0.82	0.78	1.03	0.97	0.89
Two or more	0.49 *	0.47 *	0.62 #	0.57 #	0.47 *
<i>Couple income (standardized)</i>					
		0.71 *	0.66 *	0.65 *	0.70 **
<i>Husband's employment status</i>					
Regular employee (omitted)		1.00	1.00	1.00	1.00
Part-time/contract/not working		2.73 *	1.71 #	1.71 #	1.58
Self-employed/family worker		1.28	1.24	1.23	1.30
<i>Income dependency</i>					
			0.45 *	0.46 *	0.48 **
<i>Regular employment^a</i>					
			1.46	1.42	1.41
<i>Total work, commuting, and domestic hours (standardized)</i>					
				1.08	1.07
<i>Early marriage^a</i>					
					1.82 *
<i>Bridal pregnancy^a</i>					
					2.48 **
<i>Educational hypogamy^a</i>					
					1.42
<i>Age hypogamy^a</i>					
					1.70 *
<i>Father's education</i>					
Less than high school (omitted)					1.00
High school/vocational school					1.49 *
University					1.83 *
N	14,304	14,30	14,304	14,30	14,304
df	10	16	20	22	34
log-likelihood	-3,341	-3,322	-3,305	-3,304	-3,283

** p< .01, * p<.05, # p<.10

a: omitted category is “no”

Table 5b: Odds ratios from competing risks models of divorce (panel attrition vs. remaining unmarried)

<i>Variable</i>	Model 1	Model 2	Model 3	Model 4	Model 5
<i>Education</i>					
Junior high school	1.21	1.25	1.25	1.25	1.10
High school (omitted)	1.00	1.00	1.00	1.00	1.00
Jr. college/Vocational /University	0.97	0.93	0.93	0.93	0.91
<i>Marital duration</i>	0.99	0.99	0.99	0.99	0.98 #
<i>Number of children</i>					
Zero (omitted)	1.00	1.00	1.00	1.00	1.00
One	0.66 *	0.68 *	0.70 *	0.69 *	0.70 *
Two or more	0.65 *	0.69 *	0.70 *	0.69 *	0.69 *
<i>Couple income (standardized)</i>		1.11 *	1.09 *	1.09 *	1.09 *
<i>Husband's employment status</i>					
Regular employee (omitted)		1.00	1.00	1.00	1.00
Part-time/contract/not working		1.38 #	1.42 #	1.42 #	1.38
Self-employed/family worker		1.28	1.24	1.23	1.30
<i>Income dependency</i>		0.83	0.87	0.87	0.86
<i>Regular employment^a</i>			1.38 *	1.38 *	1.35 *
<i>Total work, commuting, and domestic hours (standardized)</i>				1.00	1.01
<i>Early marriage^a</i>					1.40 *
<i>Bridal pregnancy^a</i>					1.09
<i>Educational hypogamy^a</i>					0.95
<i>Age hypogamy^a</i>					0.83
<i>Father's education</i>					
Less than high school (omitted)					1.00
High school/vocational school					0.94
University					1.25 #
N	14,304	14,30	14,304	14,30	14,304
df	10	16	20	22	34
log-likelihood	-3,341	-3,322	-3,305	-3,304	-3,283

** p< .01, * p<.05, # p<.10

a: omitted category is “no”