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BRIEF REPORT

Education and depressive symptoms in 22 European countries

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Abstract
Objectives Variations in the association between education and depressive symptoms in 22 European countries are investigated.
Methods Analyses are based on the European Social Survey Round 3 ($N = 34{,}443$). Education was coded according to the International Standard Classification of Education. Depressive symptoms are measured by the shortened Center for Epidemiologic Studies Depression Scale (CES-D 8).
Results The results of multiple logistic regressions show that people with low education have elevated risks of experiencing a high score of depressive symptoms. Relatively large inequalities were observed among both sexes for Hungary and Slovenia, small and non-significant inequalities for Austria, Denmark, and Estonia.
Conclusion The results indicate that educational inequalities in depressive symptoms are a generalized although not invariant phenomenon.

Keywords Educational inequalities · Depressive symptoms · Europe · International differences

Introduction

The positive association between education and health is well established. People with higher education generally experience lower morbidity and mortality rates than the poorly educated (Ross and Wu 1995; Cavelaars et al. 1998; Silventoinen and Lahelma 2002; Huisman et al. 2005; Knesebeck et al. 2006). Similar gradients have been found for mental disorders (Dohrenwend et al. 1992). The results of a meta-analysis published in 2003 (Lorant et al. 2003) indicate that individuals with a low socioeconomic position (including education) have significantly higher prevalences of depression. Furthermore, a longitudinal study showed that worsening socioeconomic circumstances are associated with increases in depressive symptoms (Lorant et al. 2007). Despite the progress in research on inequalities in depression according to education, there is not much known about the way in which the association between education and depression varies among countries. Comparison of varied types of societies can provide new insights into the sensitivity of social inequalities within different societal and cultural contexts (Cavelaars et al. 1998; Silventoinen and Lahelma 2002; Huisman et al. 2003; Knesebeck et al. 2006; Mackenbach et al. 2008). They also enable us to evaluate the generalizability of findings from one national setting only. There is a lack of international comparative studies dealing with the country differences in inequalities in depression. Against this background, this study investigates educational inequalities in depressive symptoms in 22 European countries.

Methods

Data in this study are delivered by the European Social Survey Round 3 (http://ess.nsd.uib.no/). Data were gathered in 22 countries (Austria, Belgium, Bulgaria, Switzerland, Germany, Denmark, Estonia, Spain, Finland, France, United Kingdom, Hungary, Ireland; Netherlands,

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Norway, Poland, Portugal, Russian Federation, Sweden, Slovenia, Slovakia, Ukraine) by face to face interviews between the end of August 2006 and November 2007. Probability sampling from all private residents aged 15 years and older was applied in all countries. Average response rate is about 63% ranging from 46% in France to 73.2% in Slovakia (Table 1). After deleting cases lacking minimum information on education level, depression, gender and age and exclusion of people younger than 25 years and those who specifically mentioned that they were still studying; our sample consists of 34,443 respondents. Response rates, numbers of remaining cases for each country and the distribution of the study variables are shown in Table 1.

Education was coded according to the International Standard Classification of Education (ISCED-97) (UNESCO 1997). Respondent's highest level of education was classified ranging from "not completed primary education" to "second stage of tertiary education" on a 7-point scale. For the analyses, the subjects were divided into two groups: (1) lower secondary, second stage of basic education, primary education, first stage of basic education or not completed primary education; (2) (upper) secondary, post-secondary, first stage of tertiary or second stage of tertiary education. Table 1 shows marked differences in educational levels between the countries under study. In Denmark, Germany, Norway, Russia, Slovakia, Switzerland, and Ukraine about 10–20% of the male respondents have a lower secondary education or less, in Portugal the rate is 74%. In most countries, low-education rates are higher among women than among men.

Depressive symptoms are measured by means of the shortened Center for Epidemiologic Studies Depression Scale (CES-D) (Radloff 1977; Huppert et al. 2008). The CES-D scale is a short self-report scale designed to measure depressive symptomatology in the general population. Respondents were asked to indicate how often they felt depressed, felt that everything was an effort, slept bad, felt lonely, felt sad, could not get going, enjoyed life (reverse coding) or felt happy (reverse coding) in the week previous to the survey (=8 items). Response categories ranged from 'none or almost none of the time' (0) to 'all or almost or all of the time' (3), forming a 4-point Likert's scale. The CES-D 8 total score ranges from 0 to 24, with higher scores indicating a higher amount of depressive complaints (Cronbach's α 0.81 among men and 0.85 among women,

Table 1 Description of the study population (European Social Survey, ESS3 2006, design weight applied)

Country (response rate in percentage; *N*)	Female (%)	Age (mean)	Lower secondary education or less (%)		CES-D 8 (scores $\geq$10, %)	
			Men	Women	Men	Women
Austria (64.0; 1,742)	55.8	49.5	64.3	67.7	12.4	13.0
Belgium (61.0; 1,478)	53.1	51.8	31.2	36.4	9.7	21.0
Bulgaria (64.8; 1,152)	60.4	52.3	31.6	31.2	30.5	35.9
Denmark (50.8; 1,300)	50.7	53.4	17.0	21.5	5.2	10.0
Estonia (65.0; 1,236)	57.6	53.2	22.8	20.2	20.0	27.1
Finland (64.4; 1,597)	51.3	53.6	32.6	34.7	8.9	10.0
France (46.0; 1,693)	52.0	50.2	53.2	50.7	9.4	20.0
Germany (54.5; 2,457)	51.1	52.5	8.2	12.9	13.8	18.4
Hungary (66.1; 1,313)	57.9	52.2	62.2	57.0	36.4	39.1
Ireland (56.8; 1,353)	53.7	49.2	39.9	36.1	8.9	9.8
The Netherlands (59.8; 1,654)	51.8	50.9	31.6	43.6	8.0	13.7
Norway (65.5; 1,448)	49.0	50.8	15.8	21.0	4.4	8.3
Poland (70.2; 1,346)	54.0	50.5	59.4	56.0	22.1	32.7
Portugal (72.8; 1,901)	60.5	53.0	74.0	79.6	23.5	37.4
Russian Federation (69.5; 1,853)	59.2	50.2	15.5	20.1	25.0	38.9
Slovakia (73.2; 1,337)	52.8	48.8	11.7	21.2	26.7	33.8
Slovenia (65.1; 1,185)	56.2	52.6	50.9	50.7	12.8	22.9
Spain (65.9; 1,586)	52.5	50.7	58.7	65.2	12.8	23.1
Sweden (65.9; 1,581)	50.9	52.4	28.2	33.7	9.0	15.7
Switzerland (51.5; 1,545)	54.1	52.1	10.7	18.2	6.9	10.1
Ukraine (66.4; 1,681)	57.6	53.2	19.6	22.0	35.9	44.4
United Kingdom (54.6; 2,005)	52.7	52.4	44.6	49.3	12.4	17.9
Total (62.7; 34,443)	*54.7*	*51.4*	*31.4*	*35.0*	*15.2*	*23.1*

all countries). Reliability and validity of the inventory were confirmed across different European countries (van de Velde et al. 2010b). Respondents who answered <5 items of the CES-D 8 scale were excluded from the analyses (182 cases). If between four and one items are missing, we calculated the mean value of the available items and multiplied it with eight to obtain the scale range of 0–24. The CES-D score was dichotomised, with scores greater or equal 10 indicating high frequency of depressive symptoms (van de Velde et al. 2010b). Table 1 shows that women have higher prevalences of depressive symptoms than men in all European countries. Moreover, cross-national variations in depressive symptoms can be observed with comparatively low values in Western European and Scandinavian countries and high values in Eastern European countries.

As several studies suggest that the magnitude of educational inequalities in depression differs for men and women (Ross and Mirowsky 2006), the analyses will be conducted for men and women separately. Age is used as a control variable.

In all analyses, a design weight is applied to correct for slightly different probabilities of selection in some countries (http://www.ess.nsd.uib.no/files/WeightingESS.pdf). To test associations between education and depressive symptoms, multiple logistic regression analyses are conducted for each country. Odds ratios and 95% confidence intervals (CI) are displayed. All analyses are conducted with the statistical program package PASW 18.

Table 2 Education (lower secondary or less) and depressive symptoms (CES-D-8, scores ≥10), adjusted for age: odds ratios (95% CI), European Social Survey, ESS3 2006, design weight applied

Country	Men	Women
Austria	1.23 (0.77–1.96)	1.41 (0.89–2.22)
Belgium	1.54 (0.87–2.72)	*3.36 (2.26–5.00)*
Bulgaria	*2.31 (1.51–3.53)*	*1.68 (1.19–2.36)*
Denmark	1.43 (0.60–3.41)	1.51 (0.83–2.76)
Estonia	1.59 (0.97–2.62)	1.21 (0.79–1.87)
Finland	*2.04 (1.15–3.63)*	1.65 (0.95–2.87)
France	1.54 (0.94–2.52)	*1.92 (1.34–2.73)*
Germany	*4.12 (2.07–8.20)*	*1.74 (1.18–2.56)*
Hungary	*2.89 (1.93–4.33)*	*3.21 (2.31–4.47)*
Ireland	1.33 (0.74–2.39)	*1.78 (1.04–3.02)*
Netherlands	*2.24 (1.31–3.85)*	*1.87 (1.20–2.91)*
Norway	1.12 (0.43–2.97)	*2.70 (1.42–5.14)*
Poland	*1.79 (1.16–2.79)*	*2.20 (1.54–3.14)*
Portugal	*2.19 (1.34–3.59)*	*1.68 (1.17–2.42)*
Russian Federation	*1.76 (1.13–2.72)*	*2.12 (1.47–3.05)*
Slovakia	*1.74 (1.03–2.96)*	*1.88 (1.26–2.80)*
Slovenia	*3.00 (1.62–5.58)*	*3.43 (2.14–5.47)*
Spain	*1.73 (1.05–2.85)*	*2.35 (1.50–3.69)*
Sweden	*2.51 (1.43–4.40)*	1.57 (0.98–2.52)
Switzerland	1.67 (0.75–3.73)	*1.84 (1.08–3.14)*
Ukraine	1.33 (0.86–2.01)	*1.68 (1.17–2.42)*
United Kingdom	*2.33 (1.54–3.52)*	*1.94 (1.38–2.73)*
Pooled odds ratios	*1.39 (1.28–1.51)*	*1.48 (1.39–1.58)*

Statistically significant odds ratios ($p < 0.05$) are italicized

Results

Table 2 shows the associations between education and depressive symptoms in the 22 countries for men and women. In general, people with low education (lower secondary or less) have elevated risks of experiencing a high score of depressive symptoms (cut point ≥10). These associations are particularly strong (odds ratios >2.0) in Hungary and Slovenia, among men and women. Associations are not significant for both sexes in Austria, Denmark, and Estonia. Associations are statistically significant ($p < 0.05$) in 13 countries among men and in 17 countries among women. Pooled odds ratios indicate slightly stronger associations among women than among men.

Discussion

Our study shows that people with low education (lower secondary or less) tend to have elevated risks of experiencing a high score of depressive symptoms. However, educational inequalities in depression do not seem to be an invariant phenomenon, as the size of differences according to education was found to vary between European countries. Multilevel analyses (not shown in detail) reveal that these country differences are significant. Relatively large inequalities were observed among both sexes for Hungary and Slovenia, small and non-significant inequalities for Austria, Denmark, and Estonia. Prior international comparisons with respect to educational inequalities in health also found that the size of health inequalities according to education varies between countries (Cavelaars et al. 1998; Silventoinen and Lahelma 2002; Huisman et al. 2003; Knesebeck et al. 2006; Mackenbach et al. 2008). However, as these studies did not focus on educational inequalities in depression, they are not directly comparable to our findings. At this moment, it is difficult to explain the observed country differences in depression inequalities, as this is one of the first comparative studies on this topic, including a range of Southern and Eastern European countries. It is one task of future research to analyze whether these country differences can be confirmed, and to identify country-specific factors that moderate the association between education and depression. The results concerning gender

differences, indicating that associations are slightly stronger among women than among men, are in line with other studies (Ross and Mirowsky 2006; van de Velde et al. 2010a).

Several limitations of this study need to be considered. Owing to the cross-sectional design of the study, it is not possible to conclude whether the educational inequalities in depression are explained by selection or causation. However, we consider selection less likely because educational level among adults, who have completed their schooling, is not affected by the occurrence of mental health problems (Krieger et al. 1997). Another limitation of our study is that all variables are based on the self-reports. Moreover, as can be seen in Table 1, response rates differ between the 22 countries with response rates below or near 50% in Denmark, France, and Switzerland. Although an average response rate of about 63% is fairly high in survey research, non-response biases our estimates if they are related to education and depression. It is known that response rates are lower in the highest and lowest socioeconomic groups as well as in less healthy people. A further methodological problem relates to the distribution of educational levels in the countries under study (Table 1). As we used an educational classification of only two groups (lower secondary or less and upper secondary or higher), estimates of inequalities to some extent are crude. We decided to dichotomize education instead of using more categories for the sake of clearness, and due to the small number of cases in some countries. Finally, our measure of depressive symptoms (CES-D 8) is based on a short self-report scale designed to measure depressive symptomatology in the general population. Thus, respondents scoring high (scores greater or equal 10) on the scale are not assumed to exhibit a clinical condition. To control stability of our findings, analyses were replicated using a different cut point (scores greater or equal 12, not shown in detail). The results are essentially similar for the differing cut points indicating that the conclusions still hold.

Despite the limitations, our study has provided additional evidence on the role of socioeconomic variations in depression by giving a comprehensive overview of educational inequalities in depressive symptoms in a number of European countries based on the large-scale probability samples. As psychosocial and material factors are likely to mediate the association between education and depression, measures to reduce adversity (e.g. stress at work and material difficulties) and to strengthen psychosocial resources (e.g. social support) especially among poorly educated people might help in reducing inequalities in depression.

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