Author's response to reviews

Title: Divorce, divorce rates, and professional care seeking for mental health problems in Europe: a cross-sectional population based study

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Author's response to reviews: see over
### Remarks referee 1

<table>
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<tr>
<th>The literature review is selective: more recent work on mental health and marriage and marital transitions using European/British samples is lacking</th>
<th>We added references:</th>
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<th>The measure of mental health used the SF-12. Why was a measure of physical health based on the SF-12 not used? The SF-12 provides a measure of both.</th>
<th>The analyses were adjusted by adding an health status indicator based on the both the somatic and mental health component of the SF-12.</th>
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| "Health status  
Both physical and mental health status were included in the analysis. Physical health was measured by compiling the answers to the question “During the past 4 weeks how much of the time have you had any of the following problems with your work or other regular activities as a result of your physical health?” Respondents could evaluate the two items—“you have accomplished less than you would like” and “you have accomplished your usual activities less carefully”—using responses ranging from all the time through never. A higher score indicates better physical health. This scale consists of the mean score of these two items, with a Cronbach’s alpha of 0.90. Mental health was based on the 36-Item Short-Form Health Survey [52], which includes both a mental health (MHI-5) and energy/vitality (EVI-scale) dimension. This scale consists of the mean of nine items that give an indication of how the respondent has felt and how things went during the last 4 weeks, with a higher score indicating a better mental health status. This scale had a Cronbach’s alpha of 0.89, which demonstrates its reliability. For both health status indicators, the overall item mean scores replaced missing values. " |

### Minor Revisions

<table>
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<th>the large size of the sample requires a more stringent test of statistical significance. Perhaps the use of a BIC statistic to adjust for large sample sizes might be appropriate. Alternatively, perhaps a minimum level of significance set at p&lt;.001 would be more appropriate that a minimum level set at p&lt;.05.</th>
<th>The interpretation of the results were guided by following criteria:</th>
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<td>&quot;To take into account the large sample size, we set the minimum level of significance at p&lt;0.001 for the individual level effects, and at p&lt;0.05 for the country level and the cross-level effects.”</td>
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### Major Compulsory Revisions
I have problems with the measurement/operationalization of certain constructs, especially social support– the presence of children is not a measure of social support! In fact, literature on lone parent families (mainly lone mothers which the authors may want to look at) has shown that presence of children is a source of stress/strain, not support.

We agree and reorganized the text accordingly:

Under the heading of "Predisposing characteristics" we added:

"Another relevant aspect of household composition is the presence of children. Because divorced parents are forced to maintain contact with each other, the presence of children in the household may hamper adjustment after divorce. In addition, having custody of children after divorce involves parenting strain and financial costs and makes it more difficult to find a job, make new friends, or find a new partner [16-18]. On the other hand, children, older children in particular, may also be an important source of social support during and after the divorce process."

I’m also not too certain about the reflection of custody in the introduction as men being because mothers most often get custody. It could be perceived of as women getting twice harmed because they get saddled with the responsibility of raising a family on diminished economic and social resources. Only at the end in the discussion do they acknowledge that children can be a burden as well as an asset.

See above: we acknowledged earlier in the text that children can be a burden as well as an asset.

And the other measures of social support are quite specific to health/mental and are questionable in their ability to tap “social support”. They appear that perhaps they are just additional indicators of need, or in the case of difficulty in finding information, a barrier for care.

We agree and reorganized the text accordingly:

Under the heading of "Enabling resources" we added:

"In addition, social support from relatives and friends can be considered an enabling resource, although it was not incorporated into the initial behavioral model of health care use [13]. On the one hand, social support can encourage health care use, as social networks may help with the recognition of the development of health problems and may stimulate a person to seek professional care [13,33-35]. On the other hand, social support can also impede health care consumption. Individuals experiencing problems usually turn to their immediate environment first for help before contacting formal care services. But as individuals with low levels of social support cannot rely on the help of their acquaintances, asking for professional care can be a way to compensate for a lack of social support [13,36]. After a divorce, people experience a reduction of their social network and available social support. In addition to the loss of their former partner, they also lose half of their relatives and, often, some shared friends [37]. We can therefore expect the divorced to have a higher mental health care use because of a lack of social support."
Overall, while they attempt to test all the facets of Andersen’s model, they are unable to examine the traditional enabling factors generally used. As such, this is really only a partial test of the model examining predisposing and need factors.

We agree and acknowledge this in the text. For instance, in the discussion section:

"First, financial means are an important enabling resource with regard to professional care [13]. Overall, low-income groups use fewer mental health services, after controlling for mental health status [19,49,59], although important differences exist when comparing general versus specialized professional support. In the present study, due to the limitations of the dataset used, we were unable to consider income differences. Given the detrimental consequences of divorce for the financial situation of the ex-spouses, especially women [60-62], this meant that an important aspect of the explanation of the higher mental health care use of the divorced was missing. Nevertheless, the indicators of education and work status might at least partially substitute for these income effects. Moreover, because we expect mental health professional care seeking to be lower among low-income groups, the inability to consider the financial situation statistically could actually lead to an underestimation of the marital status differences in professional care seeking."

They attempt to use social support (and very poor measures of it) as the test for enabling. This is a major limitation in this work which they acknowledge. But then they suggest that education and occupation may partially compensate for this but they are discussed and treated as predisposing factors, not enabling factors.

This is probably a misunderstanding: Maybe we did not clearly enough state in the text that we see education and occupation as partially compensating for the lack of information on the financial situation of the respondents, not for the low quality of our social support measures.

Be clear an upfront that you are only testing a component of the model based on limitations in the data.

Moreover, we do not want to test the Andersen model, we only use the model as an heuristic device, i.e. to order our concepts
the authors don’t do enough to distinguish what their study adds to the existing literature. The Joung et al (1995) article that is cited does not specifically compare differences in the utilization of mental health care services, which is a strength of the current analysis. However, the Prigerson et al (1999) article they cite is longitudinal and is able to show that women who divorced prior to follow up were more likely to increase their use of mental health services relative to women who remained married, even after controlling for physical and mental health. The present study uses both men and women, and the data are based on a European rather than an American population. So, although their data are cross-sectional, the ability to test the association for both men and women for utilization of mental health care services does appear to address a gap in the literature, but the authors have not fully exploited this.

A second substantive problem with the paper is the ways in which the authors attempt to make links that are causal by implying that it is the loss of a partner through divorce that is responsible for differences. Unlike the Prigerson et al (1999) article where causal assumptions are stronger, the authors in the present paper are simply conducting a cross-sectional comparison, where the divorced could have been divorced for as little as one year or as long as many decades. Thus, the authors are overstating their findings. For example one page 14, the authors state: “We expected that after divorce or separation women would display a higher decrease in mental health care use.” The authors simply haven’t followed respondents over time, nor do they even know how long divorced people in their sample have occupied this role. So, the language about what happens when people get divorced is simply not appropriate because there is no way to whether divorce itself or something else is responsible for differences in mental health care use.

We tried to make our point more clearly by revising the paragraph:

"Apart from the study of Bijl and Ravelli [12], the aforementioned studies are not based on a representative sample of the general population, do not adjust for important intermediary variables like socioeconomic status and the availability of informal support [11], or do not include data on women only [9]. Moreover, existing studies focus on only a single country, either the United States of America [9], the Netherlands [8,12], or the United Kingdom [9]. Finally, only two studies [9,12] focus on care seeking for mental health problems. In this study, we examine whether there are differences in professional care seeking due to mental health problems between the divorced and the married in a representative sample of the population of 29 European countries."

We agree and adjusted the way we discuss our findings throughout the paper with more respect to the cross-sectional nature of the data.

For example in the discussion section:

"Our hypothesis that women would display a greater increase than men in mental health care use after their breakup could not be confirmed. Nevertheless, a significant amount of between-country variation in the gendered effect of marital dissolution on professional care seeking was present, suggesting that in some countries divorce leads to increased professional care seeking among women, while in other countries a reversed gender difference can be observed"
I also have questions about the methods the authors use. The authors use multilevel models which is an appropriate technique when the data are clustered. However, the others do not indicate how the data are actually clustered when they talk about the clustered sample design (p. 9): for example, are there multiple respondents within the same household?

We agree and rewrote the sample section:

"Data was derived from multistage national probability samples from the Eurobarometer 248, which were collected between December 2005 and January 2006. The sampling design in all participating countries was based on the random selection of sampling areas stratified by urbanization (the distribution of metropolitan, urban, and rural areas). A cluster of addresses was selected from these sampled areas. In each household living at a sampled address, a respondent was selected by a random selection procedure [51]. The Eurobarometer 248 encompassed several topics, including mental and physical well-being, telecommunications, harmful Internet content, and farm animal welfare. Telephone interviews were conducted with citizens of the European Union residing in the 25 EU member countries, with the citizens of the two, then acceding countries Bulgaria and Romania, and with the two candidate countries Croatia and Turkey and the citizens of the Turkish Cypriot Community. In our analyses, we merged the data from East and West Germany, from Northern Ireland and the United Kingdom, and from the Republic of Cyprus and the Turkish Cypriot Community. The resulting samples are representative of the population of citizens in the included countries aged 15 and over. In total 29,248 respondents were included, consisting of 12,748 men and 16,500 women. Design and population weights were applied. Descriptive statistics of the weighted sample are presented in Table 1."

Table 2 was adjusted to present the necessary information.

"The intra-class correlation is 0.07 (=0.103/(0.103+1.410), so 7 % of the total variance in the outcome is between countries variance (Chi²(df = 28) = 341.5, p<0.001)" was added to the analysis section.

We also added random variance components for the core variables and added these lines to the text:

"Significant random slope coefficients are present for all core variables (no table: µdivorce = 0.19, p < .001, SD = 0.44; µgender = 0.04, p < .01, SD = 0.20; µdivorce*gender = 0.19, p < .01, SD = 0.44), showing significant between-countries variation in the aforementioned findings: in some countries the abovementioned findings do not hold, while in other countries they are more pronounced. For instance, our baseline model estimates that in approximately 20 countries the effect of divorce or separation on professional care use falls within a range of 1.02 > Bdivorce > 0.14."
There are also a number of other clarifications that the authors could make in the methods section. In the construction of variables for marital status, who is put into the category of other - those for whom a marital status cannot be determined?

In the construction of the education variable, what does ‘those who enjoy no full-time education’ (p. 8) mean?

"The variable presence of children should indicate that the omitted reference group is having no children in the household under the age of 18.

The authors should also indicate the proportion of the sample with missing values on mental and physical health, and difficulty in finding information about mental health problems so the reader can evaluate how much influence imputing the mean value on missing cases has on estimates (p.9).

We added:

"Marital status is the main independent variable in this study. We compared respondents who are divorced or separated (11.2%), singles (15.5%), widowed (11.4%), and a generic category of unidentified others (1.1%) to those who are married or cohabit (60.8%). The category of unidentified others contains respondents who spontaneously classified themselves in this rest category. Respondents who were divorced or separated but were living together with a new partner were categorized as married or cohabiting."

We added and corrected:

"The number of years of education the respondents had completed was subdivided into different categories: 20 years or more (23.7%), 16 through 19 years (40.8%), and less than 16 years (24.9%). Those who had studied 20 years or more were set as the reference category. Separate categories were added for those still studying (8.5%) and those whose educational level is unknown (2.1%)."

We added:

"The number of children up to 15 years old, and the number of adult (15+) household members apart from the spouse/partner were added. The reference group is having no other household members apart from the spouse/partner.

We added the following information to the variables section:

"Information on physical health was lacking for 202 respondents (0.7 percent of the sample); while 126 (0.4 percent of the sample) respondents didn’t provide answers to at least 6 items of the mental health dimension. Full information on these health status measures was available for respectively 99.3 % and 97.3 % of the sample. For both health status indicators, the overall item mean scores replaced missing values."

The indicator pointing to difficulties finding information was removed from the analyses because to much missing values in some countries.

page 4: Household, composition should be Household composition
page 4: rather than indicate out of work, should indicate not in the labour market
page 6: acquaintance should be acquaintances
page 11: accept should be except

Is corrected
Is corrected
Is corrected
Is corrected
For example, it is not possible to say whether the results are due to divorce crisis, and will be resolved, or are as a result of social causation. I wonder whether the Eurobarometer has a measure of *length of current status*? If so that would be an interesting variable to include in the analysis.

The only revision I would suggest, if it is possible, is to include a measure on length of current marital status if it is available.

Unfortunately, the Eurobarometer 248 (64.4) doesn't contain this information. We will consider this in future research using the data of the first and the second wave of The Survey of Health, Ageing and Retirement in Europe (SHARE). Problem is that this survey is limited to respondents aged 50 years and over.

However, my main objection to the current paper is that in my opinion the *variable country* should have been taken into account in the analysis. Since the data of the different European countries are now pooled in the analysis, it is conceivable that (part of) the findings could be explained by unaccounted differences between countries.

We took the country level into account in the revised version of the paper (see below) based on these data with different time frames for the variables for professional care seeking and health, it cannot be concluded that 'the higher professional care seeking of the divorced cannot be attributed to mental or physical health factors'.

We are well aware of this limitation (that is shared by most of the studies in this research domain), and added a comment on it in the discussion part:

"Fourth, we faced some limitations with regard to time. This analysis is based on cross-sectional data, which may hinder a causal interpretation of the results. This is problematic as concerns the association between (mental) health status and professional care seeking behavior. The physical and mental health status is measured at the moment of the interview, while the use of mental health care in the 12 months preceding the interview is retrospectively measured. Nevertheless, the former is considered a predictor of the latter. Longitudinal data might help circumvent this problem, but cross-national longitudinal datasets that contain information on marital status, mental health status, and mental health professional care seeking are currently nonexistent. In addition, we cannot rule out a possible selection effects accounting for the association between marital status and professional care seeking. Because our results are in line with the only longitudinal study, to our knowledge, on this topic [9], we believe that at least a substantial part of the differences in mental health care use is a consequence of the divorce or separation."
We agree with these remarks and are of course interested in the effect of these country level features on the professional care seeking behavior according to marital status. Because the aim of the present paper is not to fully explain between country differences we do not want to elaborate too much on this and preserve it for another research paper. Nevertheless, we agree with the referee that we, at least have to control for spuriousness. As a result, we included two country level indicators in the models, linked to the present core variables, divorce and professional care use for mental health problems. We include the country level divorce rates and an indicator of the availability of health care professionals. We developed some hypotheses concerning their possible effects. Having only 30 countries at our disposal we are not able to include additional country level indicators. We also explored the interesting divorce*divorce rate crosslevel interaction effect.

See for instance:

Country-level indicators: the divorce rate and the supply of health professionals.

We expect to see differences between countries in their use of mental health services following a breakup, as not only norms and values regarding family and divorce [40], but also social policies regarding marital dissolution [40] vary between countries. To control for between-country differences in the distribution of our key variables—marital status and professional care consumption—we take both the country-level divorce rates and the supply of professional care into account.

At present, research is lacking on the link between divorce rates and marital status differences in mental health service use. However, we see three possible links between them. Based on the aforementioned research on divorce and mental health service use [8,9], we expect the general level of professional care use in a country to reflect the marital status composition of the population. Hence, apart from the effect of the marital status composition of the population, no additional divorce rate effect is expected. We also expect to find higher divorce rates to increase the professional service use of the divorcé(e). Although more subtle forms of stigmatization are still possible [41], one can expect divorce to be less stigmatized in countries where the divorce rate is high [42], making it easier for the divorced to seek help [43]. Finally, there are indications that the use of professional care among the divorced could actually be lower in countries with a high divorce rate. Based on the social comparison theory [43] and research on divorce and stigma [41], we can assume that people in high-divorce countries no longer view marital dissolution as different nor problematic [7,44-46], leading to a relative decline in professional care seeking among divorcé(e)s.

We also expect availability and accessibility of mental health services to influence utilization [47]. Unmet need is worse in low- and middle-income countries [48], and the treatment gap might be attributable to these nations spending reduced amounts from already diminished health budgets on mental health care [47]. As a result, we can expect cross-national variation in the availability and accessibility of mental health services to influence utilization, even among middle- and high-income European countries. Hence, the availability of general or more specialized professionals is a supply-side factor that should not be ignored [49].

Country-level indicators of the available mental health services are unable to encompass important within-country differences in the accessibility of mental health services. In order to take this into account we use the degree of urbanization in an area of residence as a rough indicator of the availability of more specialized mental health professionals [49]. Additionally, differences in mental health service use between rural and
urban areas may also signal differences in stigma beliefs. For instance, as Hoyt and colleagues [50] showed, reluctance to seek professional help in rural areas of the United States has been closely linked to stigmatizing beliefs about mental health care.

2. with regard to the limitation in reference to time, the authors only mention that they cannot rule out a possible selection effect, but state to believe that at least a part of the differences in mental health care use is a consequence of the divorce. However, in my opinion there is a more important problem with regard to the time frame which is not addressed. The outcome measure, total mental health care use, pertains to the period of the last 12 months. Mental health is measured with regard to the last 4 weeks. By adjusting the differences in mental health care use in the last 12 months between the divorced and married by their mental health in the last 4 weeks, the effect of mental health is likely to be underestimated. Mental health problems are presumably largest in the period surrounding the divorce, but will decline in time (partly as an effect of successful help by mental health care professionals). By using variables with different time frames, the effect of mental health is likely to be underestimated. Is it likely that the differences in mental health care seeking could be totally explained by mental health when similar time frames would have been used?

We elaborate on this in the discussion section:

“Fourth, we faced some limitations with regard to time. This analysis is based on cross-sectional data, which may hinder a causal interpretation of the results. This is problematic as concerns the association between (mental) health status and professional care seeking behavior. The physical and mental health status is measured at the moment of the interview, while the use of mental health care in the 12 months preceding the interview is retrospectively measured. Nevertheless, the former is considered a predictor of the latter. Longitudinal data might help circumvent this problem, but cross-national longitudinal datasets that contain information on marital status, mental health status, and mental health professional care seeking are currently nonexistent. In addition, we cannot rule out a possible selection effects accounting for the association between marital status and professional care seeking. Because our results are in line with the only longitudinal study, to our knowledge, on this topic [9], we believe that at least a substantial part of the differences in mental health care use is a consequence of the divorce or separation. Finally, because professional care use during the 12 months preceding the interview was measured, while the health status indicators referred only to the last four weeks, the present results probably underestimate the importance the latter. It’s unlikely however, that this lack of comparable time frames could explain the marital status differences in professional care seeking. For instance, the present indicator of mental and somatic health status is able to statistically explain the professional care use among the widowed, so a fortiori, we could expect it to be an suitable need indicator for the divorced too.”
3. It seems that there could also be residual confounding by other factors, such as religion and degree of urbanisation. Have the authors information on these variables? How could these variables effect the outcomes?

We took urbanicity into account, see text, for instance:

"Country-level indicators of the available mental health services are unable to encompass important within-country differences in the accessibility of mental health services. In order to take this into account we use the degree of urbanization in an area of residence as a rough indicator of the availability of more specialized mental health professionals [49]. Additionally, differences in mental health service use between rural and urban areas may also signal differences in stigma beliefs. For instance, as Hoyt and colleagues [50] showed, reluctance to seek professional help in rural areas of the United States has been closely linked to stigmatizing beliefs about mental health care."

The analyses did not reveal significant rural-urban differences.

We did not consider religion, because information on religion was lacking in the Eurobarometer 248.

4. Is the categorizing of educational level valid? This might differ between the school systems in the different countries. In the Netherlands for example, if you would go to university that would take you 8 years of primary school, 6 years of 'high school' en 4 years to obtain your university degree, making a total of 18 years, so hardly anybody would fall in the highest category. If this is different for other countries, depending on country, people with a university degree would be categorized in the category 16-19 years or in the category 20 or more years.

We agree that this is not an optimal way of operationalizing educational level. In comparative research there is, at the moment, no better alternative, as other indicators have their drawbacks too. There are important differences in educational systems in European countries and it is difficult to grasp these differences in one rude indicator.

We are well aware of the limitations (see below), but do not want to elaborate on them in the present paper in order not to lose focus.

In general, there is no superior measure of education (Smith, 1995; Hoffmeyer-Zlotnik & Wolf, 2003). In cross-country comparative research, 'years of schooling' are often used as a proxy variable for educational attainment (Kunovich & Slomczyński, 2007; Hoffmeyer-Zlotnik & Warner, 2007; Treiman, Ganzboom & Rijken, 1998, Schneider, 2007; Treiman & Yip, 1989 in Kerckhoff & Dylan, 1999). Actual years of schooling can be meaningfully interpreted in the European context in terms of time-investment or socialization (Schneider, 2007). Braun and Muller (1997, p.170 in Schneider, 2007) underline: "The longer someone is exposed to education, the more skills and knowledge he or she acquires and the more he or she is directly or indirectly socialized." Smith (1995) agrees that on the average, each additional year boosts knowledge and tolerance.

Hoffmeyer-Zlotnik and Warner (2007) suggest that 'years of schooling' can be used as an adequate measure if grades are indirectly taken into account and if the various educational systems have a fixed age of school entrance (Hoffmeyer-Zlotnik & Wolf, 2003). In this case, the first three categories of the education variable in the Eurobarometer correspond roughly with primary, secondary and tertiary education (Pampel, 2003). In addition, the unobserved heterogeneity of the 'years of schooling' can be taken into account by adding the random component of the education variable in the analysis (Davia & Albert, 2007).

The same phrasing of the question 'age of the respondent when finishing school' is used in Eurobarometer 58.2 (Sjöström et al., 2006), the German Social Science Bus Survey (1996 in: Hoffmeyer-Zlotnik & Warner, 2007) and the French census (IECM & IPUMS, 2006 in: Hoffmeyer-Zlotnik & Warner, 2007).

References
5. widowed people were also found to have higher rates for seeking professional care, however the higher rates disappeared when adjusting for work status. This might be an effect of multicollinearity between widowhood and retirement. This should be mentioned in the discussion section.

We reordered our analyses and noticed that the higher professional care use of the widowed is related to their mental and somatic health status. We added this line to the text in the results section:

"The more frequent professional care consumption of the widowed also coincides with more self-reported need ($B = -0.098, SE = 0.063, p = n.s.$)"

In the discussion section we added:

*Mental health status has a strong impact on mental health care use and explains professional care seeking among the widowed, and to a substantial amount, among women. The finding that need factors are able to explain health service use among the widowed, but not among the divorced corroborates previous research by Prigerson et al. [9]. These differential effects confirm that a substantial part of the mental health care use for emotional or psychological problems among the divorced or separated is related to factors other than their somatic and mental health status. Social conditions related to level of education, work status, the perceived availability of support from friends and family, and age cannot account for this marital status effect either.*

Minor Essential Revisions

| there seems to be some Dutch English in the paper. Please check. E.g. 'much research has been occupied with...','the stigma on divorce','as concerns gender' | The text has been edited by a professional language editor |
was surprised to find a pharmacist among the list of health professionals the respondents could have contacted for an emotional or psychological health problem. Are there countries in which a pharmacist is consulted for emotional or psychological health problems? It seems more like self help, going to a pharmacy and buying unprescribed medicines to alleviate emotional problems.

We totally agree. The data showed that in some countries the pharmacists have their role to play, but in terms of clarity of operationalisation it's better to remove it from the indicator of health professional care use. The indicator was adjusted.

on page 8 it is mentioned that the sample consisted for 49.4% of women and 50.4% of men; these % do not correspond with the % from table 1.

The differences were the result of confusing between percentages in the weighted and the unweighted sample. We removed them from the text.

| In addition | We also change the name of the Eurobarometer 64.4 into the more correct name "Eurobarometer 248" |