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Community social support as a protective factor against suicide: A gender-specific ecological study of 75 regions of 23 European countries

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ABSTRACT

By studying differences in suicide rates among different geographical regions one may identify factors connected to suicidal behaviour on a regional level. Many studies have focused on risk factors, whereas less is known about protective factors, such as social support. Using suicide rates and data from the European Social Survey (ESS) we explore the association between regional level social support indicator and suicide rates in 23 European countries in 2012. Linear multiple regression analyses using region as the unit of analysis revealed inverse relationships between mean respondent valuing of social support and suicide rates for both genders, with some indication of a stronger relationship among men. Social support may have a protective effect against suicide on a regional level. Thus, increasing social support could be an effective focus of preventive activities, resulting in lowering suicide rates, with greater expected results among men.

1. Introduction

Suicide represents an important public health concern worldwide, including in Europe (WHO, 2014a, 2014b). In Europe as in most Western countries there is a consistent pattern of gender-difference in suicide rates, with many more men than women dying by suicide (Canetto and Sakinofsky, 1998; Schrijvers et al., 2012). Suicide rates vary widely across European countries and regions. For example, rates are generally higher in Northern and Eastern Europe, particularly in Baltic countries, and lower in Mediterranean countries (Marušič, 1999). Understanding the reasons for national or regional differences in suicide rates has potential value for prevention.

In addition to individual-level psychological characteristics, such as personality traits, depression, hopelessness, and anxiety, a variety of other inter- and intra-national or regional factors such as socio-economic conditions (Maris, 1997; Mann et al., 1999; Platt, 2011; Milner et al., 2013; Yur'yev et al., 2013) and regional variations in the prevalence of genetic influences (Marušič and Farmer, 2001) may interact to shape the risk for suicide. Durkheim (1897) was one of the first theorists to offer a sociological argument concerning the root causes of suicide. He posited that suicide was influenced by social context and was the result of a lack of social integration. According to Durkheim (1897), periods of economic, social, or political change result in a state of anomie or normlessness. Anomic periods lead to deregulation of desires and suffering. Durkheim hypothesized that, as an expression of suffering, societies and groups experience an increase in suicide rates. Today, social capital (Ferlander, 2007) is a similar concept which has become very popular and is often tracked back to the work of Durkheim (1897), who showed that social integration was inversely related to the suicide rates. Social capital on the other hand includes both a buffer function of the social environment on health, as well as potential negative effects arising from social inequality and exclusion (Ferlander, 2007).

Although there is an extensive literature on suicide risk factors (Brown et al., 2000; Maris, 2002), much less is known about protective factors (Silverman, 2011). However, in recent decades, suicidologists have started to recognize the importance of identifying and promoting factors that may have a protective function against suicide (Grad, 2001; O'Connor, 2011). Social capital (Ferlander, 2007) is a concept that includes both risk and protective social factors. One component of social capital is community social support—defined as anything that leads someone to believe that she or he is cared for, loved, respected, and a member of a network of mutual obligations (Cobb, 1976)—and it is thought to be a particularly promising protective factor against suicide (Wilcox et al., 2010; Kleiman et al., 2012; Christensen et al., 2014) that warrants further consideration.

Prior research has focused on the role that the social support an individual receives (and perceives) has for the same individual's suicide risk. Although this approach is highly valuable, it is typically constrained by the standard limitations of self-report methodologies –

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namely, reporting biases (e.g. depression causes distorted perceptions of social support and suicidal thoughts) and reverse causation (e.g., depression and other suicide risk factors are taxing to individuals' social support networks). Furthermore, studying differences in regional suicide rates can be a starting point for gaining insight into factors connected to suicidal behaviour on a national and regional level. Better understanding of ecologic predictors of suicidal behaviour may be relevant especially for the development of universal prevention activities. In the present study we therefore explore whether regional levels of social support indicators have implications for regional suicide rates. Previous research has already identified several national- or community-level psycho-social correlates of suicide rates, such as the interaction between alcohol use and genetics (Marušič and Farmer, 2001), stigma toward people with mental health problems (Schomerus et al., 2014), intelligence (Voracek, 2009), income inequality (Machado et al., 2015) and other economic variables (Fountoulakis et al., 2014), and indicators of mental health systems (Shah et al., 2010; Rajkumar et al., 2013). Our study focused on the possible protective function of community social support at the societal level.

The indicator we studied is the value citizens place on helping others and caring for their well-being (*value of giving social support*), which is reflected in the level of attributed importance of social support by the community members. Living in a community or culture that highly values providing social support to others may act as a protective factor since strong appreciation of this value affects the individual's decision to help in situations when altruistic behaviour is needed (Shumaker and Brownell, 1984). As a result, there may be more social support available in the community. This, in turn, may have a reciprocity effect. Gouldner (1960) and Cobb (1976) posit that a norm of reciprocity is that people usually return the benefits they receive from other since belonging to a network characterized by mutual obligations as a component of social support. Hence, people living in communities with high appreciation of the value of helping others are more likely to give and also receive social support, in comparison to communities in which this value is not considered to be as important.

Furthermore, studies have confirmed a positive connection between community social support and help-seeking behaviour for mental health problems in adults (Suka et al., 2015) and adolescents (Gulliver et al., 2010). However such studies have focused more on the existing social support available in the community as the core element of social capital (Ferlander, 2007) rather than on the value that community members place on social support. To our knowledge, social support values have not been examined in relation to suicide rates at the community level.

Community social support may act as a universal protective factor decreasing the risk for suicide regardless of individual risk factors, but it may also act as a moderating protective factor, mitigating the effect of other risk factors for suicide (Clum and Febbraro, 1994; Harrison et al., 2010). For instance, social support buffers the risk of suicide associated with depression (Cohen and Wills, 1985; Chioqueta and Stiles, 2007), negative events (Kleiman et al., 2014), post-traumatic stress disorder (Panagioti et al., 2014), drug use (You et al., 2011), and bully-victim problems in adolescents (Rigby and Slee, 1999), indicating that social support might contribute to psychological resilience when an individual is confronted with difficulties.

From a theoretical standpoint, the Interpersonal Theory of Suicide (Joiner, 2005) also is relevant. First, community social support relates to perceptions of interpersonal belongingness. In this sense, it might present a protective factor against suicidal thoughts, since lack of belongingness is one of the two conditions crucial for developing suicidal ideation (Joiner et al., 2009; Van Orden et al., 2010). Likewise, placing a high value on helping others relates to the risk construct of burdensomeness that has been posited as another perception that leads to suicidal ideation (Joiner et al., 2009). If a nation's citizens value social support more and are able to provide it more often, then burdensomeness in the population should be lower. Both of these constructs are described as being dynamic cognitive-affective states, influenced by intrapersonal and interpersonal factors (Van Orden et al., 2010), which emphasizes the interactive effect of individual intrapsychic processes with societal factors in shaping the perceptions of themselves.

Although the needs to give and receive social support may be universal, the level of need or the significance of certain aspects of social support may differ for men and women. In general, men have fewer close relationships than women (Scourfield and Evans, 2014) and it is usual that women play a critical role in connecting men socially and providing them with emotional support (Oliffe et al., 2011). Given that men receive important stability and support within marriage, a loss or divorce can be an important trigger for them because the lost social bond can isolate them (Wyder et al., 2009). Joiner (2011) further suggests that even when men have a number of social contacts, they may feel lonely if the quality of these relationships is poor. Men may not recognize this loneliness, but in difficult times (e.g. when marriage fails), they may be suddenly struck by the lack of meaningful social support (Joiner, 2011). On the contrary, women may not experience such a sense of loneliness following the loss or divorce as they are more likely to have developed supportive networks and meaningful friendships that can be sustained independently from their partner (Kposowa, 2000).

There is also a striking gender difference regarding help-seeking behaviour, with men being in general less likely to do so for psychiatric disorders such as anxiety, posttraumatic stress disorder (Bland et al., 1997), depressive symptoms and other emotional problems (Möller-Leimkühler, 2002). Normative male gender-role expectations may impose important barriers to seeking help. For example, fears of disclosing emotional vulnerability and perceptions that seeking help is an admission of incompetence may result in men's reluctance to discuss their problems with their close ones or to contact mental health professionals (Cleary, 2012; Schrijvers et al., 2012; Scourfield and Evans, 2014). In order for men in distress to overcome these barriers there is a need for influential facilitators of help-seeking; stronger value and provision of social support may play this important role. Further, suicide rates are generally higher among men than women in high-income countries and also low- and middle-income European countries (WHO, 2014b).

The aim of the present study is to investigate the relationship between a regions' suicide rates and indicator of social support levels in the community – value of giving social support—across 75 regions of 23 countries. We hypothesise that higher levels of social support are associated with lower suicide rates, even after controlling for other risk and protective factors. Considering the noted gender differences regarding the significance of social support and suicide rates, we examine the associations separately by gender, and expect that negative associations between social support and suicide rates are stronger among men than women.

2. Method

We conducted an ecological study – an empirical investigation involving the group as the unit of analysis (Morgenstern, 1982). This method typically combines data on large populations and is useful when dealing with data that summarize 'morbidity' in different regions, such as suicide rates.

We used data from the European Social Survey (ESS), an academically-driven survey, within which data on social indicators such as well-being, values and attitudes were collected on large samples from multiple countries using a uniform methodology (European Social Survey Round 6 Data, 2014). The full ESS data are available to researchers on an open-access basis on the web page www.europeansocialsurvey.org.

We used data from 75 regions of 23 European countries: Belgium, Bulgaria, Switzerland, Cyprus, Czech Republic, Germany, Denmark,

Estonia, Spain, Finland, France, Hungary, Ireland, Italy, Lithuania, Netherlands, Norway, Poland, Portugal, Sweden, Slovenia, Slovakia, and United Kingdom. We included only those European counties for which regional data (NUTS 1[1]) were available in the European Social Survey. Altogether 44,238 respondents (20,488 men, 23,750 women) were included into the analyses. Participants were aged 15–103 years old (M = 48.99; SD =18.54). The sampling of the participants for the ESS study was conducted by a strict random probability sampling method, and a minimum target response rate of 70% was required. Questionnaires were applied in languages spoken in individual participating countries, obtaining the translations by rigorous translation protocols. The data used in this study were collected in 2012 and 2013. The respondents participated in an approximately one hour long face-to-face interview (computer-assisted or paper and pencil).

For the purpose of our study we used the following questions from the ESS:

Value of giving social support: Now I will briefly describe a person. Please tell me how much this person is or is not like you: "It's very important to her/him to help the people around her/him. She/he wants to care for their well-being." The answers ranged from 1 ("very much like me") to 6 ("not like me at all"), forming a 6-point scale. In order to facilitate interpretation, we reverse-coded this item; thus, higher scores indicate that they consider social support to be a more important value.

Additionally, we used mean values of satisfaction with life and happiness, calculated from the ESS database (we calculated country and gender specific means). We also included total alcohol per capita consumption rates in litres of pure alcohol (country and gender specific), obtained from the World Health Organization on an open-access basis (WHO, 2017). We used an economic indicator: GDP (gross domestic product) at current market prices per capita by the NUTS 1 regions as it was available in the ESS database. Further on, we calculated and used regional means of self-assessed degree of religiousness from the data available in the ESS database as a measure of religiousness in individual regions.

Finally, we used regional suicide death[2] rates for men and women as the outcomes, calculated as three year averages (2012–2014).[3] These rates are available on an open-access basis from the Eurostat (Eurostat, 2017).

2.1. Data analysis

We analysed the data using the Statistical Package for Social Sciences program (SPSS 21.0). We used the ESS database to compute the main predictor variable *value of giving social support* as regional means of 75[4] included regions, which then served as units of analysis. We calculated the social support variable as overall group means, not subdivided by gender.[5] Two covariates (*life satisfaction and happiness*, and *alcohol*) were country and gender specific, but not region specific. We obtained gender specific values for these two variables, since men and women may differ on these indicators, especially with regard to alcohol use (Norström and Rossow, 2016). However, we decided not to calculate these indicators for each region individually, since too many regions would have to be excluded due to the very small numbers of respondents in this case. Two covariates (*GDP*, and *religiousness*) were region specific but not gender specific. The outcome variable (regional suicide rates), were obtained separately for men and women, enabling us to analyse predictors of gender specific suicide rates.[6] As hypothesized, scatter plots indicated considerable gender difference regarding connection between regional values of giving social support and suicide rates (see Fig. 1). Thus, we performed subsequent analyses separately for men and women. We conducted multiple linear regression analyses[7] with regional death rates due to intentional self-harm as the outcome. For each gender we entered the variable assessing the value of giving social support as a predictor in Model 1 and added the other psycho-social and socio-economic variables as predictors in Model 2.

3. Results

Mean ages of the ESS respondents ranged from 44.86 years (SD = 18.04) (Region Pólnocny, Poland) to 55.39 (SD = 19.67) (South West England). Mean scores on *value of giving social support* ranged from 4.09 (SD = 1.08) (Lithuania) to 5.44 (SD = .83) (Region Isole, Italy). Higher means indicate greater appreciation of the value of helping others and wanting to care for their well-being among the citizens. Regional suicide rates ranged from 1.36 per 100,000 people (women, Cyprus) to 58.96 per 100,000 people (men, Lithuania).

The relationship between value of social support and gender-specific regional suicide rates is presented in Fig. 1, in which we can see that the relationships exist in both gender groups, but the percentage of variability in suicide rates that is accounted for by the region's value of giving social support is higher among men than women; the correlations are presented in Table 1. There are negative associations between regional level value of social support and men's and women's suicide rates; lower average of values of social support are related to higher suicide rates of men and women, however, the correlation is higher for men (Spearman's $\rho = -.50$; $p < .001$) than women (Spearman's $\rho = -.38$; $p = .001$).

Due to the apparent gender differences and the gender-specific measurement approach we ran separate regression analyses predicting men's and women's regional suicide rates on the basis of the social support variable and covariates. We first ran regression analysis predicting suicide rates from the social support variable (Model 1). Next, we reran regression analysis controlling for life satisfaction and happiness, alcohol consumption, GDP per capita, and self-assessed degree of religiousness (Model 2).

Table 2 shows the results of the regression analysis for men. The results confirmed that regional value of giving social support is a statistically significant and independent predictor of the region's male suicide rates. Specifically, after controlling for national level gender specific life satisfaction and happiness, alcohol consumption, GDP as economic indicator, and self-assessed degree of religiousness in the region the value of giving social support remained a significant predictor of men's suicide rates with a standardized coefficient −.40 ($p = < .001$). This model explained 50% of the variance of regional suicide rates among men (Table 2).

[1] In the following cases the whole country is a region: Cyprus, Czech Republic, Denmark, Estonia, Ireland, Lithuania, Norway, Slovenia, Slovakia, and Switzerland.

[2] The suicide death rates were crude, but age-weighted with the weighting factor age distribution of the population whose mortality is being observed.

[3] The values were calculated as means of 2012 and 2014 suicide death rates for two regions, namely Slovenia and London, UK, since data for 2013 was not available for these two regions.

[4] Out of 82 regions, 7 were excluded from the analyses altogether due to small sample of respondents in the ESS database (N < 100; regions: Bremen, Germany; Hamburg, Germany; Saarland, Germany; Schleswig-Holstein, Germany; Canarias, Spain; Åland, Finland; and Northern Ireland, UK).

[5] We did not have a priori hypotheses regarding whether regional values of giving social support by one gender would have differential implications for suicide rates for the same or other gender. Still, we considered calculating the men's and women's social support variable separately. However, the correlations between men's and women's means were so high (Spearman's $\rho = .87$; $p < .001$) that including them as separate variables would be redundant and could introduce problems with multicollinearity in regressions.

[6] Men's and women's rates are positively correlated (Spearman's $\rho = .71$; $p < .001$). However, the variability of men's suicide rates (M = 19.5; SD = 9.0) between regions is higher than that of women's suicide rates (M = 5.5; SD = 2.3). Further on, the ratio between men's and women's suicide rates varies between regions – it ranges between 1:2.16 (Regions Noord-Nederland, The Netherlands; and Östra Sverige, Sweden) and 1:7.68 (Region Wschodni, Poland).

[7] Due to missing GDP data, another region (Switzerland) was excluded from the regression analyses, resulting in 74 regions from 22 countries serving as units of analysis in the regression.

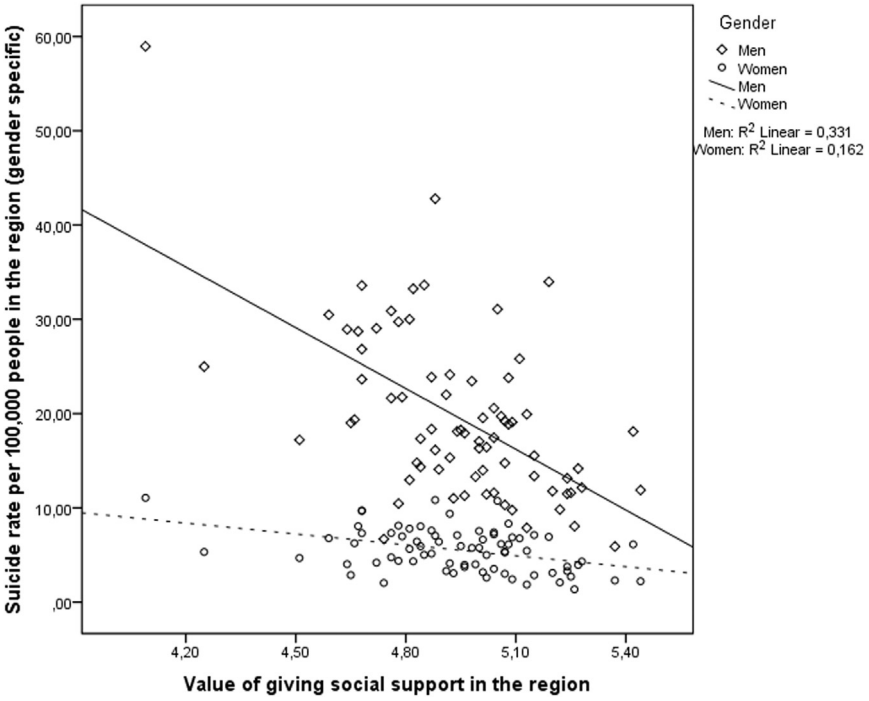

Fig. 1. Associations between average respondents' value of giving social support in the regions and men's and women's suicide rates in the regions.

Table 1
Univariate correlations (Spearman's ρ) between the study variables for men (above the diagonal) and women (below the diagonal).

	1.	2.	3.	4.	5.	6.	7.
1. Value of giving social support	.	.39***	−.61***	.12	−.08	−.50***	−.38**
2. Satisfaction and happiness	.29*	.	−.55***	.62***	−.26*	−.21	.13
3. Alcohol	−.30**	−.15	.	−.54***	.08	.64***	.22
4. GDP	.12	.59***	−.02	.	−.12	−.37**	.19
5. Religiousness	−.08	−.27*	−.29*	−.12	.	.01	−.25*
6. Suicide rate – men	−.50***	−.12	.39**	−.37**	.01	.	.71***
7. Suicide rate – women	−.38**	.17	.40***	.19	−.25*		.

Value of giving social support – the level of respondents' agreement with the statement that it is important to help people and care for their well-being; Satisfaction and happiness – mean value of satisfaction with life and happiness (country and gender specific, not by regions); Alcohol – total alcohol consumption in litres of pure alcohol (recorded 3 year average + unrecorded) *per capita* (15+); GDP – gross domestic product *per capita*; Religiousness – self-assessed degree of religiousness in the region.

* $p < .05$.
** $p < .01$.
*** $p < .001$.

Table 3 shows the results of the regression analyses predicting women's suicide rates. The regional value of giving social support was a statistically significant predictor of the regions' female suicide rates in Model 1. After controlling for the relevant covariates, the value of giving social support remained statistically significant with a standardized coefficient −.38 (p = .001). This model explained 23% of the variance of women's suicide rates (Table 3).

4. Discussion

The degree to which survey respondents at the regional level valued providing social support to others and taking care of their well-being was inversely related to these regions' suicide rates among men and women. Although the design precluded formal testing of gender differences, there appeared to be notable patterns. With regards to these, it is important to note that not only were suicide rates higher among men than women, as is known to be the case in high-income countries and also low- and middle-income European countries (WHO, 2014b), but also that men's within-group variability of suicide rates was more than 3.9-times higher than women's within-group variability of suicide rates. The latter corresponds to the fact that there are large differences between regions and countries in terms of male to female suicide ratios (WHO, 2014b), however, it also suggests that the relative importance of some individual- and/or regional-level risk and protective factors to suicidal behaviour might differ for men and women.

The observation suggestive of gender differences indicates the need to study the potential risk and/or protective factors for suicidal behaviour separately in men and women. This is also apparent from the graphical representation of the relationships between the value of giving social support in the region and the region's gender-specific suicide rates. As shown in Fig. 1 the same level of variation in the region's value of giving social support is associated with greater apparent variation in suicide rates in men than in women. The correlational design of the study doesn't enable us to draw causal conclusions. However, with consideration of the theoretically based and empirically supported understanding of social support as a protective factor against suicide, this finding implies that a small increase in the valuing of giving social support in a region might contribute to decreased suicide rates. These could be small influences among women, but notable among men.

Furthermore, these relationships remained significant after controlling for some relevant socio-demographic and psychological variables (Tables 2 and 3). The results show that regional-levels of appreciation of social support as a value are related to suicidal behaviour over and above life satisfaction and happiness, and potential risk and/or protective factors such as alcohol use, GDP, and religiousness. Again, it is important to note the apparent differences in the models explaining the regional variances in suicide rates among men and among women, even though we could not conduct inferential tests of these differences. While value of giving social support is an important predictor of both male and female suicide rates, other predictors seem to have different roles among men and women. While gender-specific national levels of alcohol consumption and

Table 2
Results of the regression analysis predicting regional suicide rates for men.

	Model 1				Model 2			
	B (SE)	*β*	*t*	*p*	*B (SE)*	*β*	*t*	*p*
Value of giving social support	−21.57 (3.61)	−.58	−5.983	< .001	−14.92 (3.82)	−.40	−3.908	< .001
Satisfaction and happiness	–	–	–	–	2.28 (1.57)	.16	1.452	.151
Alcohol	–	–	–	–	1.13 (.36)	.35	3.160	.002
GDP	–	–	–	–	< .01[a] (< .01)	−.29	−2.579	.012
Religiousness	–	–	–	–	.18 (.71)	.02	.252	.802
Adjusted R^2	.32				.50			

B – the non-standardised coefficient; β – the standardised coefficient; Value of giving social support – The level of respondents' agreement with the statement that it is important to help people and care for their well-being; Satisfaction and happiness – mean value of satisfaction with life and happiness (country and gender specific, not by regions); Alcohol – total alcohol consumption in litres of pure alcohol (recorded 3 year average + unrecorded) *per capita* (15+); GDP – gross domestic product *per capita*; Religiousness – self-assessed degree of religiousness in the region.

[a] B(SE) for GDP = −.000228 (.000088).

regional GDP contributed significantly to explaining the variability of male suicide rates, none of these (or other included variables) contributed significantly to explaining the variability of women's suicide rates.

Among men, the regional value of giving social support was strongly negatively correlated to alcohol consumption (Spearman's ρ = −.61; p < .001; see Table 1 for more information on intercorrelations) and positively correlated to life satisfaction and happiness (ρ = .39; p < .001) and thus it is possible that some other common factors are related to the variation in the regional suicide rates. On the other hand, the correlation of regional's value of giving social support with GDP was non-significant (ρ = .12; p = .325), suggesting that social support as a protective factor may contribute to regional differences in male suicide rates irrespective of GDP as an indicator of the economic state of the region.

Among women, on the other hand, only the value of giving social support contributed significantly explaining the variability of female suicide rates. Nevertheless, it is interesting to note, that value of giving social support had similar correlational patterns with other included covariates also among women: it was negatively correlated to alcohol consumption (Spearman's ρ = −.30; p = .009; see Table 1 for more information on intercorrelations) and positively to life satisfaction and happiness (ρ = .29; p = .011), which could also suggest the possibility of some other common factors that could be related to the variation in the regional suicide rates among women.

The study design doesn't enable conclusions about causal relationships on individual level and there may be other underlying common factors contributing to regional variations in suicide rates. Yet, a plausible explanation of the results is that a strong regional appreciation of the value of giving social support in the community may serve as a protective factor for the community members.

These findings are in line with previous research on social support and its potential protective function against suicide, especially among men. Living in a community in which people value helping others, particularly if they act on this sentiment, could result in lower suicide rates by buffering the effects of different risk factors and reinforcing help-seeking behaviour in case of distress. Such a pattern might be especially evident among men due to the characteristics of their social relationships (Oliffe et al., 2011) and male gender-role expectations (Cleary, 2012; Schrijvers et al., 2012; Scourfield and Evans, 2014). On the other hand, it could also act as a direct protective factor if it contributes to the sense of interpersonal belongingness within the community (Joiner, 2005; Joiner et al., 2009; Van Orden et al., 2010).

In addition to the aforementioned inability to formally test gender differences, this study had some other limitations. First, the predictor variable was obtained from a single-item question, which may limit the validity of the results, especially since social support is a very complex concept, and this single-item question may reflect a generic individual valuing of social support rather than the concept as a whole. Second, the results of ecologic analyses are subject to certain limitations in the sense that they lack certain information ordinarily contained in the basic designs. Thus we know only the average levels or rates for each group or region (Morgenstern and Thomas, 1993). Since the study was conducted using aggregated data, the obtained results do not enable conclusions about suicide risk or protective factors at the individual level. To be more precise, the results do not prove that there is a relationship between individually perceived or even utilized social support and individual suicidal behaviour. Furthermore, the data do not enable us to distinguish between the direct protective functions of social support and its moderating effects in connection to risk factors. Nevertheless, the results provided an insight into protective factors at the level of society, which may prove useful when developing program of promotion and universal prevention. Third, we were not able to control for respondents' place of residence in terms of urban or rural

Table 3
Results of the regression analysis predicting regional suicide rates for women.

	Model 1				Model 2			
	B (SE)	*β*	*t*	*p*	*B (SE)*	*β*	*t*	*p*
Value of giving social support	−3.92 (1.03)	−.41	−3.806	< .001	−3.69 (1.09)	−.38	−3.374	.001
Satisfaction and happiness	–	–	–	–	−.13 (.47)	−.04	−.285	.776
Alcohol	–	–	–	–	.38 (.29)	.15	1.304	.197
GDP	–	–	–	–	< .01[a] (< .01)	.15	1.142	.257
Religiousness	–	–	–	–	−.44 (.25)	−.21	−1.782	.079
Adjusted R^2	.16				.23			

B – the non-standardised coefficient; β – the standardised coefficient; Value of giving social support – The level of respondents' agreement with the statement that it is important to help people and care for their well-being; Satisfaction and happiness – mean value of satisfaction with life and happiness (country and gender specific, not by regions); Alcohol – total alcohol consumption in litres of pure alcohol (recorded 3 year average + unrecorded) *per capita* (15+); GDP – gross domestic product *per capita*; Religiousness – self-assessed degree of religiousness in the region.

[a] B(SE) for GDP = .000029 (.000025).

environment since this information was not collected within the ESS. As the values regarding provision of social support to others and social support among people in local community might differ between urban and rural environments, this represents another limitation to the study. Fourth, to control for economic conditions and religiousness we used the overall regional scores that were available and these were not calculated separately by gender. Furthermore, the predictors for life satisfaction and happiness and alcohol use were calculated on the national and not regional level. This is a limitation if the levels of life satisfaction and happiness and alcohol use vary among different regions. Fifth, there was considerable variation in regional sample sizes in the European Social Survey, with the smallest samples in Wales (45 men and 70 women) and the largest in Ireland (1249 men and 1372 women). However, the sampling of respondents in this study followed well-defined guidelines in order to provide representativeness of samples. Sixth, there may be differences in the way suicide rates were recorded and reported between individual regions, which would also contribute to the variability of the rates but is not accounted for by our analyses. Finally, our study included only European countries; although this is not a limitation, the findings may not generalize to other geographical regions.

In conclusion, we found evidence that regional values regarding the provision of social support may be a significant protective factor against suicide, especially among men. Therefore, interventions aimed at increasing community members' appreciation of this value could be an useful part of universal prevention activities. For example, the adolescent suicide prevention literature emphasizes the importance of interventions that promote individual connectedness to multiple proximal (e.g., family, peers) and distal (e.g. school, community) institutions (Whitlock et al., 2014). These ideas and values could be extended to protect a broader population. According to the results of this study the most beneficial effects of this kind of interventions could be obtained among men, especially in regions and communities with high suicide rates and low appreciation of the values regarding social support.

Ethical standards

The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008.

Availability of data and materials

ESS data used in this study are available to researchers on an open-access basis on the web page http://www.europeansocialsurvey.org. Some of the data applied in the analysis in this publication is based on the ESS Multilevel Data. The data is provided by the European Social Survey webpage, and prepared and made available by the Norwegian Social Science Data Services (NSD). Neither European Social Survey nor NSD are responsible for the analyses/interpretation of the data presented here. Data on alcohol consumption are available on the WHO web page http://apps.who.int/gho/data/node.wrapper.imr?x-id=465. Data on deaths due to intentional self-harm are available on the Eurostat web page http://ec.europa.eu/eurostat/web/main.

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