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MPIDR Working Paper WP 2020-026 I May 2020
https://doi.org/10.4054/MPIDR-WP-2020-026

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Anna Oksuzyan I oksuzyan@demogr.mpg.de
Sven Drefahl
Jennifer Caputoe
Siddartha Aradhya

This working paper has been approved for release by: Kieron Barclay (barclay@demogr.mpg.de),
Deputy Head of the Laboratory of Population Health.

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Is it better to intermarry? Ethnic composition of marriages and suicide risk among native-born and migrant persons in Sweden.

Anna Oksuzyan[1], Sven Drefahl[2], Jennifer Caputo[3], Siddartha Aradhya[2]

1 – Max Planck Institute for Demographic Research, Rostock, Germany
2 – Demography Unit, Institute of Sociology, Stockholm University, Sweden
3 – The Center on the Demography and Economics of Aging, the University of Chicago, USA

Corresponding author:
Anna Oksuzyan
Max Planck Institute for Demographic Research, Konrad-Zuse-Str. 1, DE-18057
Email: Oksuzyan@demogr.mpg.de
Phone: +49 381 2081 178

Abstract

Marriage is protective against suicide across populations, including for persons of different ethnicities and immigrant backgrounds. However, the well-being benefits of marriage are contingent upon marital characteristics—such as conflict and quality—that may vary among persons of different migration backgrounds in interaction with the migration background of their spouse. Leveraging Swedish register data, we compare suicide mortality hazard among married persons on the basis of their and their spouse's migration background. We find that relative to those in a native Swede-Swede union, Swedish men married to female immigrants and immigrant women married to native men are at higher risk of death by suicide, while immigrants of both genders who are married to someone from their birth country have lower suicide mortality risk. The findings support hypotheses about the strains that may be encountered by those who intermarry, as well as the potential selection of individuals into inter- and intra-ethnic marriages.

Introduction

In 2016, the World Health Organization attributed 793,000 deaths worldwide to suicide (WHO 2018). Suicide was recognized as a social problem by Durkheim in 1897 (Durkheim 1897), who noted that social integration, including marriage, appeared to be protective against suicide—a finding that continues to be replicated in more recent research (Stack 1990; Stack and Wasserman 1993). Although married persons are at lower risk of suicide mortality across populations, research also documents variations in these benefits across social groups, such as by gender (Denney et al. 2009; Luoma and Pearson 2002), age (Erlangsen et al. 2004), and ethnic background (Spallek et al. 2015; Wadsworth and Kubrin 2007). Other potential sources of variation are understudied, including the migration background of spousal dyads. Scholarly interest in inter- and intra-ethnic marriages –that is, whether an individuals are married to someone from a different or the same ethnic background (hereafter, intermarriage and intramarriage, respectively)—has grown in recent years (Dribe and Lundh 2008; Furtado and Song 2015; Meng and Gregory 2005; Meng and Meurs 2009; Milewski and Kulu 2014). Intermarriage is considered a strong indicator of immigrants' social and economic integration in a host country. At the same time, investigators find that intermarriages are less stable than intramarriages owing to strains including familial cultural conflict, experiences with discrimination, and reduced marital quality. Despite the increased interest in the meanings of inter- and intramarriage, assessments of whether it is more beneficial for mental health to marry someone from the same or a different ethnicity are scarce. This knowledge lacunae is attributable to a lack of large-scale longitudinal datasets measuring health among immigrant populations within spousal dyads.

Leveraging Swedish registry data, we investigate differences in suicide risk across inter- and intramarried individuals of both Swedish and migrant origins. In addition, focusing on the immigrant population only, we ask whether the risk of suicide differs for those married to a Swede or an immigrant from a different country in comparison with those who are married to other immigrants from their same country of origin. Our findings show that intermarriages involving Swedish men and immigrant women are characterized by significantly elevated hazard of suicide for both parties, while intramarried immigrants have markedly reduced hazard of suicide relative to intramarried Swedes. These results suggest that the mental health benefits provided by marriage vary dynamically across family migration contexts.

Background

Marriage, Health and Well-being

In his classic social study on suicide, Durkheim (1897) argued that it was often driven by an extreme lack of integration with society. He considered marriage to be one of the most important indicators of social integration, and noted that the frequency of suicide deaths was much lower among the married. Later research provided further compelling evidence that marriage bonds are linked to lower suicidal behavior (Kposowa 2002; Pekka Martikainen and Valkonen 1996; Stack 1990). Some prior epidemiological work suggests that married persons have the lowest suicide rates relative to any other marital status group (Luoma and Pearson 2002; Smith, Mercy, and Conn 1988). Other studies show lower risk of suicide among the married in comparison to only widowed (Pekka Martikainen and Valkonen 1996) or divorced (Kposowa 2002; Stack and Scourfield 2015; Stack and Wasserman 1993). The broader longevity advantage of married individuals was documented by William Farr as early as 1858 (Farr 1858). Since this seminal early work was published, substantial benefits of being married have been found for a host of both physical and mental health indicators, including reduced rates of acute conditions and work disability (Verbrugge 1979), earlier-stage diagnosis of and survival from cancer (Kravdal 2001; McLaughlin, Fisher, and Paskett 2011), lower risk of disability at older ages (Goldman, Korenman, and Weinstein 1995), lower rates of depression (Pearlin and Johnson 1977; Simon 2002), and increased happiness (Stack and Eshleman 1998).

However, these benefits do not always apply equally across social groups. Numerous studies have shown variations in mortality risk by marital status across cohorts (Hu and Goldman 1990; P Martikainen and Valkonen 1996), for different causes of death (Pekka Martikainen and Valkonen 1996), and according to different spousal age gaps (Drefahl 2010). Racial and ethnic variations in the longevity benefits of marriage have also been documented, with U.S.-based studies suggesting that marriage is more closely linked to reduced mortality for white compared to minority individuals (Elwert and Christakis 2006; Johnson et al. 2000; Martínez et al. 2016). Gender differences have received particular attention, with studies indicating that marriage is a stronger deterrent against suicide for men than women (Denney et al. 2009; Gove 1973; Kposowa 2002; Luoma and Pearson 2002). Other potential variations in the relationship between marriage and suicide mortality, such as by immigration status and spousal characteristics, have yet to be systematically explored.

Scholars have offered non-mutually exclusive explanations – marital selection and marital protection – for the relationship between marriage and improved health and lower mortality (Goldman 1993). The marital selection hypothesis suggests that persons with certain traits and health-related behaviors are positively selected into marriage and are more likely to stay married (Johnson et al. 2000). The marriage protection hypothesis draws on the socially integrative functions of marriage, and is supported by studies showing that marriage is related to better health though improved health behaviors and by providing economic security and larger social networks (Durkheim 1897; Ross 1995; Umberson 1987; Waite 1995). Empirical findings suggest that many spouses (attempt to) monitor their partners' health behaviors, especially female spouses, and may encourage a healthy diet and regular sleeping patterns, greater physical activity, and limits on alcohol and cigarette consumption (August and Sorkin 2010; Umberson 1992; Wilson and Oswald 2005). Other studies indicate that the health-related social control, emotional support and economic security provided by spouses can be especially important around stressful times, such as after being diagnosed with a new illness (Margolis 2013) or experiencing involuntary job loss (Gallo et al. 2000).

Some research findings have questioned whether it is the presence or the quality of a marital tie that is more important for promoting health and well-being. Besides being protective, marriage also has the potential to introduce interpersonal stressors that may pose health challenges. Indeed, there is a compelling evidence that marital strain is linked to poorer self-rated health and psychological well-being, as well as higher mortality (Robles and Kiecolt-Glaser 2003; Ryan and Willits 2007; Umberson et al. 2006), suggesting that strained partnerships can negate some of the benefits of marriage.

Psychological stress stemming from marital conflicts may negatively affect health by increasing biological vulnerability (Khanfer, Lord, and Phillips 2011; Vitlic et al. 2014) and risky health behaviors (Umberson et al. 2006). Scholars have also found a strong positive association between discord in the partner relationship and suicide attempts, even after adjustment for previous psychiatric diagnoses or psychological distress (Kaslow et al. 2000; Robustelli et al. 2015). Although married and non-married Air Force members who committed suicide from 1996–2006 reported a similar number of life stressors in the day before the suicide, married persons were more likely to report interpersonal stressors in the 30 days before the event (Martin et al. 2013).

Inter- and Intra-Ethnic Marriages and Well-being

Questions about whether it is more beneficial for mental health and general well-being to be married to someone from the same (intramarriage) or a different culture (intermarriage) remain under-studied. On the one hand, it may be that intermarriage is generally beneficial for both native-born and immigrant persons as it increases cultural capital, which may enhance individuals' sense of meaning and well-being (Rodríguez-García 2015). Immigrant populations may especially stand to benefit from marrying native spouses. Intermarriage has long been considered as a key measure of the social, economic, cultural and political integration of different ethnic and immigrant groups (Alba and Golden 1986; Rodríguez-García 2015). Living with native-born spouses can be an effective way to improve language skills, get access to social networks, and gain knowledge about mainstream cultures and social norms, and healthcare and social systems of the host country, all of which are essential for improving immigrants' integration into host societies, and thereby, their well-being. Providing evidence that intermarriage benefits immigrants, in a study of all marriages that occurred in Sweden from 1968 to 2003, Dribe and Lundh (2008) showed that intermarriage was strongly and positively related to immigrants' economic outcomes. Specifically, immigrants married to natives were more likely to be employed and had higher individual and household incomes than immigrants married to another immigrants (Dribe and Lundh 2008; Tegunimataka 2017). The intermarriage premium for economic outcomes has also been found in Denmark (Elwert and Tegunimataka 2016), Australia (Meng and Gregory 2005), France (Meng and Meurs 2009), and the U.S. (Furtado and Song 2015). The selection of immigrants with higher earning potential into intermarriage with native persons has been put forward to explain this relationship (Dribe and Nystedt 2011). However, positive effects of intermarriage on economic outcomes for immigrants to Denmark have been observed even at the time of household formation, suggesting that intermarriage may truly improve integration and economic achievements for at least some immigrant groups (Elwert and Tegunimataka 2016). These cultural and economic benefits of intermarriage may extend to health, resulting in overall greater well-being among intermarried than intramarried persons. At least one existing study partially supports this view. Using longitudinal data from nine European countries, Milewski and Gawron (2019) found better mental health among intermarried immigrants, but not among their native-born spouses. This study highlights the possibility that the relationship between martial composition and mental health differs by nativity within spousal dyads.

On the other hand, intermarriage may not necessarily lead to the reconciliation of intercultural, interracial, or interfaith differences between partners. It can also be accompanied by stressors, including cultural conflicts between spouses and extended family members, experiences with discrimination, and reduced marital quality, which are all linked to poorer health. Hohmann-Marriott and Amato (2008) found that relative to the same-ethnic unions, interethnic unions reported lower levels of relationship quality, which was largely accounted for by fewer shared values and less support from parents. Studies also indicate that, despite being beneficial for immigrants' integration and economic outcomes, intermarriages are less stable than intramarriages (Dribe and Lundh 2012; Kalmijn, de Graaf, and

Janssen 2005; Milewski and Kulu 2014). Similarly, higher rates of divorce were found for interracial marriages (Bratter and King 2008; Zhang and Van Hook 2009). Scholars have hypothesized that this is attributable to differences in socio-cultural backgrounds, e.g., in values, norms, attitudes, and communication styles, which result in increased misunderstandings and opportunities for marital discord (Kalmijn et al. 2005; Zhang and Van Hook 2009). Furthermore, some findings suggest that the risk of divorce increases as cultural differences within interethnic spousal dyads increase (Kalmijn et al. 2005). For example, in their analysis of the Swedish population, Dribe and Lundh (2012) found that the relative risk of union dissolution in intermarriages involving individuals from cultures that were the most similar to Sweden was just 10-38% higher than in endogamous native couples, while the risk of dissolution was 61- 155% higher in intermarriages involving immigrants from the most culturally dissimilar countries (Dribe and Lundh 2012).

Although there are fewer analyses of the intermarriage-health relationship outside of the U.S., research examining psychological well-being in Turkish-British marital dyads showed that both migrant and native-born spouses had higher depression scores if they reported cultural conflict (Baltas and Steptoe 2000). Additionally, using longitudinal data, Potarca and Bernardi (Potarca and Bernardi 2019) found that Turkish and Eastern European immigrants married to native Germans experienced substantial decline in well-being four years after marriage, while no decline was observed among ethnic intramarriages. These patterns were explained by cultural conflicts in Turkish-German intermarriages and the mismatch between education and employment--i.e. higher unemployment status despite having higher education relative to other immigrant groups--experienced by Eastern European immigrants.

In addition to experiencing marital strain due to cultural differences, intermarried individuals may face discrimination and lack of support from family and friends, all of which may increase psychological distress (Djamba and Kimuna 2014; Herman and Campbell 2012; Hohmann-Marriott and Amato 2008; Mills et al. 1995). Some studies based in the U.S. found that people in interracial marriages were more likely to experience psychological distress and reported having worse health than their same-race married peers (Bratter and Eschbach 2006; Miller and Kail 2016; Yu and Zhang 2017). For example, Bratter and Eschbach (2006) showed that some intermarried couples, e.g. White men and women or Hispanic men and women married to non-Whites experience greater psychological distress, although these patterns were not observed among all intermarried unions. Burke (2015) found that partners in the Latino-White relationships reported higher levels of psychological distress and greater levels of perceived discrimination compared to those in the Latino-Latino unions and that perceived discrimination was strongly linked with mental well-being for both interracial and intraracial relationships. Qualitative interviews also suggest that interracially married individuals receive little support from their social networks and even lose some of their social ties because of interracial nature of their relationship (Killian 2002).

It can also be that selection processes whereby men and women with unhealthy behaviors are more likely to form interracial spousal dyads contribute to the explanation of the health disadvantage of interracially married people. However, the health gap between whites in same-race and interracial marriages appears to remain significant after accounting for differences in health behaviors (Yu and Zhang 2017).

Immigrants' Health and Suicide Behaviors

Migration scholars have long noted that immigrants live longer than people born in the destination countries despite having lower socioeconomic status (Mehta et al. 2016; Razum, Zeeb, and Gerhardus 1998). The most commonly cited explanations for the immigrant mortality advantage is that people are positively selected with respect to health and socioeconomic status to migrate (Razum and Twardella

2002) and that migrants tend to have healthier lifestyles than non-migrants (Lariscy, Hummer, and Hayward 2015) (Jayaweera and Quigley 2010) (Dixon, Sundquist, and Winkleby 2000). While some studies find that immigrants have healthier profiles than native born persons (Diaz et al. 2015; Read and Reynolds 2012; Riosmena, Wong, and Palloni 2013; Wallace and Kulu 2014), others indicate that immigrants are more likely to report limiting illness, chronic conditions, and poor self-rated health (Evandrou et al. 2016; Newbold and Danforth 2003; Patel et al. 2017). In contrast to some U.S.-based studies indicating that immigrants are at lower risk of having a psychiatric disorder (Breslau et al. 2007; Grant et al. 2004), research on the mental health of international migrants in European countries generally suggests that they have poorer mental well-being (Hollander, Bruce, Ekberg, et al. 2013; Lay et al. 2006; Milewski and Doblhammer 2015). The mental health of immigrants also varies by gender and by migratory characteristics, such as country of origin (Lay, Nordt, and Rössler 2007) and reason for migration (Hollander, Bruce, Burström, et al. 2013; Marie et al. 2010; Norredam et al. 2009).

Explanations for poorer mental health among immigrants in Europe often focus on the stressors that are associated with migration. Relocation to a foreign country is a major, life-changing event, which in most cases entails social disruption of family and friend networks (Bhugra 2004; Rechel et al. 2013). Upon arrival to a host country, immigrants may need to learn a new language, integrate into a new cultural context, and develop new social networks. At the same time, immigrant groups often arrive from countries with fewer economic resources relative to native-born persons, and may encounter discrimination (Missinne and Bracke 2012; Rechel et al. 2013), and all of these circumstances may contribute to anxiety, depression and other expressions of psychological distress (Lindert et al. 2009).

Given stress surrounding migration and, generally, socioeconomic disadvantage of immigrants relative to native-born persons, one might expect to observe consistently higher suicide rates among immigrants compared to the host populations. Using the WHO/EURO Multi-Centre Study on Suicidal Behaviour database, Lipsicas et al. (2012) showed that suicide attempt rates were significantly higher in 27 of 56 immigrant groups, and only four groups had significantly lower suicide attempt rates than the host populations. However, research evidence on suicidal behavior among immigrants to European countries and the U.S. is heterogeneous due substantial variations of suicide risk by the country of origin, immigration country and gender (Spallek et al. 2015; Wadsworth and Kubrin 2007). For example, Westman et al. (2006) showed that female immigrants from Eastern Europe had an elevated suicide risk compared to Swedish women, while no differences in suicide risk were observed among men. In contrast, Eastern European immigrant men in Norway were at a lower risk of suicide than native-born persons, while the risk of suicide was similar among East European immigrant and native-born women (Puzo, Mehlum, and Qin 2017). Johansson et al. (1997) showed substantial variations of suicide risk among immigrants to Sweden even within the countries of the same East European region.

A recent review by Spallek and colleagues (2015) provides some generalizable patterns showing that immigrants from Northern and Eastern European countries had higher risks of suicide death, while and immigrants from Southern Europe tended to have lower risks compared to host populations. Lipsicas et al. (2012) demonstrated that the rates of suicidal attempts among immigrants to Europe were positively correlated with those in the countries of origin, suggesting that cultural and religious characteristics stemming from country of origin may shield against or aggravate immigrants' suicidal behavior. Apart from contextual characteristics, familiar predisposition toward suicidal behavior may also help explain these divergent patterns of suicide risk across different immigrant groups (McGuffin et al. 2010; Pedersen and Fiske 2010; Sokolowski, Wasserman, and Wasserman 2014).

Research Questions and Hypotheses

Drawing on conflicting findings regarding the economic outcomes and marital stability of inter-marriages and inconclusive patterns in studies comparing the health of intermarried versus intramarried people, in the present study we ask the following research questions:

1. Does the risk of suicide among married persons of both Swedish and migrant origins depend on whether they are married to another immigrant or a native-born person?

Given previous findings that ethnic intermarriages may characterized by cultural dissimilarities, marital discord, and instability, we hypothesize that both Swedes married to immigrants (Swedish – Immigrant intermarriages, Sw-Im) and immigrants married to Swedes (Immigrant – Swedish intermarriage, Im-Sw) will have a higher risk of suicide relative to Swedes married to other natives (Swedish intramarriages, Sw-Sw). Additionally, consistent with research showing that healthier individuals are more likely to migrate and that culturally similar spouses are less likely to divorce than partners with dissimilar backgrounds, we hypothesize that immigrants married to other immigrants from their own countries (Immigrant intramarriages, Im-Intra-Im) will exhibit the lowest suicide risk of all groups. Finally, because immigrants married to other immigrants from different countries of origin (Immigrant – Immigrant intermarriages, Im-Inter-Im) may experience spousal cultural conflicts, while at the same time not reaping the potential benefits associated with marrying a native-born spouse, we might expect immigrants in these marriages to have an elevated risk of suicide compared to all other groups. At the same time, spouses in immigrant intermarriages do share the migration experience, and both may have limited social ties in the host country beyond their families, which could enhance family cohesion within these spousal dyads. Hence, it is also possible that suicide rates among immigrant intermarriages will be similar to those found in Swedish intramarriages.

2. Among married migrants, does the risk of suicide differ for those married to a Swede or an immigrant from a different country compared to those married to another immigrant from the same country?

When examining the immigrant population only, we hypothesize that immigrants married to Swedes will have the highest risk of suicide of all three groups. This is because we expect that cultural conflicts may be less salient among immigrants married to other immigrants, even if they are from different countries of origin, than among those married to Swedes.

Methods

In this study, we use register data that contains a wide variety of population characteristics for all Swedish residents, including demographic characteristics, social status, and cause-of-death. These registers have nationwide coverage, and there is low risk of inaccurate linkages across registers (Ludvigsson et al. 2009). The study population consisted of all people aged 18 or older who were living in the country between January 1, 1991 and December 31, 2016. New individuals entered the study from the month they turn 18 and marry or through immigration to Sweden after age 18 during 1991–2016. All individuals were followed until death, censoring due to emigration, or December 31, 2016; whichever came first. The data were interval-censored, which means that individuals could re-enter the study population at re-immigration. Because experiences surrounding migration and challenges in the host country and their role in shaping immigrants' health may differ between men and women (Llácer et al. 2007; Malmusi, Borrell, and Benach 2010), all analyses were conducted in gender-specific samples.

The main variable of interest – *ethnic composition of married couples* – was defined in the following categories: Swedish-Swedish (Sw-Sw), Immigrant – Swedish (Im-Sw), Immigrant Intermarriage (Im –inter-Im), i.e. immigrant spousal dyads from other country of birth, Immigrant Intramarriage (Im-Intra-Im), i.e. immigrant spousal dyads from the same country of birth, and Swedish-Immigrant (Sw-Im).

The latter group represents the same spousal dyads as Im-Sw, but the mortality hazard is estimated for the Swedish spouse married to an immigrant rather than the migrant spouse married to a Swede.

To elucidate and control for the effects of selection and socio-demographic composition, we included the following covariates: education, income, employment, and the presence of a child under 18. We focus on intact married couples to avoid the potential effect of marital disruption through divorce or widowhood on suicide mortality (Pekka Martikainen and Valkonen 1996). Following Durkheim's social integration theory, Veevers (1973) proposed that parental status could play an important role in shaping suicidal behavior, as the social and personal adjustments of childless individuals might be less satisfactory than the adjustment of parents. Later research showed that the age of a child rather was a more important predictor of suicidal behavior than the presence and the number of children, particularly for mothers (Qin and Mortensen 2003). Hence, we also control for the presence of a minor child in the household. Three control variables are treated as annually time-varying: 1) income, measured as disposable individual income, which is split into tertiles according to the income distribution of the whole Swedish population in each year considered; 2) employment, which is broken down into employed vs. unemployed; and 3) the presence of a child under 18 years in the household.

We use hazard regression models to examine the influence of marital compositions and other characteristics on individual mortality (Gompertz 1977). The failure event in our analysis is the death of the individual due to suicide. The baseline hazard of our model is a function of age, and is assumed to follow a Gompertz distribution. In the first model we include marital composition to assess whether suicide mortality differs across different marriage groups. We then add socioeconomic characteristics (education, income and employment in Model 2), and the presence of a minor child (in Model 3) to assess whether inclusion of these controls modifies the observed relationships between marital composition and suicide mortality.

In the second step, we restrict analyses to the immigrant population to assess variations in suicide risk among immigrants married to a Swede, another immigrant from a different country of birth, and another immigrant from the same country of birth when accounting for country of birth. The variable country of birth, which was initially grouped by Statistics Sweden, was further grouped into three larger groups to increase the number of events within each marital composition group: 1) Nordic countries, Western European countries[1], North America (USA and Canada), Australia, and New Zealand, 2) Eastern European countries[2], and 3) All other countries (Table 1), which predominated by immigrants from Asia and countries of Middle East. We performed additional supplementary analyses to understand whether country-specific characteristics and social integration underlie the observed patterns, we performed additional analyses splitting the immigrant sample between those originating in Western and non-Western countries and between those who arrived in Sweden before and after age 18 separately. Prior work suggests that younger age at migration is linked to greater integration in the host societies, as they received education in the host countries, might have no or little language barrier and be more familiar with social norms and other cultural aspects of the host country, might be more acquainted with its healthcare system and were likely to adopt the lifestyles prevailing in host country than people who migrated at older ages (Aslund, Böhlmark, and Skans 2009; Söhn 2011). Thus, we may expect that immigrants who arrived to Sweden as children (18 or below) are more likely to marry Swedish individuals and resemble native-born persons with respect to their suicidal behavior.

Results

[1] Austria, Belgium, France, Germany, Ireland, Liechtenstein, Luxembourg, Monaco, the Netherlands, Switzerland, United Kingdom, Italy, Spain, Greece, Portugal, Montenegro, Malta, Andorra, Monaco, San Marino

[2] Bosnia, Former Yugoslavia, Poland, Lithuania, Latvia, Estonia, Russia and countries of former Soviet Union, Bulgaria, Romania, Czech Republic, Slovakia, Hungary Bosnia and Herzegovina, Albania, Serbia, Hungary

In total 6,249,727 married individuals aged 18 and older were included in the data set; 3,316,524 (53%) of them were men and 1,120,540 (18%) were immigrants. Over the period from 1991 to 2016, 18,116 deaths occurred due to suicide. Table 1 shows the distribution of the time at risk measured in person-years for all covariates by gender and marital composition groups. It is apparent that the proportion of persons with post-secondary education within each martial composition group was higher among those persons who entered intermarriages than among men and women in intramarriages of both Swedish and immigrant origin. In contrast, the percentage of high-income people was substantially higher among Swedes married to natives or immigrants and immigrant married to Swedes than among other immigrants married to their peers either from the same or another country. The percentage of unemployed men and women is lowest among Swedes irrespective of partners' migration background, followed by immigrants in intermarriages with Swedish persons, while immigrants married to other foreign-born individuals from different or the same country have the highest pe rcentage of unemployment. Although the percentage of parents with a minor in household is generally high across all marital composition groups, immigrant men and women married to other immigrants from the same or different countries had a child below 18 ye ars less frequently than the other three groups. As expected, the intermarriage groups, where immigrants are married to natives, were most commonly seen for immigrants from Western countries. Immigrants intermarriages and immigrant endogenous marriages were more frequent among immigrants from other than Western and East European countries. All these patterns were apparent in both genders.

Suicide and Inter-ethnic Composition of Married Partners of both Swedish and Migrant Origins

Models 1 and 4 in Table 2 show unadjusted suicide mortality hazard ratios by marital composition group for men and women, respectively. The comparison group is Sw-Sw (Swedish intramarriages), with the other categories again denoting immigrants who are married to native Swedes (Im-Sw), intermarried immigrants (Im-Inter-Im or immigrant intermarriage), intramarried immigrants (Im-Intra-Im or immigrant intramarriages), and Swedish individuals married to persons of migrant origin (Sw-Im). Compared to men in Swedish intramarriages, native-born men married to immigrants had 21% (Hazard Ratio [HR] = 1.20, 95% Confidence Interval [CI]: 1.09, 1.35) elevated hazard of death by suicide. The risk of suicide mortality among immigrant men in intermarriages, i.e. married to natives (HR = 1.09, 95%CI: 0.96, 1.24) and other immigrants from different countries of birth (HR = 0.99, 95%CI: 0.79, 1.25), was similar to that of Swedish men married to natives. In contrast, male immigrants married to another migrant from the same country of birth had about 14% (HR=0.86, 95%CI: 0.77, 0.96) lower hazard of suicide relative to men in Swedish intramarriages.

The patterns are slightly different for women. Particularly, the hazard of suicide death among Swedish women married to immigrants was similar to that of the reference group, whereas immigrant women married to Swedes had about 62% (HR = 1.62, 95%CI: 1.41, 1.87) elevated risk of death due to suicide compared to women in Swedish intramarriages. In line with the patterns observed in the male study population, the mortality hazard among women in the immigrant intermarriages was similar to the comparison group, while being married to another immigrant from the same country of birth was associated with a lower hazard of suicide relative to Swedish women married to native persons (HR=0.84, 95%CI: 0.71, 0.99).

In Models 2 and 5, we tested whether socioeconomic characteristics account for suicide mortality differences across inter- and intra-marriage groups. The results show that having secondary+ education and high income predict a lower hazard of suicide death among both men and women, while employment status appears to be an important predictor of suicide death only among men. When socioeconomic status is included in Model 2, the risk of dying from suicide was slightly attenuated for native-born men in intermarriage (HR=1.17, 95%CI: 1.05, 1.31), and it decreased noticeably among

immigrant men in intramarriage unions (HR=0.67, 95%CI: 0.60, 0.76) relative to Swedish men married to native-born women marriages. These results suggest that the lower socioeconomic status of male immigrants in these marriages explains why they do not receive even greater protections against suicide. No substantive changes in the hazard of suicide death were observed among immigrant men in Swedish and immigrant intermarriages when socioeconomic characteristics are included in Model 2. Accounting for differences in socio-economic characteristics across marriage groups, the hazard of dying from suicide among immigrant women married to Swedish men was slightly attenuated (HR = 1.53, 95%CI: 1.33, 1.76), but it remained significantly higher compared to Swedish women married to another native-born person. As it does for men, including socioeconomic characteristics in Model 5 resulted in a further reduction of mortality hazard for immigrant women in co-ethnic unions (HR = 0.63, 95%CI: 0.53, 0.76) relative to women in the Swedish intramarriage. Model 5 also reveals that women who are missing information on education have an increased suicide mortality hazard compared to women with primary education.

In Models 3 and 6 we examined whether having a minor child (under 18) confounds the relationship between martial composition and suicide death. Our analysis shows that having a minor child is independently related to about 39% lower suicide hazard for women (HR = 0.61, 95%CI: 0.53, 0.69), but not for men. Accounting for children only slightly attenuates an increased hazard of mortality for women in Im-Sw marriages compared to their female peers in Sw-Sw couples.

Suicide and Marital Composition among Married Persons of Migrant Origin

In further analysis we considered only the immigrant population. First, we run the sex-specific models that included marital composition groups as well as variables on socioeconomic characteristics and parental status (Table 3, Models 1 and 3). In Models 2 and 4, we added country of birth to assess whether migrant-specific characteristics account for survival differences across inter- and intra-marriage groups among men and women, respectively.

In all analyses focusing on the migrant population only, immigrant intramarriages – Im-Intra-Im – were taken as the reference category. Model 1 of Table 3 shows that, when socioeconomic and parental status were hold constant, the hazard of death by suicide was 34% higher among immigrant men married to Swedes compared with men in immigrant intramarriages (HR = 1.34, 95%CI: 1.13, 1.59). No suicide mortality differentials were observed among male immigrants married to other immigrants from different and the same country of birth. When country of birth was included (Model 2), the elevated hazard of mortality among immigrant men married to Swedes relative to their peers in immigrant intramarriages was completely attenuated among men (HR = 1.16, 95%CI: 0.97, 1.39). As previously, the hazard of suicide death was similar among immigrants married to their peers from different and the same countries. In Model 3 (Table 3), which was adjusted for differences in socioeconomic and parental statuses, the hazard of dying from suicide among immigrant women married to Swedes was about two times higher than for immigrant women intramarriages (HR = 2.13, 95%CI: 1.71, 2.65). As in the male sample, immigrant women in immigrant intermarriages had hazard of suicide mortality similar to women married to immigrants from different country. When country of birth was included in Model 4, the elevated hazard of mortality among women married to natives was slightly reduced (HR = 1.97, 95%CI: 1.56, 2.47) compared to women in immigrant intramarriages. The hazard estimates for suicide mortality among migrant women married to immigrants from different countries of birth remained almost unchanged (HR = 1.20, 95%CI: 0.82, 1.75).

These analyses also show that both male and female immigrants from non-Western countries have lower hazard of suicide mortality relative to migrants from high-income countries – that is, those from Nordic, western European, and North American countries, along with Australia and New Zealand.

Immigrant men and women from other European countries have similar risk of suicide death as their peers from high-income countries.

To advance our understanding of mechanisms underlying the elevated suicide mortality of immigrants married to Swedes, we performed additional analyses to test the hypothesis that immigrants who arrive to Sweden as children are more socially integrated in the mainstream society and, thus, are likely to resemble the host population with respect to cultural background and suicide patterns associated with marital composition. To do so, we repeated the regression analyses in the immigrant samples who arrived in Sweden before and after age 18 separately. Table 4 shows that holding country of birth and socioeconomic and parental statuses constant, there was no relationship between marital composition and hazard of suicide mortality among men and women who arrived to Sweden before age 18.

We then performed additional analyses splitting the migrant sample between those originating in Western and non-Western countries[3]. Controlling for socioeconomic and parental statuses in Models 1 and 2 of Table 5 show, marital composition was unrelated to suicide mortality among migrant men and women from Nordic countries, western Europe, North America, Australia and New Zealand. In contrast, men and women from non-Western countries who were married to Swedes had significantly higher risk of suicide death compared to their same-sex peers in Im-Intra-Im marriages. Specifically, being in Im-Sw marriages increased the hazard of suicide death by 56% among immigrant men (HR = 1.56%, 95%CI: 1.13, 2.14), and almost tripled the risk among immigrant women (HR = 2.91, 95%CI: 2.08, 4.08) relative to their counterparts married to persons from their same country of origin. These additional analyses also revealed an increased risk of suicide among men in immigrant intermarriages (HR = 1.50, 95%CI: 1.07, 2.11), although no similar pattern was found for women. Additionally, both male and female migrants from "other" European countries had greater hazard of suicide death than their same-sex peers from other countries.

Finally, we performed more detailed analysis to identify whether the elevated hazard of deaths in the non-Western group is driven by immigrants from specific regions. More specifically, we run the final models (adjusted for SES and parental status) by gender among immigrants[3] from only East Europeans[4], Nordic and Western Europeans, All others, all but East Europeans, East Europeans together with Nordic and Western Europeans, and all but Nordic and Western Europeans. These analyses indicated that immigrant women married to Swedish men have higher hazard of suicide death relative to their female peers married to co-ethnic men in all region-specific groups except the group that included only Nordic and Western European women (Supplementary Table 6). However, among men only immigrants from Asia married to Swedish women had an elevated mortality hazard due to suicide than men in immigrant intramarriages. In all other groups the risk of suicide was similar among immigrant men married to native women or to an immigrant women from the same or another country of origin.

Discussion

In the present study we take a step toward a better understanding of marriage benefits for immigrants and natives by investigating the effect of inter- and intra-ethnic marriages on individual mortality hazard due to suicide among both immigrants and native-born Swedes. We showed for the first time that marital constellations where Swedish men were married to female immigrants had a substantially elevated hazard of suicide death for both partners of these spousal dyads compared to the Swedish men

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[3] For those who immigrated to Sweden after the age of 18

[4] Belarus, Bulgaria, Czech Republic, Hungary, Moldova, Poland, Romania, Russia, Slovakia, Ukraine

and women married to other Swedes. Additionally, our study revealed that immigrant men and women married to immigrants from the same country have markedly reduced hazard of suicide relative to Swedes married to native-born persons. These findings partially support our initial hypotheses that marital strain due to cultural differences, potential conflicting social and cultural obligations, discrimination, and lack of support from family and friends might increase psychological distress within spousal dyads, which would be reflected in an increased hazard of suicide in intermarriage groups relative to Swedish intramarriages.

The elevated suicide hazard of immigrant women and native-born partners may be linked to instabilities in these particular spousal dyads. A number of studies in the U.S. and Europe provide compelling evidence that interethnic unions are less stable than same-ethnic marriages due to fewer shared values and norms and different communication styles, which increase misunderstandings and diminish quality of marital relationships (Dribe and Lundh 2012; Hohmann-Marriott and Amato 2008; Kalmijn et al. 2005; Milewski and Kulu 2014). In the present study, we found elevated hazard of suicide death among intermarried immigrants from non-Western nations relative to co-ethnically married immigrants, but the risk of suicide was similar across all unions in the immigrant population from Western countries. These findings provide additional support for earlier reports that most culturally dissimilar unions experience greater marital discord (Dribe and Lundh 2011).

Given research evidence that some cultures and religions may vary in the moral oppositions to suicide (Durkheim 1897; Lester 2006) and may drive our findings of elevated suicide hazard among immigrant women married to Swedish men, we performed supplementary analyses limited to specific regional groups, namely Asia, Eastern Europe, Western countries, and three other groups that excluded consecutively each of these three groups. The patterns were very similar to those observed in the whole immigrant population: in all subgroups except Nordic countries and Western Europe who are married to Swedish men have shown higher suicide mortality hazard than the female immigrants married to co-ethnic men. In contrast, no group-specific analysis revealed greater suicide mortality hazard among immigrant men in Swedish intermarriages except Asian men. These findings suggest that for most immigrant women intermarriage with native men may be particularly challenging to maintain and that Asian women and men immigrating to Sweden may possess some cultural and religious characteristics that under or in combination with marital strain may aggravate their suicidal behavior.

Native-born persons and immigrants in intermarried unions are likely to be heterogamous with respect to other sociodemographic characteristics. Prior studies in the U.S. indicate that African Americans (Crowder and Tolnay 2000) and Latinos (Lee and Edmonston 2005) who intermarry belong to the most socioeconomically advantaged groups (Fu and Heaton 2008). Our descriptive analyses show that the proportion of immigrants with high education is largest in the spousal dyads involving immigrant and native-born spouses, and these unequal educational levels might create tensions within these spousal dyads. Although Sweden has been a forerunner with respect to gender equality and a dual-earner model, female participation in labor force in Sweden and other countries with generous family policies has more often occurred in part-time employment and employment in lower-level positions (Blau and Kahn 2013). Thus, it is possible that higher educational achievements by immigrant spouses might be perceived problematically by Swedish partners, especially men, and may compound marital discord within these spousal dyads and explain our findings of elevated suicide risk among Swedish men married to immigrant women but not among Swedish women married to immigrant men.

One explanation for the increased suicide hazard of immigrant women with native-born partners than among women in Swedish intramarriages may be unequal power relations within these spousal dyads, as immigrant wives are especially likely to legally and economically depend on the native husbands (Potarca and Bernardi 2019; Riano et al. 2015). Using the German Socio-Economic Panel data, Potarca and Bernardi (2019) showed that declines in life satisfaction among immigrants married to native Germans in the year after marriage were particularly steep among women. These patterns

persisted over a period of four years, and suggest that unequal (legal and economic) status of immigrant spouses—particularly female immigrant spouses—at the household levels is an important determinant of immigrants' long-term psychological well-being. It is also possible that immigrant women married to Swedish men experience a greater degree of discrimination and stigma relative to immigrant men married to Swedish women. The cultural dissonance that immigrants in intermarriages may face as they struggle to simultaneously maintain traditions from the country of origin and adapt to the host culture may be especially profound for women, who continue to manage the bulk of domestic labor and childcare. Although no direct evidence exist to support these propositions in the first generation immigrants, the intercultural conflict has been sought to explain higher suicide mortality among intermediate generation migrants in Sweden and Norway (Bui 2009; Choi, He, and Harachi 2008; Puzo et al. 2017; Di Thiene et al. 2015).

Additionally, to explain higher rates of mental health problems among immigrant populations (Patel et al. 2017), scholars have pointed to the lower socioeconomic status and labor market marginalization of immigrants compared to natives (Di Thiene et al. 2015). Since prior work has shown that women are more likely to immigrate as trailing spouses (Ishizawa and Stevens 2011)(Caputo et al., under review), such experiences may lead to social disadvantages and greater social isolation among female migrants, which may in turn result in a mental health disadvantage. Moussa and colleagues (2015) demonstrated that the female disadvantage in mental health among immigrants to Switzerland almost halved when socioeconomic characteristics were included in the model. Although in our analyses adjusting for education, income, and employment status completely attenuated the increased hazard of suicide death among immigrant men, but only slightly among immigrant women with Swedish partners. These findings suggest that immigrants' disadvantaged socioeconomic status plays an important role in the relationship between marital composition and mental health for men, but less so for women.

The interpretation and experience of economic inequality by natives and immigrants may differ and may partially explain why intermarried couples have a higher risk of suicide death than their intramarried Swedish peers. It is possible that immigrants in intermarried unions are more likely to compare their socioeconomic status with native-born individuals given that they are more likely to socialize with local people through the network connections of their native-born spouses, whereas immigrants in intra-marriages are more likely to compare their socioeconomic outcomes with that of other immigrants. Wadsworth and Kubrin (2007) showed that White-Hispanic inequality was an important correlate of suicide for native-born Hispanics but not for immigrant Hispanics, supporting the proposition that comparing themselves to natives may exacerbate the feeling of economic disadvantage and psychosocial stress among immigrants, while relating their own status to other immigrants' social position may create the feeling of privilege and lessen stress levels. Also Swedish, men who are intermarried with immigrant women, may perceive their socioeconomic status as less advantageous when compared to other Swedish men married to co-ethnic women, who likely have cumulated more wealth.

Consistent with our expectations, we found that intramarried immigrants have the lowest suicide hazard of all groups. Besides sharing a culture, intramarried immigrants to have the lowest suicide hazard either of all groups is likely to be related to health selection, often referred to as healthy migrant effect. Although they do not derive benefits of having native spouse while socially and economically integrating in the host society, they do share the same culture, including cultural and religious characteristics that may shield against suicidal behavior, native language, and migration experiences, which cumulatively reduce marital discord.

Migration at younger ages has been linked to greater socioeconomic integration and more similar demographic behaviors and lifestyle to the native population because their higher exposure to the host society is associated with language fluency and cultural and institutional understanding (Bleakley and Chin 2010). When looking at the timing of migration, our analyses showed that the marital

composition of immigrant families was unrelated to suicide mortality among immigrants who moved to Sweden when they were children, whereas being in intermarriage with native-born person was positively linked to suicide mortality for immigrant women who moved to the country after age of 18. These findings provide additional support for prior work showing an important role of immigrants' social integration in the mainstream society in shaping their mental health and suicidal behavior.

Finally, selectivity of individuals who intermarry with respect to other characteristics than cultural background may also play an important role in explaining our findings of the elevated suicide death among native husbands and immigrant wives relative to native spouses. Although prior research is scarce, existing studies suggest that individuals who enter intermarriage tend to differ with respect to age, education, and previous marital history, and these differences may cumulatively affect the quality of marital relationship. For example, Hohmann-Marriott and Paul Amato (2008) showed that interracial couples were characterized by more complex relationship histories, including prior marriages and children, parental divorce, were more heterogeneous with regard to religion and age, and they had fewer sources of social support compared to same-ethnic couples. All these characteristics were important in reducing relationship quality among interethnic/interracial couples. Following individuals for several years before and after marriage, Dribe and Nystedt (2011) found that the intermarriage premium for male immigrants to Sweden was apparent already around the time of marriage and that high-earning immigrant men were more likely to marry native Swedish women, while low-earning male immigrants were more likely to marry another migrant. While our analyses include also controlling for socioeconomic characteristics, we may not be able to account for other (unobserved) differences that may cumulatively affect individual agency to enter specific marriage type, as well as individual suicidal behavior. Also, Potarca and Bernardi (Potarca and Bernardi 2019) revealed a strong selection into marrying natives of some immigrant groups, namely from former Yugoslavia and Southern European countries, who have already had heightened levels of life satisfaction prior to the union formation.

Since suicide is considered largely preventable public health problem (Word Health Organization 2004), it is important to take into account previous mental health problems and related treatment in suicide research, and especially among immigrants. Scholars proposed that shame, stigma and religious attitudes toward use of mental healthcare services may hinder immigrants to seek professional advice. A study in the U.S. revealed important differences in the use of mental health services by nativity with US-born Asians having higher rates of mental healthcare use than immigrant Asians (Abe-Kim et al. 2007). Although health insurance coverage may partially account for differential healthcare use by nativity, studies in other countries with a universal healthcare system for legal residents revealed similar patterns. A recent review study revealed that immigrants used mental health services less frequently but had higher rates of involuntary mental health-related hospitalizations than the host country populations (Patel et al. 2017). It is possible that lingering cultural attitudes toward mental healthcare use are less salient among intermarried immigrants given their generally better integration into the mainstream culture in comparison with the intramarried immigrants. Because data on psychiatric service use and prescription medication use were not available in this data set, we were not able to account for mental healthcare use prior to suicide. Nevertheless, if intermarried immigrants were more likely to seek professional advice for mental health problems prior to suicide than their intramarried peers, our estimates for suicide mortality among intermarried immigrants would be underestimated.

In the present study we have not included cohabiting partnerships because partnerships without children cannot be identified in our data before 2011 and thus would have limited our sample considerably. In addition, we argue that the higher degree of misreporting for cohabiting partnerships, particularly involving immigrants, could lead to bias. Also, we have not included partner characteristics in the analysis, although for different reasons. The current study is the first to examine suicide in intermarried couples and our findings provide solid basis for future research avenues on immigrants' mental health. For example, the associations observed here could potentially be driven by partner

characteristics. Immigrant-native partnerships are more likely to be characterized by heterogeneous with respect to socioeconomic background that may lead to more frequent partnership conflicts. Immigrants partnered with Swedes are also less likely to live in immigrant dominated neighborhoods (Macpherson and Strömgren 2013). This may have two opposing effects. On the one hand, living in neighborhoods dominated by natives may be beneficial for immigrants' social and socioeconomic integration and subsequently mental health. On the other hand, living in these neighborhoods may lead to a lack of access to co-ethnic networks and thus potentially increase social isolation, having a negative effect on mental health (Massey 1985; Wadsworth and Kubrin 2007). Research focusing on the role of partners characteristics at the micro level and neighborhood characteristics at the macro level shape immigrants' mental health represents a promising way to expand knowledge relevant to health and integration of the growing population of immigrants in Nordic nations.

Overall, our findings show that maintaining healthy marriage can be challenging for inter-ethnic families and that marital discord within culturally distinct dyads may have long-term consequences for individuals' mental health and well-being. We provide a necessary empirical basis to suggest that intermarried families are in need of additional support to resolve marital discord, e.g. through specific approaches to facilitate healthy communications. Further investigations of mechanisms underlying heightened suicide mortality among intermarried couples may help develop suicide prevention programs tailored to the unique needs of these population subgroups and to increase the impact of these programs.

Acknowledgments

This work was financially supported by the Max Planck Society within the framework of the research initiative "The Challenges of Migration and Integration"

Contributors

AO conceived the research questions; AO, JC, SA, and SD designed the study and analytic strategy. SD obtained access to data and conducted the data analysis. SD and SA designed the analytic strategy for sensitivity analyses. AO and JC drafted the initial version of the manuscript. AO, JC, SA, and SD interpreted the results, revised the subsequent versions of the manuscript, and approved the final version of the manuscript.

References

Abe-Kim, Jennifer, David T. Takeuchi, Seunghye Hong, Nolan Zane, Stanley Sue, Michael S. Spencer, Hoa Appel, Ethel Nicdao, and Margarita Alegría. 2007. "Use of Mental Health-Related Services among Immigrant and US-Born Asian Americans: Results from the National Latino and Asian American Study." *American Journal of Public Health* 97(1):91–98.

Alba, Richard D. and Reid M. Golden. 1986. "Patterns of Ethnic Marriage in the United States." *Social Forces* 65(1):202–23.

Aslund, Olof, Anders Böhlmark, and Oskar Nordström Skans. 2009. "Age at Migration and Social Integration." *Iza Dp*.

August, Kristin J. and Dara H. Sorkin. 2010. "Marital Status and Gender Differences in Managing a Chronic Illness: The Function of Health-Related Social Control." *Social Science and Medicine* 71(10):1831–38.

Baltas, Zuhal and Andrew Steptoe. 2000. "Migration, Culture Conflict and Psychological Well-Being

among Turkish-British Married Couples." *Ethnicity and Health* 5(2):173–80.
Bhugra, D. 2004. "Review Article Migration and Mental Health." *Acta Psychiatrica Scandinavica* 109(4):243–58.
Blau, Francine D. and Lawrence M. Kahn. 2013. "Female Labor Supply: Why Is the United States Falling Behind?" in *American Economic Review*.
Bleakley, Hoyt and Aimee Chin. 2010. "Age at Arrival, English Proficiency, and Social Assimilation among Us Immigrants." *American Economic Journal: Applied Economics*.
Bratter, Jenifer L. and Karl Eschbach. 2006. "'What about the Couple?' Interracial Marriage and Psychological Distress." *Social Science Research* 35(4):1025–47.
Bratter, Jenifer L. and Rosalind B. King. 2008. "'but Will It Last?': Marital Instability among Interracial and Same-Race Couples." *Family Relations* 57(2):160–71.
Breslau, Joshua, Sergio Aguilar-Gaxiola, Guilherme Borges, Kenneth S. Kendler, Maxwell Su, and Ronald C. Kessler. 2007. "Risk for Psychiatric Disorder among Immigrants and Their US- Born Descendants: Evidence from the National Comorbidity Survey-Replication." *J Nerv Ment Dis* 195(3):189–95.
Bui, Hoan N. 2009. "Parent-Child Conflicts, School Troubles, and Differences in Delinquency across Immigration Generations." *Crime and Delinquency* 55(3):412–41.
Burke, Jessica L. 2015. "Investigating Psychological Distress in Latino Romantic Relationship." *Gender, Race, & Class* 22(3–4):172–94.
Choi, Yoonsun, Michael He, and Tracy W. Harachi. 2008. "Intergenerational Cultural Dissonance, Parent-Child Conflict and Bonding, and Youth Problem Behaviors among Vietnamese and Cambodian Immigrant Families." *Journal of Youth and Adolescence* 37(1):85–96.
Crowder, Kyle D. and Stewart E. Tolnay. 2000. "A New Marriage Squeeze for Black Women: The Role of Racial Intermarriage by Black Men." *Journal of Marriage and Family*.
Denney, Justin T., Richard G. Rogers, Patrick M. Krueger, and Tim Wadsworth. 2009. "Adult Suicide Mortality in the United States: Marital Status, Family Size, Socioeconomic Status, and Differences by Sex." *Social Science Quarterly* 90(5):1167–85.
Diaz, Esperanza, Beatriz Poblador-Pou, Luis Andrés Gimeno-Feliu, Amaia Calderón-Larrañaga, Bernadette N. Kumar, and Alexandra Prados-Torres. 2015. "Multimorbidity and Its Patterns According to Immigrant Origin. A Nationwide Register-Based Study in Norway." *PLoS ONE* 10(12):1–18.
Dixon, Lori Beth, Jan Sundquist, and Marilyn Winkleby. 2000. "Differences in Energy, Nutrient, and Food Intakes in a US Sample of Mexican- American Women and Men: Findings from the Third National Health and Nutrition Examination Survey, 19881994." *American Journal of Epidemiology* 152(6):548–57.
Djamba, Yanyi K. and Sitawa R. Kimuna. 2014. "Are Americans Really in Favor of Interracial Marriage? A Closer Look at When They Are Asked about Black-White Marriage for Their Relatives." *Journal of Black Studies* 45(6):528–44.
Drefahl, Sven. 2010. "How Does the Age Gap between Partners Affect Their Survival?" *Demography* 47(2):313–26.
Dribe, Martin and Christer Lundh. 2008. "Intermarriage and Immigrant Integration in Sweden: An Exploratory Analysis." *Acta Sociologica* 51(4):329–54.
Dribe, Martin and Christer Lundh. 2011. "Cultural Dissimilarity and Intermarriage. A Longitudinal Study of Immigrants in Sweden 1990-2005." *International Migration Review* 45(2):297–324.
Dribe, Martin and Christer Lundh. 2012. "Mariage Mixte, Contexte Des Valeurs et Rupture d'union: Suède 1990-2005." *European Journal of Population* 28(2):139–58.
Dribe, Martin and Paul Nystedt. 2011. "Is There an Intermarriage Premium for Male Immigrants? Exogamy and Earnings in Sweden 1990-2009." *International Migration Review* 49(1):3–35.
Durkheim, Émile. 1897. *Suicide: A Study in Sociology*. edited by G. Simpson. New York: Free Press.

Elwert, Annika and Anna Tegunimataka. 2016. "Cohabitation Premiums in Denmark: Income Effects in Immigrant–Native Partnerships." *European Sociological Review* 32(3):383–402.
Elwert, Felix and Nicholas A. Christakis. 2006. "Widowhood and Race." *American Sociological Review* 71(1):16–41.
Erlangsen, Annette, Bernard Jeune, Unni Bille-Brahe, and James W. Vaupel. 2004. "Loss of Partment and Suicide Risks among Oldest Old: A Population-Based Register Study." *Age and Ageing* 33(4):378–83.
Evandrou, Maria, Jane Falkingham, Zhixin Feng, and Athina Vlachantoni. 2016. "Ethnic Inequalities in Limiting Health and Self-Reported Health in Later Life Revisited." *Journal of Epidemiology and Community Health* 70(7):653–62.
Farr, William. 1858. "The Influence of Marriage on the Mortality of the French People." Pp. 504–513 in *Transactions of the National Association for the Promotion of Social Science*, edited by G. W. Hastings. London: John W. Parker.
Fu, Xuanning and Tim B. Heaton. 2008. "Racial and Educational Homogamy: 1980 to 2000." *Sociological Perspectives* 51(4):735–58.
Furtado, Delia and Tao Song. 2015. "Intermarriage and Socioeconomic Integration: Trends in Earnings Premiums among U.S. Immigrants Who Marry Natives." *Annals of the American Academy of Political and Social Science* 662(1):207–22.
Gallo, William T., Elizabeth H. Bradley, Michele Siegel, and Stanislav V. Kasl. 2000. "Health Effects of Involuntary Job Loss among Older Workers: Findings from the Health and Retirement Survey." *Journals of Gerontology - Series B Psychological Sciences and Social Sciences* 55(3):131–40.
Goldman, Noreen. 1993. "Marriage Selection and Mortality Patterns: Inferences and Fallacies." *Demography*.
Goldman, Noreen, Sanders Korenman, and Rachel Weinstein. 1995. "Marital Status and Health Among the Elderly*." *Social Science and Medicine* 40(12):1717–30.
Gompertz, Benjamin. 1977. "On the Nature of the Function Expressive of the Law of Human Mortality." Pp. 279–82 in. Springer, Berlin, Heidelberg.
Gove, Walter R. 1973. "Sex , Marital Status , and Mortality Author (s): Walter R . Gove Source : The American Journal of Sociology , Vol . 79 , No . 1 (Jul ., 1973), Pp . 45-67 Published by : The University of Chicago Press Stable URL : Http://Www.Jstor.Org/Stable/2776709." *American Journal of Sociology* 79(1):45–67.
Grant, Bridget F., Frederick S. Stinson, Deborah S. Hasin, Deborah A. Dawson, S. Patricia Chou, Karyn Anderson, and Background: 2004. "Immigration and Lifetime Prevalence of DSM-IV Psychiatric Disorders Among Mexican Americans and Non-Hispanic Whites in the United States." *Archives of General Psychiatry* 61:1226–33.
Herman, Melissa R. and Mary E. Campbell. 2012. "I Wouldn't, but You Can: Attitudes toward Interracial Relationships." *Social Science Research* 41(2):343–58.
Hohmann-Marriott, B. E. and P. Amato. 2008. "Relationship Quality in Interethnic Marriages and Cohabitations." *Social Forces* 87(2):825–55.
Hollander, Anna-Clara, Daniel Bruce, Bo Burström, and Solvig Ekblad. 2013. "Association between Immigrant Subgroup and Poor Mental Health. A Population-Based Register Study." *The Journal of Nervous and Mental Disease* 201(8):645–652.
Hollander, Anna-Clara, Daniel Bruce, Jan Ekberg, Bo Burström, and Solvig Ekblad. 2013. "Hospitalisation for Depressive Disorder Following Unemployment—Differentials by Gender and Immigrant Status: A Population-Based Cohort Study in Sweden." *Journal of Epidemiology and Community Health* 67(10):875–81.
Hu, Yuanreng and Noreen Goldman. 1990. "Mortality Differentials by Marital Status: An International Comparison." *Demography* 27(2):233–50.

Ishizawa, Hiromi and Gillian Stevens. 2011. "Who Arrived First? The Timing of Arrival among Young Immigrant Wives and Husbands." *Journal of Ethnic and Migration Studies* 37(4):525–42.

Jayaweera, Hiranthi and Maria A. Quigley. 2010. "Health Status, Health Behaviour and Healthcare Use among Migrants in the UK: Evidence from Mothers in the Millennium Cohort Study." *Social Science and Medicine* 71(5):1002–10.

Johansson, Leena Maria, Jan Sundquist, Sven Erik Johansson, Bo Bergman, Jan Qvist, and Lil Träskman-Bendz. 1997. "Suicide among Foreign-Born Minorities and Native Swedes: An Epidemiological Follow-up Study of a Defined Population." *Social Science and Medicine* 44(2):181–87.

Johnson, Norman J., Eric Backlund, Paul D. Sorlie, and Catherine A. Loveless. 2000. "Marital Status and Mortality: The National Longitudinal Mortality Study." *Annals of Epidemiology* 10(4):224–38.

Kalmijn, Matthijs, Paul M. de Graaf, and Jacques P. G. Janssen. 2005. "Intermarriage and the Risk of Divorce in the Netherlands: The Effects of Differences in Religion and in Nationality, 1974-94." *Population Studies* 59(1):71–85.

Kaslow, Nadine, D. Ph, Martie Thompson, Lindi Meadows, Susan Chance, Robin Puett, Leslie Hollins, Salley Jessee, and Arthur Kellermann. 2000. "Risk Factors for Suicide Attempts among African American Women." *Depression and Anxiety* 12(April):13–20.

Khanfer, Riyad, Janet M. Lord, and Anna C. Phillips. 2011. "Neutrophil Function and Cortisol:DHEAS Ratio in Bereaved Older Adults." *Brain, Behavior, and Immunity* 25(6):1182–86.

Killian, Kyle D. 2002. "Dominant and Marginalized Discourses in Interracial Couples' Narratives: Implications for Family Therapists." *Family Process* 41(4):603–18.

Kposowa, A. J. 2002. "Marital Status and Suicide in the National Longitudinal Mortality Study." *Journal of Epidemiology & Community Health* 54(4):254–61.

Kravdal, Øystein. 2001. "The Impact of Marital Status on Cancer Survival." *Social Science and Medicine* 52(3):357–68.

Lariscy, Joseph T., Robert A. Hummer, and Mark D. Hayward. 2015. "Hispanic Older Adult Mortality in the United States: New Estimates and an Assessment of Factors Shaping the Hispanic Paradox." *Demography* 52(1):1–14.

Lay, Barbara, Christoph Lauber, Carlos Nordt, and Wulf Rössler. 2006. "Patterns of Inpatient Care for Immigrants in Switzerland. A Case Control Study." *Social Psychiatry and Psychiatric Epidemiology* 41(3):199–207.

Lay, Barbara, Carlos Nordt, and Wulf Rössler. 2007. "Mental Hospital Admission Rates of Immigrants in Switzerland." *Social Psychiatry and Psychiatric Epidemiology* 42(3):229–36.

Lee, Sharon M. and Barry Edmonston. 2005. "New Marriages, New Families: U.S. Racial and Hispanic Intermarriage." *Population Bulletin*.

Lester, David. 2006. "Suicide and Islam." *Archives of Suicide Research* 10(1):77–97.

Lindert, Jutta, Ondine S. vo. Ehrenstein, Stefan Priebe, Andreas Mielck, and Elmar Brähler. 2009. "Depression and Anxiety in Labor Migrants and Refugees - A Systematic Review and Meta-Analysis." *Social Science and Medicine* 69(2):246–57.

Lipsicas, Cendrine Bursztein, Ilkka Henrik Makinen, Alan Apter, Diego De Leo, Ad Kerkhof, Jouko Lönnqvist, Konrad Michel, Ellinor Salander Renberg, Isik Sayil, Armin Schmidtke, Cornelis Van Heeringen, Airi Värnik, and Danuta Wasserman. 2012. "Attempted Suicide among Immigrants in European Countries: An International Perspective." *Social Psychiatry and Psychiatric Epidemiology* 47(2):241–51.

Llácer, Alicia, María Victoria Zunzunegui, Julia del Amo, Lucía Mazarrasa, and Francisco Bolůmar. 2007. "The Contribution of a Gender Perspective to the Understanding of Migrants' Health." *Journal of Epidemiology and Community Health* 61(SUPPL. 2):4–10.

Ludvigsson, Jonas F., Petra Otterblad-Olausson, Birgitta U. Pettersson, and Anders Ekbom. 2009. "The Swedish Personal Identity Number: Possibilities and Pitfalls in Healthcare and Medical Research."

European Journal of Epidemiology 24(11):659–67.
Luoma, Jason B. and Jane L. Pearson. 2002. “Suicide and Marital Status in the United States, 1991-1996: Is Widowhood a Risk Factor?” *American Journal of Public Health* 92(9):1518–22.
Macpherson, Robert A. and Magnus Strömgren. 2013. “Spatial Assimilation and Native Partnership: Evidence of Iranian and Iraqi Immigrant Mobility from Segregated Areas in Stockholm, Sweden.” *Population, Space and Place*.
Malmusi, Davide, Carme Borrell, and Joan Benach. 2010. “Migration-Related Health Inequalities: Showing the Complex Interactions between Gender, Social Class and Place of Origin.” *Social Science and Medicine* 71(9):1610–19.
Margolis, Rachel. 2013. “Health Shocks in the Family: Gender Differences in Smoking Changes.” *Journal of Aging and Health* 25(5):882–903.
Marie, Norredam, Garcia Lopez Ana, Keiding Niels, and Krasnik Allan. 2010. “Risk of Mental Disorders in Family Reunification Migrants and Native Danes: A Register-Based Historically Prospective Cohort Study.” *International Journal of Public Health* 55(5):413–19.
Martikainen, P and T. Valkonen. 1996. “Mortality after Death of Spouse in Relation to Duration of Bereavement in Finland.” *Journal of Epidemiology and Community Health* 50(3):264–68.
Martikainen, Pekka and Tapani Valkonen. 1996. “Mortality after the Death of a Spouse: Rates and Causes of Death in a Large Finnish Cohort.” *American Journal of Public Health* 86(8 I):1087–93.
Martin, Jeffery S., Marjan Ghahramanlou-Holloway, David R. Englert, Jennifer L. Bakalar, Cara Olsen, Elicia M. Nademin, David A. Jobes, and Shannon Branlund. 2013. “Marital Status, Life Stressor Precipitants, and Communications of Distress and Suicide Intent in a Sample of United States Air Force Suicide Decedents.” *Archives of Suicide Research* 17(2):148–60.
Martínez, María Elena, Kristin Anderson, James D. Murphy, Susan Hurley, Alison J. Canchola, Theresa H. M. Keegan, Iona Cheng, Christina A. Clarke, Sally L. Glaser, and Scarlett L. Gomez. 2016. “Differences in Marital Status and Mortality by Race/Ethnicity and Nativity among California Cancer Patients.” *Cancer* 122(10):1570–78.
Massey, Douglas S. 1985. “Ethnic Residential Segregation: A Theoretical Synthesis and Empirical Review.” *Sociology and Social Research*.
McGuffin, P., N. Perroud, R. Uher, A. Butler, K. J. Aitchison, I. Craig, C. Lewis, and A. Farmer. 2010. “The Genetics of Affective Disorder and Suicide.” *European Psychiatry*.
McLaughlin, John M., James L. Fisher, and Electra D. Paskett. 2011. “Marital Status and Stage at Diagnosis of Cutaneous Melanoma.” *Cancer* 117(9):1984–93.
Mehta, Neil K., Irma T. Elo, Michal Engelman, Diane S. Lauderdale, and Bert M. Kestenbaum. 2016. “Life Expectancy Among U.S.-Born and Foreign-Born Older Adults in the United States: Estimates From Linked Social Security and Medicare Data.” *Demography* 53(4):1109–34.
Meng, Xin and Robert G. Gregory. 2005. “Intermarriage and the Economic Assimilation of Immigrants.” *Journal of Labor Economics*.
Meng, Xin and Dominique Meurs. 2009. “Intermarriage, Language, and Economic Assimilation Process: A Case Study of France.” *International Journal of Manpower*.
Milewski, Nadja and Gabriele Doblhammer. 2015. “Mental Health among Immigrants: Is There a Disadvantage in Later Life?” Pp. 191–212 in *Health among the elderly in Germany. New evidence on disease, disability and care need*. Opladen, Berlin, Toront: Barbara Budrich.
Milewski, Nadja and Annegret Gawron. 2019. “Is There an Association between Marital Exogamy of Immigrants and Nonmigrants and Their Mental Health? A Two-Partners Approach.” *Demographic Research* 40(March):561–98.
Milewski, Nadja and Hill Kulu. 2014. “Mixed Marriages in Germany: A High Risk of Divorce for Immigrant-Native Couples.” *European Journal of Population* 30(1):89–113.
Miller, Byron and Ben Lennox Kail. 2016. “Exploring the Effects of Spousal Race on the Self-Rated Health

of Intermarried Adults." *Sociological Perspectives* 59(3):604–18.
Mills, Jon K., Jennifer Daly, Amy Longmore, and Gina Kilbride. 1995. "A Note on Family Acceptance Involving Interracial Friendships and Romantic Relationships." *Journal of Psychology: Interdisciplinary and Applied*.
Missinne, Sarah and Piet Bracke. 2012. "Depressive Symptoms among Immigrants and Ethnic Minorities: A Population Based Study in 23 European Countries." *Social Psychiatry and Psychiatric Epidemiology* 47(1):97–109.
Moussa, Jehane Simona, Marco Pecoraro, Didier Ruedin, and Serge Houmard. 2015. "The Gender Gap in Mental Health: Immigrants in Switzerland." Pp. 217–31 in *Women's Mental Health*, edited by N. Khanlou and F. B. Pilkington. Bern: Springer International Publishing Switzerland 2015.
Newbold, K. Bruce and Jeff Danforth. 2003. "Health Status and Canada's Immigrant Population." *Social Science and Medicine* 57(10):1981–95.
Norredam, Marie, A. Garcia-Lopez, N. Keiding, and A. Krasnik. 2009. "Risk of Mental Disorders in Refugees and Native Danes: A Register-Based Retrospective Cohort Study." *Social Psychiatry and Psychiatric Epidemiology* 44(12):1023–29.
Patel, Kishan, Anne Kouvonen, Ciara Close, Ari Väänänen, Dermot O'Reilly, and Michael Donnelly. 2017. "What Do Register-Based Studies Tell Us about Migrant Mental Health? A Scoping Review." *Systematic Reviews* 6(1):78.
Pearlin, L. I. and J. S. Johnson. 1977. "Marital Status, Life-Strains and Depression." *American Sociological Review*.
Pedersen, N. L. and A. Fiske. 2010. "Genetic Influences on Suicide and Nonfatal Suicidal Behavior: Twin Study Findings." *European Psychiatry*.
Potarca, Gina and Laura Bernardi. 2019. *The Intermarriage Mental Health Premium. Does Marrying a Native Increase Immigrants' Well-Being?* Vol. 53.
Puzo, Q., L. Mehlum, and P. Qin. 2017. "Suicide among Immigrant Population in Norway: A National Register-Based Study." *Acta Psychiatrica Scandinavica* 135(6):584–92.
Qin, Ping and Preben B. Mortensen. 2003. "The Impact of Parental Status on the Risk of Completed Suicide." *Archives of General Psychiatry* 60(8):797–802.
Razum, Oliver and Dorothee Twardella. 2002. "Time Travel with Oliver Twist--towards an Explanation Foa a Paradoxically Low Mortality among Recent Immigrants." *Tropical Medicine & International Health : TM & IH* 7(1):4–10.
Razum, Oliver, Hajo Zeeb, and Ansgar Gerhardus. 1998. "Cardiovascular Mortality of Turkish Nationals Residing in West Germany." *Annals of Epidemiology* 8(5):334–41.
Read, Jen'nan Ghazal and Megan M. Reynolds. 2012. "Gender Differences in Immigrant Health: The Case of Mexican and Middle Eastern Immigrants." *Journal of Health and Social Behavior* 53(1):99–123.
Rechel, Bernd, Philipa Mladovsky, David Ingleby, Johan P. Mackenbach, and Martin McKee. 2013. "Migration and Health in an Increasingly Diverse Europe." *The Lancet* 381(9873):1235–45.
Riano, Yvonne, Katharina Limacher, André Aschwanden, Sophie Hirsig, and Doris Wastl-Walter. 2015. "Shaping Gender Inequalities: Critical Moments and Critical Places." *Equality, Diversity and Inclusion*.
Riosmena, Fernando, Rebeca Wong, and Alberto Palloni. 2013. "Migration Selection, Protection, and Acculturation in Health: A Binational Perspective on Older Adults." *Demography* 50(3):1039–64.
Robles, Theodore F. and Janice K. Kiecolt-Glaser. 2003. "The Physiology of Marriage: Pathways to Health." *Physiology and Behavior* 79(3):409–16.
Robustelli, Briana L., Anne C. Trytko, Angela Li, and Mark A. Whisman. 2015. "Marital Discord and Suicidal Outcomes in a National Sample of Married Individuals." *Suicide and Life-Threatening Behavior* 45(5):623–32.
Rodríguez-García, Dan. 2015. "Intermarriage and Integration Revisited: International Experiences and

Cross-Disciplinary Approaches." *Annals of the American Academy of Political and Social Science* 662(1):8–36.

Ross, Catherine E. 1995. "Reconceptualizing Marital Status as a Continuum of Social Attachment." *Journal of Marriage and the Family* 57(1):129.

Ryan, Andrea Kay and Fern K. Willits. 2007. "Family Ties, Physical Health, and Psychological Well-Being." 907–20.

Simon, Robin W. 2002. "Revisiting the Relationships among Gender, Marital Status, and Mental Health." *American Journal of Sociology*.

Smith, Jack C., James A. Mercy, and Judith M. Conn. 1988. "Marital Status and the Risk of Suicide." *American Journal of Public Health* 78(1):78–80.

Söhn, Janina. 2011. "Immigrants' Educational Attainment: A Closer Look at the Age-at-Migration Effect." in *A Life-Course Perspective on Migration and Integration*.

Sokolowski, Marcus, Jerzy Wasserman, and Danuta Wasserman. 2014. "Genome-Wide Association Studies of Suicidal Behaviors: A Review." *European Neuropsychopharmacology*.

Spallek, Jacob, Anna Reeske, Marie Norredam, Signe Smith Nielsen, Jessica Lehnhardt, and Oliver Razum. 2015. "Suicide among Immigrants in Europe - A Systematic Literature Review." *European Journal of Public Health* 25(1):63–71.

Stack, Steven. 1990. "The Effect of Divorce on Suicide in Denmark, 1951-1980." *The Sociological Quarterly* 31(3):359–70.

Stack, Steven and J. Ross Eshleman. 1998. "Marital Status and Happiness: A 17-Nation Study." *Journal of Marriage and the Family*.

Stack, Steven and Jonathan Scourfield. 2015. "Recency of Divorce, Depression, and Suicide Risk." *Journal of Family Issues* 36(6):695–715.

Stack, Steven and Ira Wasserman. 1993. "Marital Status, Alcohol Consumption, and Suicide: An Analysis of National Data." *Journal of Marriage and Family* 55(4):1018–24.

Tegunimataka, Anna. 2017. "Trajectories of Integration: Naturalization, Intermarriage and Education in Denmark, 1980-2015."

Di Thiene, Domitilla, K. Alexanderson, P. Tinghög, G. La Torre, and E. Mittendorfer-Rutz. 2015. "Suicide among First-Generation and Second-Generation Immigrants in Sweden: Association with Labour Market Marginalisation and Morbidity." *Journal of Epidemiology and Community Health* 69(5):467–73.

Umberson, D. 1987. "Family Status and Health Behaviors: Social Control as a Dimension of Social Integration." *Journal of Health and Social Behavior*.

Umberson, Debra. 1992. "Gender, Marital Status and the Social Control of Health Behavior." *Social Science and Medicine* 34(8):907–17.

Umberson, Debra, Kristi Williams, Daniel A. Powers, Hui Liu, and Belinda Needham. 2006. "You Make Me Sick: Marital Quality and Health over the Life Course." *Journal of Health and Social Behavior* 47(1):1–16.

Veevers, J. E. 1973. "Parenthood and Suicide: An Examination of a Neglected Variable." *Social Science and Medicine* 7(2):135–44.

Verbrugge, Lois M. 1979. "Marital Status and Health Problems." *Journal of Marriage and Family* 41(2):267–85.

Vitlic, Ana, Riyad Khanfer, Janet M. Lord, Douglas Carroll, and Anna C. Phillips. 2014. "Bereavement Reduces Neutrophil Oxidative Burst Only in Older Adults: Role of the HPA Axis and Immunesenescence." *Immunity & Ageing* 11(1):13.

Wadsworth, Tim and Charis E. Kubrin. 2007. "Hispanic Suicide in U.S. Metropolitan Areas: Examining the Effects of Immigration, Assimilation, Affluence, and Disadvantage." *American Journal of Sociology* 112(6):1848–85.

Waite, Linda J. 1995. “Does Marriage Matter?” *Demography* 32(4):483–507.
Wallace, Matthew and Hill Kulu. 2014. “Migration and Health in England and Scotland: A Study of Migrant Selectivity and Salmon Bias.” *Population, Space and Place* 20(8):694–708.
Westman, Jeanette, Jan Sundquist, Leena Maria Johansson, Sven-Erik Johansson, and Kristina Sundquist. 2006. “Country of Birth and Suicide: A Follow-up Study of a National Cohort in Sweden.” *Archives of Suicide Research* 10(3):239–48.
WHO. 2018. *Mental Health Atlas 2017*. Geneva: World Health Organizatio.
Wilson, Chris M. and Andrew J. Oswald. 2005. “How Does Marriage Affect Physical and Psychological Health? A Survey of the Longitudinal Evidence.” *Discussion Paper Series*.
Word Health Organization. 2004. “Suicide Huge but Preventable Public Health Problem.”
Yu, Yan Liang and Zhenmei Zhang. 2017. “Interracial Marriage and Self-Reported Health of Whites and Blacks in the United States.” *Population Research and Policy Review* 36(6):851–70.
Zhang, Yuanting and Jennifer Van Hook. 2009. “Marital Dissolution Among Interracial Couples.” *Journal of Marriage and Family* 71(1):pp 95-107.

Table 1. Distribution of time at risk by background characteristics among men and women across marital composition groups, Sweden, 1991–2016

	Men					Women				
Characteristics	**Sw-Sw***	**Sw-Im**	**Im-Sw**	**Im-Inter-Im**	**Im-Intra-Im**	**Sw-Sw**	**Sw-Im**	**Im-Sw**	**Im-Inter-Im**	**Im-Intra-Im**
Person Years	31,329,020[§]	1838,110	1,519,840	524,920	2,628,060	31,444,900	1,350,260	2,152,.480	619,570	3,177,510
Education										
Prim-Second	72.25	69.07	63.74	59.82	65.41	69.44	65.19	61.02	58.22	66.16
Post-Second	26.70	30.29	33.16	33.04	26.55	29.98	34.51	36.78	34.73	25.15
Missing	1.05	0.64	3.10	5.68	8.04	0.58	0.30	2.20	7.05	8.69
Income										
Low	9.58	11.00	12.84	26.43	25.64	10.19	11.38	13.22	26.88	26.01
Medium	38.86	41.03	40.63	43.73	46.38	38.52	40.59	40.78	44.52	47.27
High	51.56	47.97	46.53	26.20	27.98	51.29	48.03	46.00	28.59	26.71
Employment										
Unemployed	95.68	94.87	92.67	90.42	90.55	93.68	92.09	91.46	89.85	90.43
Employed	4.32	5.13	7.33	9.58	9.45	6.32	7.91	8.54	10.15	9.57
Parental status										
Child below 18	68.40	68.74	61.85	55.67	55.58	67.98	63.24	67.16	54.15	52.97
No child/adult child	31.60	31.26	38.15	44.33	44.42	32.02	36.76	32.84	45.85	47.03
Country of birth										
Western countries	-	-	67.00	29.35	25.65	-	-	59.45	26.04	22.95
Other European countries	-	-	14.15	23.92	32.76	-	-	17.58	31.68	30.52
All others	-	-	18.85	46.73	41.58	-	-	22.96	42.29	46.53

* Sw-Sw: Swedish – Swedish, Sw-Im: Swedish – Immigrant; Im-Sw: Immigrant – Swedish; Im-Inter-Im: Immigrant – Immigrant from different countries; Im-Intra-Im: Immigrant – Immigrant from the same country

§ in 1000 person-years

Table 2. Mortality hazard ratios for marital composition groups in the total Swedish population, 1991–2016

	Men			Women		
	Model 1*	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
	HR [95% CI]**	HR [95% CI]	HR [95% CI]	HR [95% CI]	HR [95% CI]	HR [95% CI]
Marital composition groups (ref: Sw-Sw)[§]						
Sw-Im	1.208[+++]	1.173[++]	1.171[++]	1.118	1.083	1.077
	[1.085,1.345]	[1.053,1.306]	[1.052,1.304]	[0.908,1.376]	[0.880,1.334]	[0.875,1.327]
Im-Sw	1.090	1.04	1.04	1.622[+++]	1.526[+++]	1.481[+++]
	[0.960,1.237]	[0.916,1.181]	[0.916,1.181]	[1.409,1.867]	[1.325,1.758]	[1.285,1.707]
Im-Inter-Im	0.994	0.805	0.805	1	0.789	0.771
	[0.790,1.251]	[0.638,1.014]	[0.638,1.014]	[0.708,1.413]	[0.557,1.117]	[0.544,1.091]
Im-Intra-Im	0.861[++]	0.673[+++]	0.674[+++]	0.838[+]	0.634[+++]	0.639[+++]
	[0.770,0.962]	[0.600,0.755]	[0.601,0.756]	[0.708,0.991]	[0.533,0.755]	[0.537,0.760]
Education (ref: Primary or secondary)						
Post-Secondary		0.767[+++]	0.768[+++]		0.796[+++]	0.809[+++]
		[0.718,0.820]	[0.719,0.821]		[0.721,0.879]	[0.732,0.893]
Missing		1.123	1.122		1.455[+]	1.430[+]
		[0.952,1.324]	[0.951,1.323]		[1.087,1.947]	[1.068,1.914]
Income (ref: Medium)						
Low		1.537[+++]	1.535[+++]		1.401[+++]	1.380[+++]
		[1.430,1.651]	[1.429,1.650]		[1.252,1.568]	[1.233,1.545]
High		0.601[+++]	0.602[+++]		0.556[+++]	0.572[+++]
		[0.564,0.639]	[0.565,0.640]		[0.506,0.612]	[0.520,0.629]
Employment status (ref: Employed)						
Unemployed		1.264[+++]	1.264[+++]		1.017	1.019
		[1.134,1.408]	[1.134,1.409]		[0.865,1.195]	[0.867,1.198]
Parental status (ref: Having no or adult children)						
Having a minor child			0.963			0.606[+++]
			[0.888,1.044]			[0.532,0.690]
Observations	12,897,950			13,897,357		
Nr. deaths	6229			2549		

* Model 1: Marital composition groups; Model 2: Model 1+ socioeconomic characteristics; Model 3: Model 2 + having a child under 18
** Hazard ratio [95% Confidence Interval]
[§] Sw-Sw: Swedish – Swedish, Sw-Im: Swedish – Immigrant; Im-Sw: Immigrant – Swedish; Im-Inter-Im: Immigrant – Immigrant from different country of birth; Im-Intra-Im: Immigrant – Immigrant from the same country of birth
+ p-value <0.05; ++ p-value < 0.01; +++ p-value <0.001

Table 3. Mortality hazard ratios for marital composition groups in the immigrant population, Sweden, 1991–2016

	Men		Women	
	Model 1*	**Model 2**	**Model 1**	**Model 2**
	HR [95% CI]**	HR [95% CI]	HR [95% CI]	HR [95% CI]
Marital composition groups (ref: Im-Intra-Im)§				
Im-Sw	1.338+++	1.162	2.129+++	1.965+++
	[1.130,1.585]	[0.971,1.390]	[1.709,2.651]	[1.564,2.469]
Im-Inter-Im	1.195	1.209	1.229	1.201
	[0.929,1.539]	[0.939,1.557]	[0.842,1.795]	[0.822,1.754]
Education (ref: Primary or secondary)				
Post-Second	0.677+++	0.708+++	0.722++	0.731+
	[0.558,0.822]	[0.582,0.860]	[0.565,0.924]	[0.571,0.937]
Missing	0.711	0.729	1.367	1.418
	[0.501,1.009]	[0.514,1.035]	[0.913,2.048]	[0.946,2.127]
Income (ref: Medium)				
Low	1.312++	1.399+++	1.158	1.216
	[1.077,1.599]	[1.147,1.706]	[0.895,1.498]	[0.939,1.575]
High	0.851	0.808+	0.720++	0.684++
	[0.703,1.031]	[0.667,0.980]	[0.564,0.921]	[0.534,0.876]
Employment status (ref: Employed)				
Unemployed	0.912	0.95	0.848	0.847
	[0.667,1.247]	[0.695,1.300]	[0.570,1.262]	[0.569,1.261]
Parental status (ref: Having no or adult children)				
Having a minor child	0.842	0.928	0.573+++	0.599+++
	[0.680,1.042]	[0.746,1.154]	[0.430,0.765]	[0.448,0.801]
Country of birth (ref: Nordic & Western countries)§				
Other European		0.855		0.987
		[0.705,1.038]		[0.770,1.266]
All other countries		0.491		0.497
		[0.389, 0.619]		[0.367, 0.675]
Observations	2,225,792		2,907,401	
Nr. deaths	660		397	

* Model 1: Marital composition groups, education, income, and employment and parental status; Model 2: Model 1 + country of birth

** Hazard ratio (95% Confidence Interval)

§ Im-Sw: Immigrant – Swedish; Im-Inter-Im: Immigrant – Immigrant from different country of birth; Im-Intra-Im: Immigrant – Immigrant from the same country of birth

Nordic, Western European, and North American countries, Australia, New Zealand

+ p-value<0.05; ++ p-value< 0.01; +++ p-value<0.001

Table 4. Mortality hazard ratios for suicide by marital composition groups in the immigrant population for Western and non-Western countries, Sweden, 1991–2016

	Western countries		Non-Western countries	
	Men	**Women**	**Men**	**Women**
	HR [95% CI]*	HR [95% CI]	HR [95% CI]	HR [95% CI]
Marital composition groups (ref: Im-Intra-Im)§				
Im-Sw	0.949	1.392	1.556++	2.912+++
	[0.744,1.211]	[1.000,1.938]	[1.129,2.144]	[2.077,4.084]
Im-Inter-Im	0.789	0.998	1.503+	1.433
	[0.496,1.255]	[0.509,1.956]	[1.071,2.109]	[0.865,2.375]
Education (ref: Primary or secondary)				
Post-Second	0.706+	0.515++	0.740+	1.002
	[0.516,0.965]	[0.327,0.809]	[0.556,0.984]	[0.710,1.414]
Missing	0.578	1.318	0.934	1.769+
	[0.329,1.015]	[0.665,2.614]	[0.586,1.489]	[1.047,2.989]
Income (ref: Medium)				
Low	1.425+	1.139	1.239	1.082
	[1.056,1.922]	[0.751,1.726]	[0.914,1.678]	[0.736,1.590]
High	0.755	0.694	0.914	0.808
	[0.564,1.011]	[0.473,1.018]	[0.675,1.239]	[0.550,1.186]
Employment status (ref: Employed)				
Unemployed	1.158	0.632	0.737	0.895
	[0.691,1.942]	[0.277,1.442]	[0.452,1.200]	[0.513,1.562]
Parental status (ref: Having no or adult children)				
Having a minor child	1.105	0.651	0.931	0.71
	[0.763,1.601]	[0.373,1.135]	[0.679,1.276]	[0.474,1.064]
Country of birth (ref: All other countries)				
Other European			1.727+++	2.133+++
			[1.334,2.236]	[1.532,2.969]
Observations	511,466	569,240	1,387,634	1,901,118
Nr. deaths	294	166	270	167

* Hazard ratio [95% Confidence Interval]

§ Im-Sw: Immigrant – Swedish; Im-Inter-Im: Immigrant – Immigrant from different country of birth; Im-Intra-Im: Immigrant – Immigrant from the same country of birth

+ p-value <0.05; ++ p-value < 0.01; +++ p-value <0.001

Table 5. Mortality hazard ratios for marital composition groups in the immigrant population by age at immigration, Sweden, 1991–2016

	18 years or below at immigration		18+ years at immigration	
	Men	**Women**	**Men**	**Women**
	HR [95% CI]*	HR [95% CI]	HR [95% CI]	HR [95% CI]
Marital composition groups (ref: Im-Intra-Im)[§]				
Im-Sw	1.232	1.885	1.176	2.002^{+++}
	[0.725,2.093]	[0.967,3.674]	[0.966,1.432]	[1.567,2.558]
Im-Inter-Im	1.322	0.97	1.188	1.223
	[0.636,2.748]	[0.312,3.017]	[0.905,1.558]	[0.818,1.829]
Education (ref: Primary or secondary)				
Post-Second	0.619	0.526	0.726^{++}	0.773
	[0.352,1.088]	[0.262,1.060]	[0.589,0.894]	[0.591,1.010]
Missing	-	-	0.771	1.550^{+}
			[0.542,1.097]	[1.027,2.340]
Income (ref: Medium)				
Low	2.230^{++}	2.296^{+}	1.330^{++}	1.103
	[1.283,3.876]	[1.218,4.326]	[1.076,1.645]	[0.832,1.462]
High	0.692	0.435^{++}	0.841	0.754^{+}
	[0.428,1.119]	[0.238,0.795]	[0.681,1.038]	[0.575,0.989]
Employment status (ref: Employed)				
Unemployed	1.248	0.998	0.887	0.795
	[0.637,2.444]	[0.448,2.222]	[0.622,1.266]	[0.502,1.260]
Parental status (ref: Having no or older children)				
Having a minor child	0.692	0.429^{++}	0.978	0.643^{++}
	[0.414,1.157]	[0.226,0.816]	[0.770,1.243]	[0.465,0.889]
Country of birth (ref: Western countries)				
Other European	0.896	0.746	0.842	1.001
	[0.498,1.613]	[0.326,1.705]	[0.685,1.035]	[0.767,1.305]
All others	0.708	0.927	0.463^{+++}	0.453^{+++}
	[0.369,1.360]	[0.440,1.953]	[0.361,0.594]	[0.324,0.634]
Observations	318,853	429,588	1,899,100	2,470,358
Nr. deaths	96	64	564	333

* Hazard ratio [95% Confidence Interval]

[§] Im-Sw: Immigrant – Swedish; Im-Inter-Im: Immigrant – Immigrant from different country of birth; Im-Intra-Im: Immigrant – Immigrant from the same country of birth

+ p-value <0.05; ++ p-value < 0.01; +++ p-value <0.001

Supplementary Table 6. Mortality hazard ratios for suicide by marital composition groups among immigrant women by country of birth, Sweden, 1991–2016

	Eastern Europe	All others	Nordic & Western Europe	All excl. Eastern Europe	All excl. All others	All excl. Nordic & Western Europe
	HR [95%CI]	HR [95%CI]	HR [95%CI]	HR [95%CI]	HR [95%CI]	HR [95%CI]
Marital composition (ref.: Im-Intra-Im)						
Im-Sw§	2.569+++	3.863+++	1.392	1.728+++	1.792+++	2.912+++
	[1.681,3.926]	[2.194,6.801]	[1.000,1.938]	[1.287,2.318]	[1.369,2.344]	[2.077,4.084]
Im-Inter-Im	1.654	1.123	0.998	0.974	1.299	1.433
	[0.908,3.012]	[0.433,2.914]	[0.509,1.956]	[0.562,1.688]	[0.833,2.027]	[0.865,2.375]
Education (ref: Primary or secondary)						
Post-Second	0.880	1.308	0.515++	0.693+	0.687+	1.002
	[0.569,1.362]	[0.741,2.311]	[0.327,0.809]	[0.492,0.976]	[0.504,0.935]	[0.710,1.414]
Missing	1.639	2.082	1.318	1.482	1.460	1.769+
	[0.778,3.453]	[0.967,4.484]	[0.665,2.614]	[0.902,2.435]	[0.886,2.407]	[1.047,2.989]
Income (ref: Medium)						
Low	0.952	1.326	1.139	1.150	1.073	1.082
	[0.571,1.585]	[0.724,2.428]	[0.751,1.726]	[0.820,1.614]	[0.778,1.480]	[0.736,1.590]
High	0.838	0.747	0.694	0.698+	0.758	0.808
	[0.529,1.327]	[0.369,1.516]	[0.473,1.018]	[0.499,0.978]	[0.565,1.017]	[0.550,1.186]
Employment status (ref: Employed)						
Unemployed	0.844	1.036	0.632	0.772	0.739	0.895
	[0.405,1.758]	[0.439,2.444]	[0.277,1.442]	[0.428,1.395]	[0.428,1.276]	[0.513,1.562]
Parental status (ref: Having no or older children)						
Having a minor	0.591	0.920	0.651	0.665+	0.602+	0.710
	[0.326,1.071]	[0.518,1.633]	[0.373,1.135]	[0.451,0.980]	[0.402,0.904]	[0.474,1.064]
Country of birth						
Nordic & Western*				1.000	1.000	
Eastern Europe					1.010	2.133+++
					[0.773,1.320]	[1.532,2.969]
All others				0.364+++		1.000
				[0.254,0.521]		
Observations	682,674	1,218,444	569,240	1,787,684	1,251,914	1,901,118
Nr. deaths	107	60	166	226	273	167

* Nordic and Western Europe countries, North America (USA and Canada), Australia, and New Zealand
** Hazard ratio [95% Confidence Interval]
§ Im-Sw: Immigrant – Swedish; Im-Inter-Im: Immigrant – Immigrant from different country of birth; Im-Intra-Im: Immigrant – Immigrant from the same country of birth
+ p-value<0.05; ++ p-value< 0.01; +++ p-value<0.001

Supplementary Table 7. Mortality hazard ratios for suicide by marital composition groups among immigrant men by country of birth, Sweden, 1991–2016

	Eastern Europe	All others	Nordic & Western Europe	All excl. Eastern Europe	All excl. All others	All excl. Nordic & Western Europe
	HR [95%CI]	**HR [95%CI]**	**HR [95%CI]**	**HR [95%CI]**	**HR [95%CI]**	**HR [95%CI]**
Marital composition (ref.: Im-Intra-Im)						
Im-Sw	1.080	2.378^{+++}	0.949	1.155	1.030	1.556^{++}
	[0.683,1.708]	[1.493,3.788]	[0.744,1.211]	[0.925,1.441]	[0.831,1.275]	[1.129,2.144]
Im-Inter-Im	1.516	1.496	0.789	1.019	1.103	1.503^{+}
	[0.970,2.367]	[0.883,2.534]	[0.496,1.255]	[0.721,1.439]	[0.802,1.517]	[1.071,2.109]
Education (ref: Primary or secondary)						
Post-Second	0.638^{+}	0.842	0.706^{+}	0.763^{+}	0.683^{++}	0.740^{+}
	[0.429,0.949]	[0.554,1.277]	[0.516,0.965]	[0.596,0.977]	[0.535,0.871]	[0.556,0.984]
Missing	0.962	0.793	0.578	0.656	0.756	0.934
	[0.542,1.708]	[0.350,1.798]	[0.329,1.015]	[0.415,1.038]	[0.510,1.119]	[0.586,1.489]
Income (ref: Medium)						
Low	1.643^{+}	0.816	1.425^{+}	1.197	1.522^{+++}	1.239
	[1.101,2.451]	[0.507,1.312]	[1.056,1.922]	[0.929,1.542]	[1.200,1.929]	[0.914,1.678]
High	1.182	0.622	0.755	0.723^{+}	0.900	0.914
	[0.798,1.751]	[0.379,1.022]	[0.564,1.011]	[0.563,0.928]	[0.712,1.138]	[0.675,1.239]
Employment status (ref: Employed)						
Unemployed	0.540	0.900	1.158	1.037	0.878	0.737
	[0.236,1.235]	[0.489,1.658]	[0.691,1.942]	[0.699,1.540]	[0.567,1.360]	[0.452,1.200]
Parental status (ref: Having no or older children)						
Having a minor	1.109	0.786	1.105	0.949	1.078	0.931
	[0.700,1.757]	[0.507,1.220]	[0.763,1.601]	[0.715,1.259]	[0.809,1.438]	[0.679,1.276]
Country of birth (ref: Nordic & Western countries)						
Nordic & Western*				1.000	1.000	
Eastern Europe					0.805^{+}	1.727^{+++}
					[0.654,0.991]	[1.334,2.236]
All others				0.427^{+++}		1.000
				[0.328,0.557]		
Observations	500,134	887,500	511,466	1,398,966	1,011,600	1,387,634
Nr. of deaths	162	108	294	402	456	270

* Nordic and Western Europe countries, North America (USA and Canada), Australia, and New Zealand

** Hazard ratio [95% Confidence Interval]

[§] Im-Sw: Immigrant – Swedish; Im-Inter-Im: Immigrant – Immigrant from different country of birth; Im-Intra-Im: Immigrant – Immigrant from the same country of birth

+ p-value<0.05; ++ p-value< 0.01; +++ p-value<0.001