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Journal of Family Issues

Recency of Divorce, Depression and suicide risk

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Keywords:	Divorce/Separation, Family Violence, Work & Family, Religion, Intimate Relationships
Abstract:	<p>Previous individual level research on the association between the status of divorce and suicide risk has been marked by two recurrent limitations: (1) it is not clear if the timing of divorce (recent vs. distal) affects risk of completed suicides and (2) it is not clear if the association between divorce and suicide completions will withstand controls for a series of risk and protective factors. The present study addresses these two gaps in the literature. Data are from the National Mortality Follow Back Survey and refer to 13,897 deaths including 1,169 suicides. A model is estimated which controls for major alternative predictors of suicide completions including depression and sociological factors. The results of a multivariate logistic regression analysis determined that, controlling for the psychiatric, social and economic predictors of suicide completions, recent divorce increases the odds of death by suicide 1.6 times, compared to 1.3 times for distal divorce.</p>

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Recency of Divorce, Depression and Suicide Risk

Durkheim (1897/1966) demonstrated that married persons had a lower risk of suicide completions than single persons in 19th century France. Married persons were thought to be higher in social integration, higher in ties and mutual responsibilities to a spouse, than non married persons. Such bonds, in turn, lowered suicide risk.

Following up on this insight, investigations from the 20th century explored individual level data on suicide rates among marital status groups (for reviews see Agerbo, Stack & Petersen, 2011; Lester, 1992, 2000; Stack, 1982, 2000b). A systematic review of the literature from 1880 through 1994 on suicide completions found 37 such studies based on individual level data, and all supported Durkheim's basic premise of the protective effect of marriage (Stack, 2000b). Work since 1994 continues to demonstrate a link between divorce and completed suicide at the individual level (e.g., Agerbo, Sterne, & Gunnell, 2007; Kposowa, 2000; Luoma & Pearson, 2002; Yeh et al., 2008; Yip & Thorburn, 2004). This association has persisted in a variety of social contexts through time and space. That divorced people are at a risk for completed suicide that is greater than that of age matched, married peers is close to a sociological law.

However, there are two recurrent limitations of this body of research: (1) little is known about the timing of the impact of divorce on risk of completed suicide. Specifically, are the recently divorced at the same, more, or less risk than the long-term divorced? Does the influence of divorce affect suicide completions among the divorced only in the short term? (2) Does the status of being divorced have an independent effect on suicide risk? According to the selection hypothesis (e.g., Wade & Pevalin, 2004), mental disturbances precede marital disruption. Such mental disturbances select people

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3 out of marriage for divorce. Rates of major depression among the divorced are
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5 reportedly as much as nine times higher for men and three times higher for women
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7 compared to their married counterparts (Wade & Pevalin, 2004). It is important to control
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9 for psychiatric problems such as depression to determine if the stresses of occupying the
10
11 role of a divorced person affect suicide risk independent of depression. Once controls are
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13 introduced for the covariates of divorce such as psychiatric morbidity and economic
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15 strain, will the bivariate association between divorce and completed suicides hold up?
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17 Does depression, in particular, cause both divorce and suicide?
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22 The present paper contributes to the literature by addressing these two relatively
23
24 neglected issues. As such, it integrates a sociological with a psychiatric perspective. Such
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26 integrated models have been advocated by writers such as Kposowa & Glyniadaki
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28 (2012). It employs data from the National Mortality Follow – Back Survey, a national, in
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30 depth study of 13,897 deaths including 1,169 suicides. This allows for the testing of two
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32 central hypotheses: (1) The suicide risk of the recently divorced is greater than that of the
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34 long term divorced, and (2) the impact of divorce on suicide risk is independent of
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36 psychiatric and social covariates.
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40 41 BACKGROUND AND THEORETICAL FRAMEWORK 42

43
44 *Literature Review.* Much of the sociological literature on divorce and suicide is
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46 based on aggregate data on suicide rates and divorce rates (e.g., Barstad, 2008; Gundlach,
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48 1990; Lester, 1994; Trovato 1986, 1987; for reviews see Lester, 2000; Stack 2000b). In
49
50 contrast, the present investigation focuses on individual level research where there is a
51
52 clearer link between divorce and suicide. Research that is based on concrete, individual
53
54 level data has demonstrated that divorced people have an elevated risk of suicide. A
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3 review of 37 such studies, containing 493 findings and published from 1880 through
4
5 1994, found that 426/493 findings (86.4%) showed that divorced people had a higher
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7 suicide risk than their married counterparts (Stack, 2000b). The magnitude of the
8
9 difference between the suicide rates of the married and the divorced is often substantial.
10
11 For example, in Austria the suicide rate of divorced persons was 128.6/100,000 compared
12
13 to 30.5/100,000 for married persons. The ratio of these two rates, the coefficient of
14
15 aggravation (COA), was 4.22. In the United States the COA varies mostly between 3.0
16
17 and 4.0 (Stack, 2000b).
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22 A systematic epidemiological study by the World Health Organization (1968) still
23
24 provides the largest single set of relevant cross national data. In circa 1960, the COA's
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26 for males, by nation, include: Denmark 6.2, Finland 4.2, France 2.2, West Germany 5.0,
27
28 Italy 3.6, Netherlands, 5.1, Norway 3.6, US 4.2, Sweden 3.8, Switzerland 4.5, England
29
30 3.8, and Australia 4.2. Corresponding female COA's were Denmark 4.6, Finland 2.9,
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32 France 1.9, West Germany 3.1, Italy 17.0, Netherlands 3.6, Norway 2.9, Sweden 3.4,
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34 Switzerland 3.4, England 2.6, and Australia 4.1 (World Health Organization, 1968).
35
36 These figures are summarized in Table 1. In most nations the divorced have a suicide rate
37
38 that is at least double that of the married population. There is substantial variation in the
39
40 COA across nations, but the COA is always greater than one.
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46 (Table 1 about here)

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48 While Stack (2000b) provides a systematic review of the evidence from 1880 through
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50 1994, in order to assess any new fundamental change, a search was done through
51
52 databases (*Sociological Abstracts* and *MEDLINE*) using the subjects "suicide" and
53
54 "divorce," and years "1995-2011." The search was further limited to studies meeting two
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3 additional criteria: suicidality was defined as suicide completions. Other forms of
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5 suicidality such as suicide ideation and attempts were omitted. (b) The completed
6
7 suicides had to involve divorced persons themselves. Studies exploring the impact of
8
9 divorce on other groups (such as the children of divorced persons) were not included.
10
11 Another 24 relevant investigations, based on individual level data were found. Adding
12
13 these to the 37 from Stack (2000b) brings the total to 61 studies. Individual level
14
15 research done after 1994 has found the same general pattern. Table 1 includes
16
17 descriptions of representative suicide rates and risk ratios from many of these additional
18
19 investigations. It lists the investigations in order by nation. Suicide rates, when available,
20
21 are given for divorced vs. married persons. The coefficient of aggravation (ratio of the
22
23 suicide rates of divorced/married or the relative risk ratio), and a list of control variables,
24
25 if any, that are employed by the researchers are listed in the Table as well.
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32 Findings from Europe and North America continue to document that the divorced
33
34 have a higher suicide risk than the married. For example, in England and Wales between
35
36 1982 and 1996 divorced males were 2.7 times and divorced females 2.5 times more apt to
37
38 die through suicide than their married counterparts (Yip & Thorburn, 2004). In Denmark,
39
40 divorced males between 41-60 years old are 3.9 times more apt than married males to die
41
42 through suicide, while the COA for Danish women, 41-60, is 3.7 (Agerbo et al., 2007). In
43
44 a longitudinal American study, Kposowa (2000) found that divorced men at baseline in
45
46 1979 were 2.4 times more apt than married men to suicide by 1989. Divorced women at
47
48 baseline were not at significantly elevated risk for suicide. However, this finding is
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50 tenuous given a rather small number of divorced female suicides (n=10) (Kposowa,
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2003).

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3 Available data from developed nations in Oceania also confirm the divorce-
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5
6 suicide linkage. For example, in Queensland, Australia, a study of 6,062 suicides between
7
8 1994-2004, found high coefficients of aggravation. The median relative risk of divorced
9
10 persons relative to married persons was 6.1 (Wyder, Ward & DeLeo, 2009).
11

12 Eastern nations tend to have a similar pattern. Divorce places both males and
13
14 females at higher risk of suicide. In an overtime, longitudinal study in Taiwan, being
15
16 divorced at baseline was associated with a greater risk of suicide by follow-up. For
17
18 example, divorced persons aged 35-50 in 1997 were 2.7 times more apt to die through
19
20 suicide by 2003 than their married counterparts. The relative risk ratios for divorced men
21
22 and women of this age group were similar, being 2.7 for men and 2.9 for women (Yeh et
23
24 al., 2008). In Hong Kong a study of suicide rates between 1981 and 1993 by Yip (1998)
25
26 determined that divorced men had a suicide rate of 18.9, 1.4 times greater than that of
27
28 married men, 13.7. Divorced women had a suicide rate 1.4 times higher than their
29
30 married counterparts (17.9 vs. 13.2). In India the suicide rate of divorced men is quite
31
32 high, 346/100,000, fully 20 times that of their married counterparts. The gap between
33
34 divorced women and married women in India is also substantial, being 126 vs.
35
36 11.9/100,000, the corresponding COA is 10.6 (Mayer & Ziaian, 2002).
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43 The last column of Table 1 presents a summary of control variables in the various
44
45 studies. It is noteworthy that very few investigations of individual level data on divorce
46
47 and suicide incorporate control variables. Many are epidemiological or descriptive
48
49 studies. A few of the 61 studies reviewed included controls for alternative predictors of
50
51 suicide (e.g., Agerbo, Sterne & Gunnell, 2007; Kposowa, 2000; and Yeh et al., 2008).
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55 None of the 61 studies included a control for depression.
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It is noted that two papers not listed in Table 1 do examine the long term impact of parental divorce on the risk of suicide attempts among the children of divorced parents (Lizardi, Thompson, Keys, & Hasin, 2010a; 2010b). These papers do control for depression. However, they differ from the thrust of the present analysis in two ways. First, the present paper is concerned with the intragenerational impact of divorce on the divorced persons themselves, not their children. Our analysis is not dealing with very long term, intergenerational impacts of divorce on the children of divorced. Second, our analysis concerns suicide completions, not attempts. To the extent that the predictors of suicide completions are different from the predictors of attempts (Lester, 2000), for example men have higher rates of the former but lower rates of the latter than women, it is important to study these suicidal behaviors separately.

Theoretical Interpretations. Several sociological theories offer explanations for the connection between suicide and marital status (Cutright & Fernquist, 2005; Cutright, Stack & Fernquist, 2005; Gibbs, 2000; Stack, 2000b). The most often cited explanation is Durkheim's idea that marriage protects against suicide because of its promotion of social integration or bonds between husband and wife (e.g., Agerbo, Stack, & Petersen, 2011; Shiner, Scourfield, Fincham & Langer, 2009; Stack, 2000b). In this vein, bonds to a spouse reduce suicide through mechanisms including the giving and receiving of social support, companionship, and validation. The loss of these bonds through divorce contributes to suicide risk. Generally the literature on marital transitions finds that psychological distress increases after divorce (e.g., Strohschein, et al., 2005), which is consistent with the social integration view of divorce and suicide. Second, there is Gibbs and Martin's (1964) marital status integration hypothesis. Basically, statistically

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3 infrequent status sets, such as being divorced and male relative to married and being
4 male, are assumed to be inherently stressful and, as such, contribute to suicide risk.
5
6 However, as the status sets such as divorced male become less infrequent, we would
7
8 anticipate a corresponding decline in suicide rates among persons in such status sets. As
9
10 divorce became more commonplace between 1960 and 1980, the gap between the suicide
11
12 rates of the married and divorced narrowed (Stack, 1990). As divorce became more
13
14 commonplace, the stigma associated with being divorced lessened and new institutions
15
16 developed such as personal ads which facilitated finding a new mate. A third perspective
17
18 focuses on marital status differences in suicide acceptability, with married people more
19
20 likely than divorced persons to regard suicide as a morally unacceptable act (Cutright,
21
22 Stack & Fernquist, 2005). Groups with negative attitudes towards suicide tend to have
23
24 lower suicide rates (Stack, 2000a). These explanations are not mutually exclusive.
25
26 Divorced persons lack ties to a spouse, are in a statistically infrequent status
27
28 configuration, and can have higher levels of suicide acceptability simultaneously. In
29
30 related work, marriage is also associated with better physical health and enhanced
31
32 economic resources (Stack, 1994; 2011). Each of these, in turn, is known to contribute to
33
34 lower suicide risk for married persons relative to divorced persons (Stack, 2000a, 2000b).
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43 *Limitations: Timing of Divorce.* One recurrent limitation of the 61 concrete,
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45 individual level studies is that the recency or the timing of suicide after divorce is largely
46
47 unexplored. This is often not the fault of the investigators, since some of the research is
48
49 based on secondary analysis of existing data, and the existing archival data simply does
50
51 not have any information on the timing of divorce (e.g., Kposowa 2000; Stack, 1998,
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53 2004). Such investigations generally have no alternative but to lump together all divorced
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3 persons who suicide regardless as to how long they have been divorced. Persons who
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5 experienced divorce and suicided in the weeks following the divorce generally are
6
7 grouped with persons who suicide one year, two years, three years, and longer after their
8
9 divorces (e.g., Dzurova et al, 2006; Mayer & Ziaian, 2002; Phillips et al., 2002; Yip &
10
11 Thorburn, 2004). A key question is: is the link between divorce and subsequent suicide
12
13 time dependent? Are the recently divorced any more apt to suicide than persons who
14
15 divorced long ago?
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20 A case can be made that the recently divorced may be most at risk for suicide.
21
22 One might contend that the initial social, psychological and economic shocks of divorce
23
24 would place the recently divorced person at high risk. The initial strains of divorce such
25
26 as the creation of two households where there had been one, the financial pressures,
27
28 strains with old in-laws, and custody issues may fade with time. People need time to
29
30 adjust to disruptions in their social and economic relationships. To the extent that divorce
31
32 happens too quickly, it can produce sociological anomie (Durkheim 1897/1966;
33
34 Kposowa, 2000). Possibly the subsets of divorced persons most prone to suicide include
35
36 those whose personalities make them less adaptable, with fewer ties to extended family
37
38 and friends for social support, and with meager financial resources. With time new
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40 intimate others can be found, possibly cohabitation can be initiated, expenses shared with
41
42 a roommate or mate, and so on. Over time divorced persons can adjust to their new
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44 station in life and suicide risk can decline. Given such considerations, divorce would
45
46 have its strongest impact on suicide in the near term (Roskar, Podlesek, Kuzmanic, et al.,
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48 2011).
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3 On the other hand, a case can be made for distal effects of divorce on suicide. It
4 may take a long time for the stresses associated with the role of the divorce to wear down
5 the divorced person before they give up the struggle and suicide. Suicide risk can
6 increase over time due to the cumulative effect of strains such as many false starts in
7 dating relationships that ultimately fail, the loss of physical attractiveness – often a key
8 asset in mate selection, diminished hopes for finding a new partner, the grind of years of
9 loneliness, pressures from single parenting, and economic downward mobility often
10 brought about by inability to replace an affluent spouse (Stack 1994; 2011). It may
11 simply take many divorced people a long time to give up after enduring many years of
12 adversity.
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27 Only one study was found which assessed the recency of divorce on suicide risk.
28 Its findings need to be taken with some caution for at least two reasons. It is based on
29 Slovenia, a less developed nation with a small population of two million people, and one
30 of the lowest divorce rates in Europe (Roskar, Podlesek, Kuzmanic et al, 2011). It is not
31 clear if the results based on this type of social and economic context can be generalized to
32 the contemporary U.S. Further, a limitation of this investigation is that it restricted the
33 sample to persons who died within five years of their divorce. Persons who were
34 divorced and suicided, but who had been divorced for more than five years were
35 excluded. Hence, this precluded the detection of very long term (more than five years)
36 distal impacts of divorce on suicide. Nevertheless, the distribution for those suiciding
37 within five years of their divorce by the timing of their suicide was as follows: 37% less
38 than one year, 22% two years afterwards, 19% three years afterwards, 11% four years
39 afterwards, and 11% five years after the divorce. This distribution suggests that the
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3 recently divorced (e.g., 1-3 years) are at greater risk of suicide than those who have been
4
5 divorced for 4-5 years.

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8 In a related research stream, the timing of widowhood on suicide is explored.
9
10 Ajdacic-Gross *et al.* (2008) found that the annualized suicide rates in widowed people
11
12 were highest in the first week after bereavement and that in the first months after
13
14 bereavement, the suicide rates decreased, first rapidly and then gradually. Also
15
16 Erlangsen, Jeune, Bille-Brahe & Vaupel (2004) noted a significant increase in the suicide
17
18 risk during the first year after a bereavement, especially for men.
19

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22 *Limitations: Model Specification.* A second limitation of the individual based
23
24 research on divorce and completed suicide is that it tends not to control for the covariates
25
26 of divorce such as psychiatric morbidity and economic strain (Stack, 2011). It should be
27
28 noted that it is very difficult to come upon data that is publicly available which contain
29
30 both measures of divorce and psychiatric morbidity (e.g., Kposowa & Glyniadaki, 2012).
31
32 It is not the fault of researchers who use secondary data analysis. Some previous such
33
34 work is based on datasets which simply do not have measures of psychiatric constructs
35
36 (e.g., Kposowa, 2000; Stack, 1998, 2004). This is due, in part, to a relative lack of a
37
38 generalized integration of psychiatric and sociological models of suicidality (Kposowa
39
40 & Glyniadaki, 2012). Psychiatric morbidity is of particular concern. Completed as well
41
42 as attempted suicide is related to depression (e.g., Lester, 2000; Lizardi et al., 2010a).
43
44 According to a Meta analysis of 23 relevant studies, persons suffering from major
45
46 depression are, for example, fully 20.4 times more apt to die through completed suicide
47
48 than non depressed persons (Stack, 2009). In turn, divorced persons have a relatively
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50 high incidence of depression and related psychiatric disorders.
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The reader should note that there is a related literature, not fully reviewed here, on suicide attempts among the children of divorced parents which has some relevance to the issues at hand. Lizardi et al. (2010a) analyzed suicide attempts using the National Epidemiological Survey on Alcohol and Related Conditions (NESARC) and determined that depression affected the risk of suicide attempts. In addition, parental divorce affected the risk of attempted suicide of the subjects (children of divorce) in the survey. While the constructs of both suicidality and divorce in Lizardi et al's (2010a) research (attempts, parental divorce) differ from those in the present study (completed suicides, divorce of subjects, not parents of subjects), they add additional evidence for links between divorce and suicidality independent of depression.

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It is plausible that there are selection effects that influence both divorce and suicide. There has been a long standing debate between the selection and social causation perspectives concerning marital transitions (e.g., Wade & Pevalin, 2004; Stack & Eshleman, 1998). The social causation thesis argues that marital disruption leads to poor mental health, while the social selection hypothesis argues that poor mental health leads to marital disruption. For example, being difficult to live with, depressed individuals would be expected to have a higher rate of divorce, as well as a higher incidence of suicide.

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None of the 61 individual level studies to date on divorce and suicide completions control for either pre divorce or post divorce depression. Hence, individual level analyses of divorce's impact on completed suicide generally do not control for such selection biases; that is, they do not control for depression and related psychiatric disorders that may cause both divorce and completed suicide (e.g., Mayer & Ziaian, 2002; Trovato,

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2
3 1991; World Health Organization, 1968; Yeh et al., 2008). Many investigators who use
4 secondary data are simply not able to control for psychiatric morbidity since measures of
5 that construct are not available in the data source (e.g., Kposowa, 2000; Stack, 1998,
6 2004). The present investigation is the first to be able to add a measure of depression.
7
8 However, while in a related literature on suicide attempts among the children of divorce,
9 there has been a control for depression (Lizardi et al., 2010a), no one to date has been
10 able to explore the impact of divorce on the risk of suicide completions among the
11 divorced persons themselves. It should be noted, however, that we cannot fully test the
12 selection hypothesis since we lack data on pre divorce depression levels.
13
14

15 While they omit depression as a control, a few of the 61 previous studies have
16 been able to control for some covariates of divorce that contribute to suicide risk (see
17 Table 1). For example, using the data in the National Longitudinal Mortality Study,
18 Kposowa (2000) was able to control for socio-economic status indicators (education and
19 household income), but not psychiatric morbidity. Stack (1998) was able to control for
20 education, but not income. Such analysis of secondary data are necessarily limited to the
21 availability of measures of important constructs in such datasets. Using data from the
22 National Mortality Follow back Survey, the present investigation is able to add a control
23 for depression in order to sort out the independent effects of divorce on suicide risk.
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26 Whilst in principle many suicide researchers accept the value of a psycho-social
27 or bio-psycho-social model, in practice most studies are discipline-specific (e.g.,
28 Kposowa & Glyniadaki, 2012). The consideration of both sociological and psychological
29 variables is not common, and Kposowa & Glyniadaki (2012) call for such integrated
30 models. While there is some relevant work on suicide attempts among the children of
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3 divorce (e.g., Lizardi et al., 2010a), there is no such work on suicide completions among
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5 the divorced themselves. The present paper fills this gap in the literature. We include both
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7 a measure of depression as well as a structural social factor, the timing of divorce.
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10 11 METHODOLOGY

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13 All data are from the National Mortality Follow back Survey (NMFBS) (US
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15 Public Health Service, 2000). The NMFBS is based on psychological autopsies of a
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17 representative sample of deaths in the United States. Significant others of the deceased
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19 were contacted and interviewed by trained professionals. Standard questions regarding
20
21 the psychiatric, medical, treatment-centered and other issues regarding the deceased were
22
23 asked of the significant others. Some questions regarding the social context of the
24
25 deceased were also included. The NMFBS is the largest, publicly available psychological
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27 autopsy dataset on suicide. Complete data were available on 13,897 deaths including
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29 1,169 suicides.
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35 Some caution needs to be exercised in interpreting the results of the present study
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37 since it uses psychological autopsy data. Such data rely on retrospective opinions of
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39 informants about the deceased. In this line of work, the opinions cannot be directly
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41 measured from the deceased person themselves, as in typical social science survey
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43 research. While psychological autopsy studies of suicide have their limitations, they are
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45 considered by many suicide researchers as the gold standard in the investigation of
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47 completed suicides where the subject is not available for interviews (Connor, Beautrais,
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49 Brent, et al, 2011, 2012).
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3 The dependent variable is a dichotomy where 1=death by suicide and 0=deaths
4 from all other causes. Since the dependent variable is a dichotomy, logistic regression
5 techniques are appropriate (Menard, 2002).
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10 Marital status and the timing of marital transitions are measured by four binary
11 (0,1) dichotomous variables. Two measures of the timing of divorce are included. The
12 first is the experience of a recent divorce before death. A recent divorce is defined as one
13 that occurred during the year of the survey (1993) and/or during 1991-1992. It is coded
14 either 0 (before 1991) or 1 (1991-1993). Long term divorce is defined as a one which
15 occurred prior to 1991. Widowhood status is also coded as two variables in relation to the
16 recency of that status. Recent widowhood refers to deaths of spouses that occurred
17 between 1991-1993, and long term status as a widow refers to cases where the death
18 happened before 1991. All four measures are binary variables (0,1). The benchmark or
19 comparison marital status category consists of person in all other marital statuses
20 including married, and single (never married). The benchmark group, then, consists of
21 persons who have not lost a spouse through divorce or death.
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38 Several additional sociological concepts are incorporated into the model. They
39 relate to the religious and economic spheres of social life. Religiosity level, a protective
40 factor (see Stack, 2000b; Stack & Kposowa, 2011), is measured in terms of the extent of
41 religious activities, as indexed by the NMFBS item: "How often did the deceased
42 participate in religious activities." The responses to this survey question ranged from
43 never (0) through every day (5).
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53 Economic strain is measured by two constructs. These measures refer to job loss
54 (0,1), and job demotion during the last year of life (0,1). While job loss (unemployment)
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3 has received attention in previous investigations (for reviews see Platt & Hawton, 2000,
4
5 or Stack, 2000a), job demotion is an unstudied area in suicide studies. Platt and Hawton
6
7 (2000) have called for new measures of economic strain, in addition to unemployment, a
8
9 much studied measure. We answer this call.
10
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13 A key psychiatric factor, depression, is measured using a scale of 8 items that are
14
15 available in the NMFBS. These items tap feelings of worthlessness, withdrawal,
16
17 problems in concentrating, a wish to die, changes in sleep patterns, changes in weight,
18
19 crying spells, and sluggishness of the deceased. A distinction is made between the
20
21 response category where the deceased reportedly had a condition often (=1), and all
22
23 others (=0). Scores were summed and ranged from 0 to 8. The alpha reliability coefficient
24
25 for the index was 0.7414. Finally, a control is entered for a key demographic factor,
26
27 gender, where male=1 and female=0.
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31 32 RESULTS 33

34 Table 2 provides the results of the multivariate logistic regression analysis.
35
36 Controlling for depression and the other variables in the equation, from the odds ratio,
37
38 (Table 2 about here)
39
40 persons who were recently divorced were 1.64 times more apt to die through suicide than
41
42 the reference group. However, persons who had been divorced longer were not at
43
44 enhanced risk of suicide. While the odds ratio was positive indicating an 18% greater risk
45
46 of suicide, it just missed the level of statistical significance ($p = .06$). Turning to
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48 relationship loss through widowhood, persons who had experienced the recent loss of a
49
50 spouse through death were 1.37 times more apt to suicide than persons without a loss of a
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52 spouse. Long term widowhood was not associated with enhanced risk of suicide.
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3 The findings on the economic strain indicators suggested that economic problems
4 are associated with enhanced risk of self destruction. Persons experiencing loss of a job
5 during the last year of life were 1.3 times more to die through suicide. Further, persons
6 experiencing a demotion at work during the last 12 months of life were fully 7.63 times
7 more apt to die of suicide than persons not experiencing such an employment setback.

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15 Religiosity served as a protective factor. Controlling for the other independent
16 variables, the higher the religiosity the lower the suicide risk. From the odds ratio, a one
17 unit change in the five level religiosity index was associated with 19% drop in the odds of
18 death by suicide.

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25 Strong evidence for a psychiatric perspective was found. Controlling for all other
26 risk and protective factors, depression increased the risk of suicide. A one unit change in
27 the depression index was associated with an 18% rise in the risk for death through
28 suicide. Further analysis determined that a majority of persons who had perfect scores
29 (index score of 8) on depression died through suicide.

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37 The model provided a reasonable fit for the data. The Nagelkerke r-squared
38 indicated the presence of an adequate model. Importantly, using the model to predict
39 death, the model correctly classified 91% of the deaths as either suicide or nonsuicide
40 deaths.

41 42 43 44 45 46 CONCLUSION.

47
48 While there have been 61 previous individual based, studies on the relationship
49 between divorce and suicide published between 1880-2010, they have been marked by
50 two recurrent limitations: (1) neglect of the timing of divorce and (2) neglect of
51 incorporating psychiatric control variables into the analysis, including depression.
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Only one study based in the small, Eastern European nation of Slovenia, has explored the timing of divorce (Roskar, Podlessek, Kuzmanic, et al., 2011). The previous investigation limited the analysis to persons divorced less than 5 years, thus leaving the effects of very long term distal effects an open question. It also lacked a control for a major determinant of both divorce and suicide: depression. The present paper explores the timing of divorce in a substantially different social context, the US, a developed, large nation with a much higher incidence of divorce. We also include all divorced persons, not just ones divorced in a five year window, in order to fully test for distal impacts of divorce on suicide. Finally, we introduce a series of control variables including depression.

In both social settings, Slovenia and the U.S., it is the recently divorced who are at the greatest risk for suicide. While one might anticipate distal effects, where the will to live may be ground down only after many years of post divorce stress, the greatest risk, in fact, involves those who are recently divorced. Professionals involved in suicide prevention might wish to direct a disproportionate amount of their resources towards this particular, at-risk group.

An important issue running through virtually all of the 61 existing studies on divorce and suicide completions among the divorced themselves is that typically, often due to the unavailability of data in secondary data sets, they are unable to control for the respondent's depression (as well as other dimensions of psychiatric morbidity). This leaves selection effects unaddressed. Depression may cause both divorce and suicide. A Meta analysis of 13 overtime studies, where psychiatric and personality variables were measured before divorces took place, determined that neuroticism (e.g., depression,

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3 anxiety) was a significant predictor of who eventually became divorced (Roberts et al.,
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5
6 2007). In a similar vein, analyses using the National Comorbidity Surveys have
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8 determined that 11 out of the 14 psychiatric disorders investigated were predictive of
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10 ultimate divorce (Kessler, Walters, & Forthofer, 1998; Stack, 2011). For example, the
11
12 manic disorder increased the odds of divorce by 3.2 times, while major depression
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14 enhanced the risk of divorce by 1.7 times that of the general population. Both of these
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16 disorders, in turn, are known, from other research, to increase suicide risk (Lester, 2000;
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18 Wasserman & Wasserman, 2009).
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22 The present inquiry controlled for depression levels and still found that recent
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24 divorce increased the risk of suicide. Depression had, as expected, an independent impact
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26 on the odds of suicide. However, in order to fully assess the merits of the social selection
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28 and social causation hypotheses, measures of pre divorce depression are needed.
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32 The findings on several control variables are noteworthy. Judging from the
33
34 relative sizes of the Chi Square statistics in table 2, religious activities were the strongest
35
36 predictor of suicide, more important than recent divorce, depression and other
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38 independent variables. While divorce is the more commonly index of social integration,
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40 religion is the next more commonly used index of bonds to a social group (Stack, 2000b).
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42 Unfortunately, religious activities are the only measure of religiosity in the National
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44 Mortality Follow back Survey. Religious activities can include time spent with
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46 coreligionists as well as time spent attending religious services. Specific measures of
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48 each type of activity are needed in order to test the religious integration and religious
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50 networks perspectives on religion and suicide. Future work is also needed to weight this
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3 factor against measures of still other constructs including commitment to core religious
4 beliefs (Stack & Kposowa, 2011).
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8 The traditional indicator of economic strain, unemployment, exerted an
9 independent impact on the odds of suicide, as expected. In addition, a new construct, job
10 demotion, was also highly predictive of suicide. The paper also answers the call of Platt
11 and Hawton (2000) for the exploration of new measures of economic strain in research on
12 suicide. The paper also answers the call of Platt
13 and Hawton (2000) for the exploration of new measures of economic strain in research on
14 suicide.
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20 Over the last 130 years there have been 61 studies on subject's divorce and
21 completed suicide at the individual level, but they represent a tiny fraction of research on
22 suicide. Since 1980 alone, there has been over 30,000 works on suicide published (Web
23 of Science, accessed, March 1, 2011). Emanuele (2009) noted this neglect and called for
24 research on the role of romantic disruption as a widespread, neglected contributing factor
25 to suicide. An analysis of recently released data on 30,593 completed suicides in the
26 recently released data set termed the National Violent Death Reporting System found that
27 at least 27% of the suicides involved intimate partner problems including divorce,
28 separation, and custody battles (Stack & Bowman, 2011, 160). The present investigation
29 answers the call of Emanuele (2009) for work on relationship loss, a key social factor.
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44 The present paper, by including indicators from both the psychiatric and social
45 models, bridges the gap between those two paradigms on suicide. It finds, as expected,
46 that they compliment each other. There is strong evidence for including both a link
47 between depression and suicide, and divorce and suicide as well. While psychiatric
48 factors are clearly important predictors of suicide risk, they need to be combined with
49 social factors in order to fully understand suicide (Kposowa & Glyniadaki, 2012).
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3 The question of the timing of relationship breakdown could be explored with
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5 respect to interaction effects with a character trait, impulsivity. Impulsivity is a known
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7 risk factor for suicide (Corruble, 1999; Kotler et al., 2001; Lester, 2000). Perhaps the
8
9 odds of suicide among divorced persons in the immediate period following divorce would
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11 be relatively high among persons with impulse control problems. If so, persons involved
12
13 in suicide prevention efforts might be able to fine tune a definition of the population most
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15 at risk of suicide following divorce, those with impulse control disorders.
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20 The present paper is focused on the strains associated in the post legal divorce
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22 period. Future work is needed on “psychological divorce” or the stressful period of
23
24 separation which precedes legal divorce. Divorce is not a single event but can be viewed
25
26 as a culmination of strains which end in a legal divorce. Possibly the most painful period
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28 of persons enduring the suffering of divorce is the psychological divorce that develops
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30 before any legal adjudication for ending the marriage (Ide, Wyder, Kolves & DeLeo,
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32 2010).
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Table 1. Selected Findings from Previous Investigations on the Relationship between Divorce and Suicide: First Author (date), Nation/Group, Year, Suicide Rate of Divorced, Suicide Rate of Married, Coefficient of Aggravation (Divorced/Married Suicide Rate), & Control Variables.

Author (date)	Nation/Group	Year	Suicide Rate Divorced	Suicide Rate Married	C.O.A.	Control Variables
WHO (1968)	Australia/M	1961	90.6	20.5	4.4	none
WHO (1968)	Australia/M	1961	37.7	9.3	4.1	none
Cantor (1995)	Australia/M	1991	na	na	2.8	None
Cantor (1995)	Australia/Fem	1991	na	na	3.1	none
Wyder (2009)	Australia	1999	na	na	8.0	none
Wyder (2009)	Australia	1999	na	na	2.5	none
Dzurova (2006)	Czechoslovakia Males, 25-44	2001	71.7	25.0	2.9	none
Dzurova (2006)	Czechoslovakia Females, 25-44	2001	14.5	7.5	1.9	none
WHO (1968)	Denmark/Males	1960	163.7	26.5	6.2	none
WHO (1968)	Denmark/Fem	1960	55.0	12.1	4.6	none
Agerbo (2007)	Denmark, Males 41-60	1990	Na	Na	3.9	ES,\$
Agerbo (2007)	Denmark, females 41-60	1990	na	na	3.7	ES,\$
WHO (1968)	Finland/Males	1960	175.8	41.4	4.2	none
WHO (1968)	Finland/Fem	1960	30.6	10.4	2.9	none
WHO (1968)	France/Males	1962	65.7	29.6	2.2	none
WHO (1968)	France/Fem	1962	15.6	8.1	1.9	none
WHO (1968)	Germany/Males	1961	146.7	28.9	5.0	none
WHO (1968)	Germany/Fem	1961	41.9	13.6	3.1	none
Yip (1998)	Hong Kong/M	1987	18.9	13.7	1.4	none
Yip (1998)	Hong Kong/F	1987	17.9	13.2	1.3	none
Mayer (2002)	India	1995	197.9	14.6	13.6	none
Mayer (2002)	India/Males	1995	346.8	17.3	20.0	none
Mayer (2002)	India/Fem	1995	126.4	11.9	10.6	none
WHO (1968)	Italy/Males	1961	35.7	10.0	3.6	none
WHO (1968)	Italy/Fem	1961	61.2	3.6	17.0	none
Masocco(2008)	Italy/males	2001	13.3	9.9	1.3	none
Masocco(2008)	Italy/females	2001	5.67	3.33	1.7	none
WHO (1968)	Netherlands/Males	1960	54.0	9.9	5.1	none
WHO (1968)	Netherlands/Fem	1960	22.1	6.2	3.6	none
WHO (1968)	New Zealand/M	1961	23.3	16.4	1.4	none
WHO (1968)	New Zealand/F	1961	12.0	6.6	1.8	none
Corcoran (2010)	N. Ireland/M	2000	na	na	2.61	none
Corcoran	N. Ireland/Fem	2000	na	na	2.57	none

(2010)						
WHO (1968)	Norway/Males	1960	46.9	12.8	3.6	none
WHO (1968)	Norway/Fem	1960	10.0	3.5	2.9	none
WHO (1968)	Sweden/Males	1960	107.9	28.4	3.8	none
WHO (1968)	Sweden/Fem	1960	29.5	8.8	3.4	none
WHO (1968)	Switzerland/M	1960	128.7	28.3	4.5	none
WHO (1968)	Switzerland/F	1960	35.0	10.3	3.4	none
Yeh (2008)	Taiwan, 35-50	2000	Na	Na	2.73	ES
Yeh (2008)	Taiwan, M35-50	2000	na	na	2.7	ES
Yeh (2008)	Taiwan, F 35-50	2000	na	na	2.9	ES
WHO (1968)	U.K., England & Wales/ M	1961	49.8	13.4	3.7	none
WHO (1968)	U.K., England & Wales/ Fem	1961	24.6	9.4	2.6	none
Yip (2004)	UK-England & Wales M 40-49	1989	29.9	11.9	2.5	none
Yip (2004)	UK-England & Wales F 40-49	1989	9.4	4.1	2.3	none
WHO (1968)	USA/males	1960	88.0	21.1	4.2	none
WHO (1968)	USA/females	1960	20.0	6.2	3.2	none
Gibbs (2000)	USA,black F,35-44	1980	7.8	3.2	2.4	none
Stack (2004)	USA	1990	Na	Na	1.4	O,R,U
Stack (1998)	USA-white M	1990	Na	Na	2.5	Ed
Stack (1998)	USA-black M	1990	Na	Na	1.2	Ed
Cutright (2005)	USA/M 35-54	1979	70.6	17.0	4.2	none
Cutright (2005)	USA/F 35-54	1979	25.2	8.7	2.9	none
Cutright(2005)	USA/M 35-54	1993	54.0	15.4	4.0	None
Cutright(2005)	USA/F 35-54	1993	14.6	4.4	3.3	None
Kposowa(2000)	USA	1984*	Na	Na	2.1	Ed,\$
Kposowa(2000)	USA/males	1984*	na	Na	2.4	Ed,\$
Kposowa(2000)	USA/females	1984*	na	na	1.3	Ed,\$
Luoma (2002)	USA/M,40-44	1993	62	18	3.4	none
Luoma (2002)	USA/F, 40-44	1993	18	5	3.6	none

Notes: In some cases the Year of the data being analyzed is the midpoint of a range (e.g., for N. Ireland, 2000, for 1996-2005). *Longitudinal study based on 1979-1989. Control Variable: D=physical disability; Ed=education Level; ES=employment status; O=occupation; R=race; \$= income; U=urban vs. rural residence. None: no economic, religious, psychiatric, and related control variables. Age and gender suicide rates may be explored. For space considerations, in studies with many suicide rates for various age groups (e.g., Luoma et al., 2002), one from the midlife range (which typically includes most suicides) is provided.

Table 2. The Association between Proximal and Distal Relationship Loss and Suicide Risk, Controlling for Other Social and Psychiatric Factors, National Mortality Follow back Survey (N=13,897 deaths including 1,169 suicides).

Variable	Logistic Regression Coefficient	Wald Chi Square	Odds Ratio	95% Confidence Interval, Odds Ratio
Relationship Loss				
Recent Divorce	.49*	6.89	1.64	1.20 - 2.24
Distal Divorce	.17	2.62	1.18	.99 - 1.41
Recent Widowhood	.31*	3.02	1.37	1.01 - 1.84
Distal Widowhood	-.79*	47.43	.45	.37 - .54
All other Marital Statuses (reference)	1.00			
Economic Strain				
Job Loss	.26*	3.41	1.30	1.02 - 1.65
Job Demotion	2.03*	41.59	7.63	4.54 - 12.82
Religious Activities	-.20*	78.9	.81	.78 - .84
Depression Index	.13*	69.84	1.14	1.11 - 1.17
Gender (male)	.16*	5.48	1.18	1.05 - 1.32
Constant	-2.40*	922.23	-----	-----
* p < .05				
-2 log likelihood	7693.5 *			
Nagelkerke r-squared	.054			
Deaths Correctly predicted by model	91.66%			

Recency of Divorce, Depression and Suicide Risk

Abstract

Previous individual level research on the association between the status of divorce and suicide risk has been marked by two recurrent limitations: (1) it is not clear if the timing of divorce (recent vs. distal) affects risk of completed suicides and (2) it is not clear if the association between divorce and suicide completions will withstand controls for a series of risk and protective factors including psychiatric morbidity. The present study addresses these two gaps in the literature. Data are from the National Mortality Follow Back Survey and refer to 13,897 deaths including 1,169 suicides. A model is estimated which controls for major alternative predictors of suicide completions including psychiatric predictors (depression scale), and sociological risk and protective factors (job loss, job demotion, and religiosity). The results of a multivariate logistic regression analysis determined that, controlling for the psychiatric, social and economic predictors of suicide completions, **recent divorce increases the odds of death by suicide 1.6 times, compared to 1.3 times for distal divorce. The study provides the first systematic, U.S. based results that show that the timing of divorce influences risk of completed suicides independent of depression.**

Recency of Divorce, Depression and Suicide Risk

Durkheim (1897/1966) demonstrated that married persons had a lower risk of suicide completions than single persons in 19th century France. Married persons were thought to be higher in social integration, higher in ties and mutual responsibilities to a spouse, than non married persons. Such bonds, in turn, lowered suicide risk.

Following up on this insight, investigations from the 20th century explored individual level data on suicide rates among marital status groups (for reviews see Agerbo, Stack & Petersen, 2011; Lester, 1992, 2000; Stack, 1982, 2000b). A systematic review of the literature from 1880 through 1994 on suicide completions found 37 such studies based on individual level data, and all supported Durkheim's basic premise of the protective effect of marriage (Stack, 2000b). Work since 1994 continues to demonstrate a link between divorce and completed suicide at the individual level (e.g., Agerbo, Sterne, & Gunnell, 2007; Kposowa, 2000; Luoma & Pearson, 2002; Yeh et al., 2008; Yip & Thorburn, 2004). This association has persisted in a variety of social contexts through time and space. That divorced people are at a risk for completed suicide that is greater than that of age matched, married peers is close to a sociological law.

However, there are two recurrent limitations of this body of research: (1) little is known about the timing of the impact of divorce on risk of completed suicide. Specifically, are the recently divorced at the same, more, or less risk than the long-term divorced? Does the influence of divorce affect suicide completions among the divorced only in the short term? (2) Does the status of being divorced have an independent effect on suicide risk? According to the selection hypothesis (e.g., Wade & Pevalin, 2004), mental disturbances precede marital disruption. Such mental disturbances select people

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3 out of marriage for divorce. Rates of major depression among the divorced are
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5 reportedly as much as nine times higher for men and three times higher for women
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7 compared to their married counterparts (Wade & Pevalin, 2004). It is important to control
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9 for psychiatric problems such as depression to determine if the stresses of occupying the
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11 role of a divorced person affect suicide risk independent of depression. Once controls are
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13 introduced for the covariates of divorce such as psychiatric morbidity and economic
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15 strain, will the bivariate association between divorce and completed suicides hold up?
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17 Does depression, in particular, cause both divorce and suicide?
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22 The present paper contributes to the literature by addressing these two relatively
23
24 neglected issues. As such, it integrates a sociological with a psychiatric perspective. Such
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26 integrated models have been advocated by writers such as Kposowa & Glyniadaki
27
28 (2012). It employs data from the National Mortality Follow – Back Survey, a national, in
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30 depth study of 13,897 deaths including 1,169 suicides. This allows for the testing of two
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32 central hypotheses: (1) The suicide risk of the recently divorced is greater than that of the
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34 long term divorced, and (2) the impact of divorce on suicide risk is independent of
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36 psychiatric and social covariates.
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40 41 BACKGROUND AND THEORETICAL FRAMEWORK 42

43
44 *Literature Review.* Much of the sociological literature on divorce and suicide is
45
46 based on aggregate data on suicide rates and divorce rates (e.g., Barstad, 2008; Gundlach,
47
48 1990; Lester, 1994; Trovato 1986, 1987; for reviews see Lester, 2000; Stack 2000b). In
49
50 contrast, the present investigation focuses on individual level research where there is a
51
52 clearer link between divorce and suicide. Research that is based on concrete, individual
53
54 level data has demonstrated that divorced people have an elevated risk of suicide. A
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3 review of 37 such studies, containing 493 findings and published from 1880 through
4
5 1994, found that 426/493 findings (86.4%) showed that divorced people had a higher
6
7 suicide risk than their married counterparts (Stack, 2000b). The magnitude of the
8
9 difference between the suicide rates of the married and the divorced is often substantial.
10
11 For example, in Austria the suicide rate of divorced persons was 128.6/100,000 compared
12
13 to 30.5/100,000 for married persons. The ratio of these two rates, the coefficient of
14
15 aggravation (COA), was 4.22. In the United States the COA varies mostly between 3.0
16
17 and 4.0 (Stack, 2000b).
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22 A systematic epidemiological study by the World Health Organization (1968) still
23
24 provides the largest single set of relevant cross national data. In circa 1960, the COA's
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26 for males, by nation, include: Denmark 6.2, Finland 4.2, France 2.2, West Germany 5.0,
27
28 Italy 3.6, Netherlands, 5.1, Norway 3.6, US 4.2, Sweden 3.8, Switzerland 4.5, England
29
30 3.8, and Australia 4.2. Corresponding female COA's were Denmark 4.6, Finland 2.9,
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32 France 1.9, West Germany 3.1, Italy 17.0, Netherlands 3.6, Norway 2.9, Sweden 3.4,
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34 Switzerland 3.4, England 2.6, and Australia 4.1 (World Health Organization, 1968).
35
36 These figures are summarized in Table 1. In most nations the divorced have a suicide rate
37
38 that is at least double that of the married population. There is substantial variation in the
39
40 COA across nations, but the COA is always greater than one.
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46 (Table 1 about here)

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48 While Stack (2000b) provides a systematic review of the evidence from 1880 through
49
50 1994, in order to assess any new fundamental change, a search was done through
51
52 databases (*Sociological Abstracts* and *MEDLINE*) using the subjects "suicide" and
53
54 "divorce," and years "1995-2011." The search was further limited to studies meeting two
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3 additional criteria: suicidality was defined as suicide completions. Other forms of
4
5 suicidality such as suicide ideation and attempts were omitted. (b) The completed
6
7 suicides had to involve divorced persons themselves. Studies exploring the impact of
8
9 divorce on other groups (such as the children of divorced persons) were not included.
10
11 Another 24 relevant investigations, based on individual level data were found. Adding
12
13 these to the 37 from Stack (2000b) brings the total to 61 studies. Individual level
14
15 research done after 1994 has found the same general pattern. Table 1 includes
16
17 descriptions of representative suicide rates and risk ratios from many of these additional
18
19 investigations. It lists the investigations in order by nation. Suicide rates, when available,
20
21 are given for divorced vs. married persons. The coefficient of aggravation (ratio of the
22
23 suicide rates of divorced/married or the relative risk ratio), and a list of control variables,
24
25 if any, that are employed by the researchers are listed in the Table as well.
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32 Findings from Europe and North America continue to document that the divorced
33
34 have a higher suicide risk than the married. For example, in England and Wales between
35
36 1982 and 1996 divorced males were 2.7 times and divorced females 2.5 times more apt to
37
38 die through suicide than their married counterparts (Yip & Thorburn, 2004). In Denmark,
39
40 divorced males between 41-60 years old are 3.9 times more apt than married males to die
41
42 through suicide, while the COA for Danish women, 41-60, is 3.7 (Agerbo et al., 2007). In
43
44 a longitudinal American study, Kposowa (2000) found that divorced men at baseline in
45
46 1979 were 2.4 times more apt than married men to suicide by 1989. Divorced women at
47
48 baseline were not at significantly elevated risk for suicide. However, this finding is
49
50 tenuous given a rather small number of divorced female suicides (n=10) (Kposowa,
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52 2003).
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3 Available data from developed nations in Oceania also confirm the divorce-
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6 suicide linkage. For example, in Queensland, Australia, a study of 6,062 suicides between
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8 1994-2004, found high coefficients of aggravation. The median relative risk of divorced
9
10 persons relative to married persons was 6.1 (Wyder, Ward & DeLeo, 2009).
11

12
13 Eastern nations tend to have a similar pattern. Divorce places both males and
14
15 females at higher risk of suicide. In an overtime, longitudinal study in Taiwan, being
16
17 divorced at baseline was associated with a greater risk of suicide by follow-up. For
18
19 example, divorced persons aged 35-50 in 1997 were 2.7 times more apt to die through
20
21 suicide by 2003 than their married counterparts. The relative risk ratios for divorced men
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23 and women of this age group were similar, being 2.7 for men and 2.9 for women (Yeh et
24
25 al., 2008). In Hong Kong a study of suicide rates between 1981 and 1993 by Yip (1998)
26
27 determined that divorced men had a suicide rate of 18.9, 1.4 times greater than that of
28
29 married men, 13.7. Divorced women had a suicide rate 1.4 times higher than their
30
31 married counterparts (17.9 vs. 13.2). In India the suicide rate of divorced men is quite
32
33 high, 346/100,000, fully 20 times that of their married counterparts. The gap between
34
35 divorced women and married women in India is also substantial, being 126 vs.
36
37 11.9/100,000, the corresponding COA is 10.6 (Mayer & Ziaian, 2002).
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44 The last column of Table 1 presents a summary of control variables in the various
45
46 studies. It is noteworthy that very few investigations of individual level data on divorce
47
48 and suicide incorporate control variables. Many are epidemiological or descriptive
49
50 studies. A few of the 61 studies reviewed included controls for alternative predictors of
51
52 suicide (e.g., Agerbo, Sterne & Gunnell, 2007; Kposowa, 2000; and Yeh et al., 2008).
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55 None of the 61 studies included a control for depression.
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4 It is noted that two papers not listed in Table 1 do examine the long term impact
5 of parental divorce on the risk of suicide attempts among the children of divorced parents
6 (Lizardi, Thompson, Keys, & Hasin, 2010a; 2010b). These papers do control for
7 depression. However, they differ from the thrust of the present analysis in two ways.
8 First, the present paper is concerned with the intragenerational impact of divorce on the
9 divorced persons themselves, not their children. Our analysis is not dealing with very
10 long term, intergenerational impacts of divorce on the children of divorced. Second, our
11 analysis concerns suicide completions, not attempts. To the extent that the predictors of
12 suicide completions are different from the predictors of attempts (Lester, 2000), for
13 example men have higher rates of the former but lower rates of the latter than women, it
14 is important to study these suicidal behaviors separately.
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29 *Theoretical Interpretations.* Several sociological theories offer explanations for
30 the connection between suicide and marital status (Cutright & Fernquist, 2005; Cutright,
31 Stack & Fernquist, 2005; Gibbs, 2000; Stack, 2000b). The most often cited explanation is
32 Durkheim's idea that marriage protects against suicide because of its promotion of social
33 integration or bonds between husband and wife (e.g., Agerbo, Stack, & Petersen, 2011;
34 Shiner, Scourfield, Fincham & Langer, 2009; Stack, 2000b). In this vein, bonds to a
35 spouse reduce suicide through mechanisms including the giving and receiving of social
36 support, companionship, and validation. The loss of these bonds through divorce
37 contributes to suicide risk. Generally the literature on marital transitions finds that
38 psychological distress increases after divorce (e.g., Strohschein, et al., 2005), which is
39 consistent with the social integration view of divorce and suicide. Second, there is Gibbs
40 and Martin's (1964) marital status integration hypothesis. Basically, statistically
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3 infrequent status sets, such as being divorced and male relative to married and being
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5 male, are assumed to be inherently stressful and, as such, contribute to suicide risk.
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8 However, as the status sets such as divorced male become less infrequent, we would
9
10 anticipate a corresponding decline in suicide rates among persons in such status sets. As
11
12 divorce became more commonplace between 1960 and 1980, the gap between the suicide
13
14 rates of the married and divorced narrowed (Stack, 1990). As divorce became more
15
16 commonplace, the stigma associated with being divorced lessened and new institutions
17
18 developed such as personal ads which facilitated finding a new mate. A third perspective
19
20 focuses on marital status differences in suicide acceptability, with married people more
21
22 likely than divorced persons to regard suicide as a morally unacceptable act (Cutright,
23
24 Stack & Fernquist, 2005). Groups with negative attitudes towards suicide tend to have
25
26 lower suicide rates (Stack, 2000a). These explanations are not mutually exclusive.
27
28
29 Divorced persons lack ties to a spouse, are in a statistically infrequent status
30
31 configuration, and can have higher levels of suicide acceptability simultaneously. In
32
33 related work, marriage is also associated with better physical health and enhanced
34
35 economic resources (Stack, 1994; 2011). Each of these, in turn, is known to contribute to
36
37 lower suicide risk for married persons relative to divorced persons (Stack, 2000a, 2000b).
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43 *Limitations: Timing of Divorce.* One recurrent limitation of the 61 concrete,
44
45 individual level studies is that the recency or the timing of suicide after divorce is largely
46
47 unexplored. This is often not the fault of the investigators, since some of the research is
48
49 based on secondary analysis of existing data, and the existing archival data simply does
50
51 not have any information on the timing of divorce (e.g., Kposowa 2000; Stack, 1998,
52
53 2004). Such investigations generally have no alternative but to lump together all divorced
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3 persons who suicide regardless as to how long they have been divorced. Persons who
4
5 experienced divorce and suicided in the weeks following the divorce generally are
6
7 grouped with persons who suicide one year, two years, three years, and longer after their
8
9 divorces (e.g., Dzurova et al, 2006; Mayer & Ziaian, 2002; Phillips et al., 2002; Yip &
10
11 Thorburn, 2004). A key question is: is the link between divorce and subsequent suicide
12
13 time dependent? Are the recently divorced any more apt to suicide than persons who
14
15 divorced long ago?
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19 A case can be made that the recently divorced may be most at risk for suicide.
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21 One might contend that the initial social, psychological and economic shocks of divorce
22
23 would place the recently divorced person at high risk. The initial strains of divorce such
24
25 as the creation of two households where there had been one, the financial pressures,
26
27 strains with old in-laws, and custody issues may fade with time. People need time to
28
29 adjust to disruptions in their social and economic relationships. To the extent that divorce
30
31 happens too quickly, it can produce sociological anomie (Durkheim 1897/1966;
32
33 Kposowa, 2000). Possibly the subsets of divorced persons most prone to suicide include
34
35 those whose personalities make them less adaptable, with fewer ties to extended family
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37 and friends for social support, and with meager financial resources. With time new
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39 intimate others can be found, possibly cohabitation can be initiated, expenses shared with
40
41 a roommate or mate, and so on. Over time divorced persons can adjust to their new
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43 station in life and suicide risk can decline. Given such considerations, divorce would
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45 have its strongest impact on suicide in the near term (Roskar, Podlesek, Kuzmanic, et al.,
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47 2011).
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3 On the other hand, a case can be made for distal effects of divorce on suicide. It
4 may take a long time for the stresses associated with the role of the divorce to wear down
5 the divorced person before they give up the struggle and suicide. Suicide risk can
6 increase over time due to the cumulative effect of strains such as many false starts in
7 dating relationships that ultimately fail, the loss of physical attractiveness – often a key
8 asset in mate selection, diminished hopes for finding a new partner, the grind of years of
9 loneliness, pressures from single parenting, and economic downward mobility often
10 brought about by inability to replace an affluent spouse (Stack 1994; 2011). It may
11 simply take many divorced people a long time to give up after enduring many years of
12 adversity.
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27 Only one study was found which assessed the recency of divorce on suicide risk.
28 Its findings need to be taken with some caution for at least two reasons. It is based on
29 Slovenia, a less developed nation with a small population of two million people, and one
30 of the lowest divorce rates in Europe (Roskar, Podlesek, Kuzmanic et al, 2011). It is not
31 clear if the results based on this type of social and economic context can be generalized to
32 the contemporary U.S. Further, a limitation of this investigation is that it restricted the
33 sample to persons who died within five years of their divorce. Persons who were
34 divorced and suicided, but who had been divorced for more than five years were
35 excluded. Hence, this precluded the detection of very long term (more than five years)
36 distal impacts of divorce on suicide. Nevertheless, the distribution for those suiciding
37 within five years of their divorce by the timing of their suicide was as follows: 37% less
38 than one year, 22% two years afterwards, 19% three years afterwards, 11% four years
39 afterwards, and 11% five years after the divorce. This distribution suggests that the
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3 recently divorced (e.g., 1-3 years) are at greater risk of suicide than those who have been
4
5 divorced for 4-5 years.

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8 In a related research stream, the timing of widowhood on suicide is explored.
9
10 Ajdacic-Gross *et al.* (2008) found that the annualized suicide rates in widowed people
11
12 were highest in the first week after bereavement and that in the first months after
13
14 bereavement, the suicide rates decreased, first rapidly and then gradually. Also
15
16 Erlangsen, Jeune, Bille-Brahe & Vaupel (2004) noted a significant increase in the suicide
17
18 risk during the first year after a bereavement, especially for men.
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22 *Limitations: Model Specification.* A second limitation of the individual based
23
24 research on divorce and completed suicide is that it tends not to control for the covariates
25
26 of divorce such as psychiatric morbidity and economic strain (Stack, 2011). It should be
27
28 noted that it is very difficult to come upon data that is publicly available which contain
29
30 both measures of divorce and psychiatric morbidity (e.g., Kposowa & Glyniadaki, 2012).
31
32 It is not the fault of researchers who use secondary data analysis. Some previous such
33
34 work is based on datasets which simply do not have measures of psychiatric constructs
35
36 (e.g., Kposowa, 2000; Stack, 1998, 2004). This is due, in part, to a relative lack of a
37
38 generalized integration of psychiatric and sociological models of suicidality (Kposowa
39
40 & Glyniadaki, 2012). Psychiatric morbidity is of particular concern. Completed as well
41
42 as attempted suicide is related to depression (e.g., Lester, 2000; Lizardi et al., 2010a).
43
44 According to a Meta analysis of 23 relevant studies, persons suffering from major
45
46 depression are, for example, fully 20.4 times more apt to die through completed suicide
47
48 than non depressed persons (Stack, 2009). In turn, divorced persons have a relatively
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50 high incidence of depression and related psychiatric disorders.
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The reader should note that there is a related literature, not fully reviewed here, on suicide attempts among the children of divorced parents which has some relevance to the issues at hand. Lizardi et al. (2010a) analyzed suicide attempts using the National Epidemiological Survey on Alcohol and Related Conditions (NESARC) and determined that depression affected the risk of suicide attempts. In addition, parental divorce affected the risk of attempted suicide of the subjects (children of divorce) in the survey. While the constructs of both suicidality and divorce in Lizardi et al's (2010a) research (attempts, parental divorce) differ from those in the present study (completed suicides, divorce of subjects, not parents of subjects), they add additional evidence for links between divorce and suicidality independent of depression.

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It is plausible that there are selection effects that influence both divorce and suicide. There has been a long standing debate between the selection and social causation perspectives concerning marital transitions (e.g., Wade & Pevalin, 2004; Stack & Eshleman, 1998). The social causation thesis argues that marital disruption leads to poor mental health, while the social selection hypothesis argues that poor mental health leads to marital disruption. For example, being difficult to live with, depressed individuals would be expected to have a higher rate of divorce, as well as a higher incidence of suicide.

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None of the 61 individual level studies to date on divorce and suicide completions control for either pre divorce or post divorce depression. Hence, individual level analyses of divorce's impact on completed suicide generally do not control for such selection biases; that is, they do not control for depression and related psychiatric disorders that may cause both divorce and completed suicide (e.g., Mayer & Ziaian, 2002; Trovato,

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3 1991; World Health Organization, 1968; Yeh et al., 2008). Many investigators who use
4 secondary data are simply not able to control for psychiatric morbidity since measures of
5 that construct are not available in the data source (e.g., Kposowa, 2000; Stack, 1998,
6 2004). The present investigation is the first to be able to add a measure of depression.
7
8 However, while in a related literature on suicide attempts among the children of divorce,
9 there has been a control for depression (Lizardi et al., 2010a), no one to date has been
10 able to explore the impact of divorce on the risk of suicide completions among the
11 divorced persons themselves. It should be noted, however, that we cannot fully test the
12 selection hypothesis since we lack data on pre divorce depression levels.
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25 While they omit depression as a control, a few of the 61 previous studies have
26 been able to control for some covariates of divorce that contribute to suicide risk (see
27 Table 1). For example, using the data in the National Longitudinal Mortality Study,
28 Kposowa (2000) was able to control for socio-economic status indicators (education and
29 household income), but not psychiatric morbidity. Stack (1998) was able to control for
30 education, but not income. Such analysis of secondary data are necessarily limited to the
31 availability of measures of important constructs in such datasets. Using data from the
32 National Mortality Follow back Survey, the present investigation is able to add a control
33 for depression in order to sort out the independent effects of divorce on suicide risk.
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46 Whilst in principle many suicide researchers accept the value of a psycho-social
47 or bio-psycho-social model, in practice most studies are discipline-specific (e.g.,
48 Kposowa & Glyniadaki, 2012). The consideration of both sociological and psychological
49 variables is not common, and Kposowa & Glyniadaki (2012) call for such integrated
50 models. While there is some relevant work on suicide attempts among the children of
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3 divorce (e.g., Lizardi et al., 2010a), there is no such work on suicide completions among
4 the divorced themselves. The present paper fills this gap in the literature. We include both
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6 a measure of depression as well as a structural social factor, the timing of divorce.
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10 METHODOLOGY

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12 All data are from the National Mortality Follow back Survey (NMFBS) (US
13 Public Health Service, 2000). The NMFBS is based on psychological autopsies of a
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15 representative sample of deaths in the United States. Significant others of the deceased
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17 were contacted and interviewed by trained professionals. Standard questions regarding
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19 the psychiatric, medical, treatment-centered and other issues regarding the deceased were
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21 asked of the significant others. Some questions regarding the social context of the
22
23 deceased were also included. The NMFBS is the largest, publicly available psychological
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25 autopsy dataset on suicide. Complete data were available on 13,897 deaths including
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27 1,169 suicides.
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34 Some caution needs to be exercised in interpreting the results of the present study
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36 since it uses psychological autopsy data. Such data rely on retrospective opinions of
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38 informants about the deceased. In this line of work, the opinions cannot be directly
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40 measured from the deceased person themselves, as in typical social science survey
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42 research. While psychological autopsy studies of suicide have their limitations, they are
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44 considered by many suicide researchers as the gold standard in the investigation of
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46 completed suicides where the subject is not available for interviews (Connor, Beautrais,
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48 Brent, et al, 2011, 2012).
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3 The dependent variable is a dichotomy where 1=death by suicide and 0=deaths
4 from all other causes. Since the dependent variable is a dichotomy, logistic regression
5 techniques are appropriate (Menard, 2002).
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10 Marital status and the timing of marital transitions are measured by four binary
11 (0,1) dichotomous variables. Two measures of the timing of divorce are included. The
12 first is the experience of a recent divorce before death. A recent divorce is defined as one
13 that occurred during the year of the survey (1993) and/or during 1991-1992. It is coded
14 either 0 (before 1991) or 1 (1991-1993). Long term divorce is defined as a one which
15 occurred prior to 1991. Widowhood status is also coded as two variables in relation to the
16 recency of that status. Recent widowhood refers to deaths of spouses that occurred
17 between 1991-1993, and long term status as a widow refers to cases where the death
18 happened before 1991. All four measures are binary variables (0,1). The benchmark or
19 comparison marital status category consists of person in all other marital statuses
20 including married, and single (never married). The benchmark group, then, consists of
21 persons who have not lost a spouse through divorce or death.
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38 Several additional sociological concepts are incorporated into the model. They
39 relate to the religious and economic spheres of social life. Religiosity level, a protective
40 factor (see Stack, 2000b; Stack & Kposowa, 2011), is measured in terms of the extent of
41 religious activities, as indexed by the NMFBS item: "How often did the deceased
42 participate in religious activities." The responses to this survey question ranged from
43 never (0) through every day (5).
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53 Economic strain is measured by two constructs. These measures refer to job loss
54 (0,1), and job demotion during the last year of life (0,1). While job loss (unemployment)
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3 has received attention in previous investigations (for reviews see Platt & Hawton, 2000,
4 or Stack, 2000a), job demotion is an unstudied area in suicide studies. Platt and Hawton
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6 (2000) have called for new measures of economic strain, in addition to unemployment, a
7
8 much studied measure. We answer this call.
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12 A key psychiatric factor, depression, is measured using a scale of 8 items that are
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14 available in the NMFBS. These items tap feelings of worthlessness, withdrawal,
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16 problems in concentrating, a wish to die, changes in sleep patterns, changes in weight,
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18 crying spells, and sluggishness of the deceased. A distinction is made between the
19
20 response category where the deceased reportedly had a condition often (=1), and all
21
22 others (=0). Scores were summed and ranged from 0 to 8. The alpha reliability coefficient
23
24 for the index was 0.7414. **Finally, controls are entered for two key demographic**
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26 **factors: gender, where male=1 and female=0 and age in years.**
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31 32 RESULTS

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34 Table 2 provides the results of the multivariate logistic regression analysis.
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36 Controlling for depression and the other variables in the equation, from the odds ratio,
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38 (Table 2 about here)
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40 persons who were recently divorced were **1.60** times more apt to die through suicide than
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42 the reference group. **In addition, persons who had been divorced longer were 1.29**
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44 **times more apt to die through suicide than the reference group.** Turning to
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46 relationship loss through widowhood, persons who had experienced the recent loss of a
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48 spouse through death were **1.7** times more apt to suicide than persons without a loss of a
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50 spouse. **Long term widowhood was associated with reduced risk of suicide.**
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3 **The findings provided mixed support for economic strain constructs.**
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5 **Persons experiencing loss of a job during the last year of life were not significantly**
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7 **more apt than others to die through suicide (Wald=2.39, p = 0.06). However,**
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9 **persons experiencing a demotion at work during the last 12 months of life were fully**
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11 **7.29 times more apt to die of suicide than persons not experiencing such an employment**
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13 **setback.**
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17 Religiosity served as a protective factor. Controlling for the other independent
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19 variables, the higher the religiosity the lower the suicide risk. **From the odds ratio (.81),**
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21 **a one unit change in the five level religiosity index was associated with 19% drop in**
22
23 **the odds of death by suicide ((100*(.81-1)) (De Maris, 1992).**
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27 Strong evidence for a psychiatric perspective was found. Controlling for all other
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29 risk and protective factors, depression increased the risk of suicide (**odds ratio=1.14**). **A**
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31 **one unit change in the depression index was associated with a 14% rise in the risk**
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33 **for death through suicide ((100* (1.14-1)).** Further analysis determined that a majority
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35 of persons who had perfect scores (index score of 8) on depression died through suicide.
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39 **In order to estimate the relative importance of the predictors of suicide,**
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41 **standardized coefficients were assessed (Walker & Maddan, 2013), and are shown**
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43 **in the last column of Table 2. The variable with the largest absolute value of its**
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45 **standardized coefficient is religious activities (-.32) followed by depression (.25).**
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48 The model provided a reasonable fit for the data. The Nagelkerke r-squared
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50 indicated the presence of an adequate model. Importantly, using the model to predict
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52 death, the model correctly classified 91% of the deaths as either suicide or nonsuicide
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54 deaths.
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CONCLUSION.

While there have been 61 previous individual based, studies on the relationship between divorce and suicide published between 1880-2010, they have been marked by two recurrent limitations: (1) neglect of the timing of divorce and (2) neglect of incorporating psychiatric control variables into the analysis, including depression.

Only one study based in the small, Eastern European nation of Slovenia, has explored the timing of divorce (Roskar, Podlesek, Kuzmanic, et al., 2011). The previous investigation limited the analysis to persons divorced less than 5 years, thus leaving the effects of very long term distal effects an open question. It also lacked a control for a major determinant of both divorce and suicide: depression. The present paper explores the timing of divorce in a substantially different social context, the US, a developed, large nation with a much higher incidence of divorce. We also include all divorced persons, not just ones divorced in a five year window, in order to fully test for distal impacts of divorce on suicide. Finally, we introduce a series of control variables including depression.

In both social settings, Slovenia and the U.S., it is the recently divorced who are at the greatest risk for suicide. While one might anticipate distal effects, where the will to live may be ground down only after many years of post divorce stress, the greatest risk, in fact, involves those who are recently divorced. Professionals involved in suicide prevention might wish to direct a disproportionate amount of their resources towards this particular, at-risk group.

An important issue running through virtually all of the 61 existing studies on divorce and suicide completions among the divorced themselves is that typically, often

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3 due to the unavailability of data in secondary data sets, they are unable to control for the
4 respondent's depression (as well as other dimensions of psychiatric morbidity). This
5
6 leaves selection effects unaddressed. Depression may cause both divorce and suicide. A
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8 Meta analysis of 13 overtime studies, where psychiatric and personality variables were
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10 measured before divorces took place, determined that neuroticism (e.g., depression,
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12 anxiety) was a significant predictor of who eventually became divorced (Roberts et al.,
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14 2007). In a similar vein, analyses using the National Comorbidity Surveys have
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16 determined that 11 out of the 14 psychiatric disorders investigated were predictive of
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18 ultimate divorce (Kessler, Walters, & Forthofer, 1998; Stack, 2011). For example, the
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20 manic disorder increased the odds of divorce by 3.2 times, while major depression
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22 enhanced the risk of divorce by 1.7 times that of the general population. Both of these
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24 disorders, in turn, are known, from other research, to increase suicide risk (Lester, 2000;
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26 Wasserman & Wasserman, 2009).

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28 The present inquiry controlled for depression levels and still found that recent
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30 divorce increased the risk of suicide. Depression had, as expected, an independent impact
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32 on the odds of suicide. However, in order to fully assess the merits of the social selection
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34 and social causation hypotheses, measures of pre divorce depression are needed.

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36 The findings on several control variables are noteworthy. **Judging from the**
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38 **relative sizes of the standardized logistic regression coefficients in table 2**, religious
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40 activities were the strongest predictor of suicide, more important than recent divorce,
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42 depression and other independent variables. While divorce is the more commonly index
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44 of social integration, religion is the next more commonly used index of bonds to a social
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46 group (Stack, 2000b). Unfortunately, religious activities are the only measure of
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3 religiosity in the National Mortality Follow back Survey. Religious activities can include
4 time spent with coreligionists as well as time spent attending religious services. Specific
5 measures of each type of activity are needed in order to test the religious integration and
6 religious networks perspectives on religion and suicide. Future work is also needed to
7 weight this factor against measures of still other constructs including commitment to core
8 religious beliefs (Stack & Kposowa, 2011).
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18 **The traditional indicator of economic strain, unemployment, did not exert an**
19 **independent impact on the odds of suicide. However, a new construct, job demotion,**
20 **was also highly predictive of suicide.** The paper also answers the call of Platt and
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Over the last 130 years there have been 61 studies on subject's divorce and completed suicide at the individual level, but they represent a tiny fraction of research on suicide. Since 1980 alone, there has been over 30,000 works on suicide published (Web of Science, accessed, March 1, 2011). Emanuele (2009) noted this neglect and called for research on the role of romantic disruption as a widespread, neglected contributing factor to suicide. An analysis of recently released data on 30,593 completed suicides in the recently released data set termed the National Violent Death Reporting System found that at least 27% of the suicides involved intimate partner problems including divorce, separation, and custody battles (Stack & Bowman, 2011, 160). The present investigation answers the call of Emanuele (2009) for work on relationship loss, a key social factor.

The present paper, by including indicators from both the psychiatric and social models, bridges the gap between those two paradigms on suicide. It finds, as expected,

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3 that they compliment each other. There is strong evidence for including both a link
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5 between depression and suicide, and divorce and suicide as well. While psychiatric
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7 factors are clearly important predictors of suicide risk, they need to be combined with
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9 social factors in order to fully understand suicide (Kposowa & Glyniadaki, 2012).
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13 The question of the timing of relationship breakdown could be explored with
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15 respect to interaction effects with a character trait, impulsivity. Impulsivity is a known
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17 risk factor for suicide (Corruble, 1999; Kotler et al., 2001; Lester, 2000). Perhaps the
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19 odds of suicide among divorced persons in the immediate period following divorce would
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21 be relatively high among persons with impulse control problems. If so, persons involved
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23 in suicide prevention efforts might be able to fine tune a definition of the population most
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25 at risk of suicide following divorce, those with impulse control disorders.
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29 The present paper is focused on the strains associated in the post legal divorce
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31 period. Future work is needed on “psychological divorce” or the stressful period of
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33 separation which precedes legal divorce. Divorce is not a single event but can be viewed
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35 as a culmination of strains which end in a legal divorce. Possibly the most painful period
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37 of persons enduring the suffering of divorce is the psychological divorce that develops
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39 before any legal adjudication for ending the marriage (Ide, Wyder, Kolves & DeLeo,
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41 2010).
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Table 1. Selected Findings from Previous Investigations on the Relationship between Divorce and Suicide: First Author (date), Nation/Group, Year, Suicide Rate of Divorced, Suicide Rate of Married, Coefficient of Aggravation (Divorced/Married Suicide Rate), & Control Variables.

Author (date)	Nation/Group	Year	Suicide Rate Divorced	Suicide Rate Married	C.O.A.	Control Variables
WHO (1968)	Australia/M	1961	90.6	20.5	4.4	none
WHO (1968)	Australia/M	1961	37.7	9.3	4.1	none
Cantor (1995)	Australia/M	1991	na	na	2.8	None
Cantor (1995)	Australia/Fem	1991	na	na	3.1	none
Wyder (2009)	Australia	1999	na	na	8.0	none
Wyder (2009)	Australia	1999	na	na	2.5	none
Dzurova (2006)	Czechoslovakia Males, 25-44	2001	71.7	25.0	2.9	none
Dzurova (2006)	Czechoslovakia Females, 25-44	2001	14.5	7.5	1.9	none
WHO (1968)	Denmark/Males	1960	163.7	26.5	6.2	none
WHO (1968)	Denmark/Fem	1960	55.0	12.1	4.6	none
Agerbo (2007)	Denmark, Males 41-60	1990	Na	Na	3.9	ES,\$
Agerbo (2007)	Denmark, females 41-60	1990	na	na	3.7	ES,\$
WHO (1968)	Finland/Males	1960	175.8	41.4	4.2	none
WHO (1968)	Finland/Fem	1960	30.6	10.4	2.9	none
WHO (1968)	France/Males	1962	65.7	29.6	2.2	none
WHO (1968)	France/Fem	1962	15.6	8.1	1.9	none
WHO (1968)	Germany/Males	1961	146.7	28.9	5.0	none
WHO (1968)	Germany/Fem	1961	41.9	13.6	3.1	none
Yip (1998)	Hong Kong/M	1987	18.9	13.7	1.4	none
Yip (1998)	Hong Kong/F	1987	17.9	13.2	1.3	none
Mayer (2002)	India	1995	197.9	14.6	13.6	none
Mayer (2002)	India/Males	1995	346.8	17.3	20.0	none
Mayer (2002)	India/Fem	1995	126.4	11.9	10.6	none
WHO (1968)	Italy/Males	1961	35.7	10.0	3.6	none
WHO (1968)	Italy/Fem	1961	61.2	3.6	17.0	none
Masocco(2008)	Italy/males	2001	13.3	9.9	1.3	none
Masocco(2008)	Italy/females	2001	5.67	3.33	1.7	none
WHO (1968)	Netherlands/Males	1960	54.0	9.9	5.1	none
WHO (1968)	Netherlands/Fem	1960	22.1	6.2	3.6	none
WHO (1968)	New Zealand/M	1961	23.3	16.4	1.4	none
WHO (1968)	New Zealand/F	1961	12.0	6.6	1.8	none
Corcoran (2010)	N. Ireland/M	2000	na	na	2.61	none
Corcoran	N. Ireland/Fem	2000	na	na	2.57	none

(2010)						
WHO (1968)	Norway/Males	1960	46.9	12.8	3.6	none
WHO (1968)	Norway/Fem	1960	10.0	3.5	2.9	none
WHO (1968)	Sweden/Males	1960	107.9	28.4	3.8	none
WHO (1968)	Sweden/Fem	1960	29.5	8.8	3.4	none
WHO (1968)	Switzerland/M	1960	128.7	28.3	4.5	none
WHO (1968)	Switzerland/F	1960	35.0	10.3	3.4	none
Yeh (2008)	Taiwan, 35-50	2000	Na	Na	2.73	ES
Yeh (2008)	Taiwan, M35-50	2000	na	na	2.7	ES
Yeh (2008)	Taiwan, F 35-50	2000	na	na	2.9	ES
WHO (1968)	U.K., England & Wales/ M	1961	49.8	13.4	3.7	none
WHO (1968)	U.K., England & Wales/ Fem	1961	24.6	9.4	2.6	none
Yip (2004)	UK-England & Wales M 40-49	1989	29.9	11.9	2.5	none
Yip (2004)	UK-England & Wales F 40-49	1989	9.4	4.1	2.3	none
WHO (1968)	USA/males	1960	88.0	21.1	4.2	none
WHO (1968)	USA/females	1960	20.0	6.2	3.2	none
Gibbs (2000)	USA,black F,35-44	1980	7.8	3.2	2.4	none
Stack (2004)	USA	1990	Na	Na	1.4	O,R,U
Stack (1998)	USA-white M	1990	Na	Na	2.5	Ed
Stack (1998)	USA-black M	1990	Na	Na	1.2	Ed
Cutright (2005)	USA/M 35-54	1979	70.6	17.0	4.2	none
Cutright (2005)	USA/F 35-54	1979	25.2	8.7	2.9	none
Cutright(2005)	USA/M 35-54	1993	54.0	15.4	4.0	None
Cutright(2005)	USA/F 35-54	1993	14.6	4.4	3.3	None
Kposowa(2000)	USA	1984*	Na	Na	2.1	Ed,\$
Kposowa(2000)	USA/males	1984*	na	Na	2.4	Ed,\$
Kposowa(2000)	USA/females	1984*	na	na	1.3	Ed,\$
Luoma (2002)	USA/M,40-44	1993	62	18	3.4	none
Luoma (2002)	USA/F, 40-44	1993	18	5	3.6	none

Notes: In some cases the Year of the data being analyzed is the midpoint of a range (e.g., for N. Ireland, 2000, for 1996-2005). *Longitudinal study based on 1979-1989. Control Variable: D=physical disability; Ed=education Level; ES=employment status; O=occupation; R=race; \$= income; U=urban vs. rural residence. None: no economic, religious, psychiatric, and related control variables. Age and gender suicide rates may be explored. For space considerations, in studies with many suicide rates for various age groups (e.g., Luoma et al., 2002), one from the midlife range (which typically includes most suicides) is provided.

Table 2. The Association between Proximal and Distal Relationship Loss and Suicide Risk, Controlling for Other Social and Psychiatric Factors, National Mortality Follow back Survey (N=13,897 deaths including 1,169 suicides).

Variable	Logistic Regression Coefficient	Wald Chi Square	Odds Ratio	95% Confidence Interval, Odds Ratio	Standardized Regression Coefficient (BETA)
Relationship Loss					
Recent Divorce	.47*	6.14	1.60	1.10 - 2.32	.06
Distal Divorce	.25*	5.41	1.18	1.04 - 1.59	.07
Recent Widowhood	.53*	8.08	1.37	1.18 - 2.47	.08
Distal Widowhood	-.49*	13.34	.61	.47 - .79	-.18
All other Marital Statuses (reference)	1.00				
Economic Strain:					
Job Loss	.22	2.39	1.30	.94 - 1.65	.04
Job Demotion	1.98*	39.62	7.29	3.92 - 13.53	.11
Religious Integration:					
Religious Activities	-.21*	80.51	.81	.77 - .84	-.32
Psychiatric Morbidity:					
Depression Index	.14*	77.54	1.15	1.11 - 1.18	.25
Demographics:					
Gender (male)	.16*	4.93	1.17	1.01 - 1.34	.08
Age	-.007*	20.16	.99	.98 - .99	-.19
Constant	-2.00*	403.21	-----	-----	
* p < .05					
-2 log likelihood	7672.6 *				
Nagelkerke r-squared	.057				
Deaths Correctly predicted by model	91.65%				

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