The Interaction of Family Background and Personal Education on Depressive Symptoms in Later Life

Abstract

This study assesses the interaction between personal education and family background during childhood on depressive symptoms in later life by applying Ross & Mirowsky's resource substitution and structural amplification theory of health and education. OLS regression models are estimated using data from the "Survey of Health, Ageing and Retirement in Europe" (SHARE). Higher education helps overcoming the negative consequences of a poor family background. Since people from poor families are less likely to attain higher educational levels, they lack exactly the resource they need in order to overcome the negative consequences their non-prosperous background has on depressive symptoms. Thus, low family background and low personal education amplify each other. Examining whether this interaction changes as people age cautiously alludes to the conclusion, that three processes – cumulative (dis-)advantage, age-as-leveler, and persistent inequalities – might take place.

Keywords: depression, education, family background, aging, SHARE, Europe

The Interaction of Family Background and Personal Education on Depressive Symptoms in Later Life

Introduction

A great deal of evidence so far suggests an association between family background during childhood and health outcomes in adult life and older age (Brandt et al., 2012; Case et al., 2005; Hayward & Gorman, 2004; Mazzonna, 2011). Another constant finding in research is the association between education and health: better educated persons report better health outcomes regarding many different aspects of health and well-being (Cagney & Lauderdale, 2002; Lauderdale, 2001; Ross & Mirowsky, 2010; Ross & Wu, 1995), including psychological health (Cairney & Krause, 2005; Clarke et al., 2011; Grzywacz et al., 2004; Ladin, 2008).

A question that is still not completely answered is whether the association between education and health is stronger for persons coming from less advantaged family origins or whether persons originating from a well-off family background profit more from education. Ross & Mirowsky (2011) applied the resource substitution theory of education and health (see also Ross & Mirowsky 2006, 2010) and the integrated concept of structural amplification in order to investigate whether personal education and parental education interact in their effect on physical impairment. Their study shows that the association between personal education and physical impairment is stronger for adults with poorly educated parents compared to persons whose parents attained higher educational levels. Persons with both - low personal education and low parental education – exhibit the highest levels of physical impairment, with unhealthy lifestyle (smoking, being overweight) serving as a possible pathway.

Whether the health effects of education and/or family background remain constant or change over the life course is debated. Three opposing theories exist: the cumulative (dis-)advantage theory, the age-as-leveler hypothesis, and the persistent health inequality hypothesis. The

theory of cumulative (dis-)advantage posits that the educational gap in health diverges with age, since resources related to SES, which are beneficial to health, cumulate with age (Dannefer, 2003; Mirowsky & Ross, 2008; Ross & Wu, 1996). This advantages people with higher SES. The age-as-lever hypothesis states that health inequalities related to SES increase until early old age, but eventually abate again as people get older (House et al., 1994). Possible explanations are selective mortality and selective survey attrition (Lynch, 2003). Furthermore, an increase in other age-related factors (such as functional limitations or chronic diseases) could dominate the effects of SES (Moody-Ayers et al., 2007). The persistent health inequality hypothesis suggests that the SES-related gradient in health remains constant across the life course (Ferraro & Farmer, 1996a, b).

If on the one hand family background and education moderate each other in their effect on health (as suggested by the theory of resource substitution and structural amplification) and on the other hand the main effects of family background and education vary with age (as suggested by the theory of cumulative (dis-)advantage and age-as-leveler hypothesis), does the interaction between family background and education also vary with age, and if so, how?

The aim of this study is to extend the analyses of Ross & Mirowsky (2011) in three ways: firstly, this study investigates the interaction of family background and personal education regarding psychological well-being, namely the number of depressive symptoms. Secondly, instead of focusing on parental education only, the study applies a broader index for the socio-economic family background. Thirdly, this study explores whether age makes a difference in the interaction of family background and personal education on depressive symptoms, i.e. whether the interaction becomes weaker or stronger as people age.

The association between family background, education, and (psychological) health

Family background in childhood is found to have an impact on physical health (Bowen & Gonzalez, 2010; Brandt et al., 2012; O'Rand & Hamil-Luker, 2005; van den Berg et al., 2011;

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van den Berg et al., 2009) as well as on psychological well-being and cognitive health in later life (Gilman et al., 2002; Luo & Waite, 2005). Childhood health is a possible pathway: as several studies demonstrate, children of parents with low socio-economic status exhibit worse health outcomes during childhood compared to their counterparts from well-off families (e.g. Bauldry et al., 2012; Case et al., 2002; Currie et al., 2007; Reinhold & Jürges, 2012). Childhood health in turn is a strong predictor for health in adulthood and old age (Blackwell et al., 2001; Case et al., 2005; Haas, 2007, 2008).

Parent's socioeconomic status does not only affect the health outcomes of their offspring, but also has an impact on their educational attainment. The literature on intergenerational mobility suggests that children's educational outcomes are largely determined by the socio-economic status of their parents (e.g. Carvalho, 2012; Jerrim & Micklewright, 2009). Health appears to be an important pathway of intergenerational status transmission: children from socially disadvantaged backgrounds are more likely to experience negative health outcomes during childhood (see above), which has adverse effects on their success in school (Case et al., 2005).

Education has been found to be beneficial for both physical health and mental health (Cairney & Krause, 2005; Clarke et al., 2011; Ladin, 2008; Mirowsky & Ross, 2003; Ross & Mirowsky, 2006). Higher educated individuals accumulate more financial and psychosocial resources that are needed in the production of health. According to Ross & Mirowsky (2011) education is a resource in itself as well as a resource needed to generate other resources. As a resource in itself, education stands for learned effectiveness and personal control. From the viewpoint of the theory of learned effectiveness education indicates resourcefulness. Education also produces abilities and skills people need in everyday life. Education teaches people how to learn, how to collect and process information, and how to effectively solve problems; therefore education produces a feeling of control over own life outcomes

(Mirowsky & Ross, 1998, 2003), whereas "its absence breeds learned helplessness" (Ross & Mirowsky, 2006, p. 1401)

Education also helps to generate other health advancing resources, since it has an impact on future work and economic conditions. Education, work, earnings, wealth, and income are often regarded as interchangeable measures for socioeconomic status, but one has to acknowledge that education functions as a determinant of work, prestige, wealth, and income (Mirowsky & Ross, 1998) since better educated individuals are better able to accumulate resources such as better jobs, higher prestige, and higher income. Thus, education is a key determinant for an individual's placement in the social stratification system. Better jobs and higher income in turn are associated with better (mental) health outcomes (Back & Lee, 2011; Berchick et al., 2012).

The theory of resource substitution and structural amplification

Resource substitution theory of education and health (Ross & Mirowsky, 2006, 2010, 2011) argues that education is more beneficial to the (mental) health of otherwise disadvantaged groups. The central assumption of this theory is that the absence of one resource is less harmful if other resources can substitute the lacking resource. In general, individuals who have access to a wide array of different health advancing resources are not as dependent on specific single resources. In case a specific resource is lacking, persons with more resources at disposal are able to substitute the lacking resource with alternative resources. Individuals who have no or only limited access to health advancing resources are more dependent on the specific single resources they do have access to. The resource substitution theory hypothesizes that education will interact with disadvantaged family background in a way that education will have a larger effect on the health and well-being of individuals stemming from a disadvantaged family background in childhood.

Structural amplification is a special case of resource substitution. Structural amplification occurs "when social conditions decrease the likelihood of attaining personal resources that otherwise would moderate the conditions undesirable consequences" (Ross & Mirowsky, 2011, p. 592). In this case education is the resource, which would be necessary to alleviate the impact of a disadvantaged family background on health outcomes in later life. But it is exactly the disadvantaged family background, which reduces the likelihood of accomplishing high educational levels.

Cumulative (dis-)advantage theory, age-as-leveler hypothesis, persistent health inequality theory – empirical evidence

Whereas research shows that education and family background do have an impact on health in later life, it is still unclear if and how their effects change as people age. Three theories - namely cumulative (dis-)advantage theory, age-as-leveler hypothesis, and persistent health inequality theory - are heavily debated. So far, the empirical evidence on which of the three theories applies is mixed. In his study on cohort and life-course patterns in the relation between education and health, Lynch (2003) shows that the effect of education increases with age and that this effect becomes stronger with cohort. Other studies by Ross & Wu (1996), Aneshensel et al. (1984), Dupre (2007), Schöllgen et al. (2010), and Leopold & Engelhardt (2013) also confirm the cumulative disadvantage theory.

There is also evidence for the age-as-leveler hypothesis. A study conducted by Herd (2006) showed that the educational gap in functional health increases at first, but eventually declines and thus disparities in health diminish. Other studies, which confirm the age-as-leveler hypothesis include those conducted by House and coworkers (1994), Beckett (2000), and Kim and Miech (2009). Although many studies focus on the effect of education or racial disparities, very few studies investigated whether the impact of family background in childhood becomes weaker as people age. Moody-Ayers and colleagues (2007) find that the

impact of socioeconomic status during childhood abates in old age and suggest that other age-related factors (such as an increase in functional limitations and chronic diseases) dominate family background. The age-as-leveler hypothesis is mainly attributed to selective mortality. A higher mortality in low social strata leads to a bias in the surviving population "towards a selection of more "robust" individuals, which, in turn, may weaken the observed relationship between education and health in old age (Leopold & Engelhardt, 2013, p. 24; Lynch, 2003). However, Herd`s findings (Herd, 2006) suggest that mortality selection does not fully explain diminishing health inequalities. Further, it is also possible that age dependent processes in health are stronger in older ages and that age-related factors simply dominate the effects of education and SES (see also Moody Ayers, 2007; Lynch, 2003).

In their studies on racial disparities in health in the US, Ferraro and Farmer (1996a, b) found evidence, which offers most support to the persistent inequalities in ethnic differences across the life course.

Schöllgen and coworkers suggest, that the "use of different SES and health indicators may be one reason for inconsistent results across studies" (Schöllgen et al., 2010, p. 18).

Summary

This study elaborates the interaction between education and family background regarding psychological well-being in later life. The resource substitution and structural amplification theory of education and health hypothesizes that education has a stronger impact on the psychological well-being of persons with disadvantaged family origins and thus moderates the association between family background and depressive symptoms. Since the literature suggests that the effects of family background and education might vary with age (as stated by the theory of cumulative (dis-)advantage and age-as-leveler hypothesis), this study tests whether the interaction between family background and personal education on psychological well-being becomes stronger or weaker with age.

Methods

Data Source

The analyses use the "Survey of Health, Ageing and Retirement in Europe" (SHARE; for an overview see Börsch-Supan et al., 2008; Börsch-Supan & Jürges, 2005; Malter & Börsch-Supan, 2013). SHARE is designed as a panel study. So far, four waves have been collected (2004-05, 2006-07, 2008-09, 2010-11). SHARE contains computer-assisted face-to-face interviews with more than 55,000 individuals aged 50 years and older in 20 European countries. SHARE is modeled closely after the U.S. 'Health and Retirement Study' and it is the first data set to combine extensive cross-national information on socio-economic status, health, and family relationships of Europe's elder population. Whereas waves 1, 2, and 4 collected information on the current living conditions of the respondents, the third wave of SHARE, the SHARELIFE project (for a methodological overview, see Schroeder, 2011) collected retrospective life histories of the respondents, including the living conditions during childhood.

This study uses a subsample of the SHARE data, which consists of respondents who participated in wave 3 (SHARELIFE) *and* in at least one other wave. Respondents who did not participate in wave 3 or who did not answer the questions on family background at age 10, personal education, and current depressive symptoms (the EURO-D item battery) are not taken into account.

The basis for the sample is the third wave SHARELIFE with 27,974 individual interviews. Observations from wave 1, 2, or 4 are merged to the wave 3 dataset. Respondents who participated – apart from the SHARELIFE wave – in more than one other wave with are only considered once, taking their most recent status. The combined dataset consists of 27,504 individuals. Individuals with missing age indication or who are younger than 50 years (421 individuals) are dropped. So are individuals with missing information on the variables of

interest. The analytical sample thus consists of 20,716 individuals; see table 1 for descriptive statistics[1].

Comparing the analytical sample with those who have to be dropped because of missing data shows, that the analytical sample is less depressed, more educated, younger, financially better off, comes from a family background with a higher socio-economic status.

Dependent variable

The primary outcome variable in all analyses is respondents' state of mental well-being, measured by the number of depressive symptoms reported in the interview. This variable is operationalized using the EURO-D scale (Prince et al., 1999a; Prince et al., 1999b). The EURO-D scale has been developed for measuring the prevalence of depression among older people within a European context, but has many similarities with the widely used CES-D scale (Radloff, 1977). The EURO-D scale ranges from zero (no symptoms of depression existent) to 12 (12 symptoms of depression existent). The symptoms are depressed mood, pessimism, suicidality, excessive feelings of guilt, trouble sleeping, loss of interest, irritability, diminution in appetite, fatigue, difficulties in concentrating on entertainment or reading, lack of enjoyment in recent activities, and tearfulness. Respondents answer "yes" or "no" to questions about the presence of the aforementioned symptoms. All the items refer to the presence of those symptoms within the last month. The reliability (Cronbach's alpha) of the EURO-D scale within the analytic sample is 0.71.

Education and family background

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[1] The largest sources for missingness are education (2,182 missing cases), number of depressive symptoms (1,586 missing cases), past episodes of financial hardship (1,399 cases) and three variables measuring socio-economic background during childhood (number of bookshelves 1,548 missing cases; skill level of main breadwinner 2,683 cases; and features of accommodation 1,394 cases).

Education is measured by the categories of the International Standard Classification of Education (ISCED-97) (UNESCO, 1997). The variable has 7 categories, with ISCED levels 1 to 6 (with higher values indicating higher educational attainment) plus an additional category for no education. The median across countries is 3, indicating an (upper) secondary educational attainment level[2].

Family background is measured by four different variables: the number of books in the household at age 10, the skill level required for the occupation of the main breadwinner in the household at age 10, the number of rooms per capita in the household at age 10, and the number of features of the accommodation at age 10. The number of books is a categorical variable, which estimates the number of bookshelves, which could be filled with the books at home, ranging from 1 to 5, with higher values indicating higher numbers of books at home. This variable is a good indicator for parental education and cultural background of the household (Esping-Andersen, 2008). The skill level of the main breadwinner's occupation is based on the first digit of the ISCO-88 codes, which divides the occupations into their assumed skill level, ranging from 1 to 4, with higher values indicating a higher skill level (see also Mazzonna, 2011), assuming that the occupational skills are related to the educational level of the parents and thus to parental income. The number of rooms in the household (excluding kitchen and bathroom) at age 10 is adjusted for the number of persons living in the household. Finally, a variable that counts the number of features of the accommodation (such as fixed bath, central heating, inside toilet, running cold and hot water) is used as a proxy for the quality of the accommodation. As Mazzonna (2011) points out, the number of rooms per capita and the features of the accommodation can be considered as asset indicators and therefore serve as an indication for household wealth. Taken together, these four variables measure SES in childhood. Therefore, in the following family background will refer to the

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[2] However, the median varies considerably between countries, with Italy and Spain having the lowest median (equals 1), and The Netherlands, Greece, and Czechia having a median of 2.

socio-economic life circumstances in childhood rather than referring to a more general concept of life circumstances at age 10.

In order to account for country-specific differences in family background, each of the four variables on family background are centered on their country-specific means for the analyses, which means that the country-specific mean for the variable is subtracted from the individual value for each case.

Following Mazzonna (2011), a principal component analysis (PCA) is conducted in order to build an index for family background. The PCA is a measure for data reduction, which provides a linear weighting system of the variables described above, that are used as an approximation of family background. The analysis suggests retaining one component only to represent family background. The first principal component explains about 49% of the total variance and thus contains the most relevant information. It is therefore used to represent family background. One could doubt the accuracy of the retrospective SHARELIFE data on childhood circumstances, which are the basis for the constructed index on family background, since the collected information is prone to recall bias. Havari and Mazzonna (2011) show that the retrospective data collected in SHARELIFE shows good internal and external consistency and conclude that the data is useful in assessing how childhood circumstances impact living conditions in later life.

Further explanatory variables

Current financial hardship is measured using a question on whether respondents are able to make ends meet with their household income (Litwin & Sapir, 2009). The variable ranges from 1 representing "with great difficulty" to 4 representing "easily". The analyses also contain a dummy variable on past episodes of financial hardship (after age 20) in order to capture a more complete life course perspective on financial hardship. Lower levels of education are associated with an increased risk for financial hardship (Ross & Wu, 1995).

Financial hardship in turn is associated with an increase in depressive symptoms (Butterworth et al., 2012; Mirowsky & Ross, 2001).

The current employment status is based on a question which distinguishes whether respondents are (self-)employed (either full-time or part-time), retired, unemployed and looking for work, permanently sick or disabled, or homemaker. Dummy-variables are created for each of the five answer categories. The analyses also include a dummy-variable representing whether the respondent has ever been unemployed and looking for a job in order to capture not only current unemployment but to consider also past phases of unemployment. These variables act as mediators in the association between education and depressive symptoms. Higher education decreases the likelihood of experiencing unemployment (Cunado & de Gracia, 2012), and unemployment in turn increases the number of depressive symptoms (Berchick et al., 2012).

Control variables

The existing literature considers as well confirmed the fact that gender, age, and chronic diseases are correlated with mental health. Women report more symptoms of depression (Mirowsky & Ross, 1995; Ross & Mirowsky, 2006), prevalence of depression varies over the life course and has a u-shaped pattern with highest levels in younger adulthood, lowest levels in midlife, and increasing levels in older ages (Mirowsky & Ross, 1992), persons suffering from chronic diseases are more likely to also suffer from depression (co-morbidity) (Braam et al., 2005; Ostergaard et al., 2013). Thus, variables gender, age (in years), age squared (in years), and the number of diagnosed physical chronic diseases (e.g. diabetes, osteoporosis, high blood pressure, cancer, Parkinson's disease) enter the analyses.

Persons living with a spouse or partner report higher psychological well-being compared to persons without a partner or spouse (Clarke et al., 2011). Therefore, a dummy variable, which

contrasts persons living with a spouse or partner to persons living as single is part of the analyses.

Furthermore, country and wave are held constant in all the analyses.

[Table 1 about here]

Statistical analyses

The analyses consist of stepwise OLS regression models in order to test the theory of resource substitution and structural amplification. The first set of analyses regresses a) personal education on family background and the covariates (country, age, age squared, wave, living with a partner, more than two chronic conditions) to test the assumption that people with low childhood SES are less likely to attain high educational levels, and b) the number of depressive symptoms on family background, education, and the interaction term between family background and education, holding constant the covariates (country, age, age squared, wave, living with a partner, more than two chronic conditions) to test the moderating effect of education on the association between family background and depressive symptoms. Furthermore, variables, which represent the economic consequences of education, such as current and past episodes of financial hardship, current employment status, as well as an indication for periods of unwanted unemployment are added. Testing the hypothesis that the effect of the interaction between education and family background on depressive symptoms might vary across age requires additional analyses, which include the three-way interaction term between family background, personal education, and age. Stepwise regression models first test all three two-way interactions separately (personal education X family background, family background X age, personal education X age), then the three different two-way interactions together in one model, and finally all two-way interactions together with the three-way interaction in the last model.

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Results

The interaction of family background and education

Model 1 in table 2 displays the results of education regressed on family background and the control variables. The coefficient shows that a more well-off family background increases educational attainment. Thus, one important assumption of the theory of structural amplification is confirmed, namely that the moderator "of the association between social condition and health is a result from the condition itself" (Ross & Mirowsky 2011, p. 591) Models 2 to 4 (see table 2) further test whether the resource substitution theory is valid. A more well-off family background and more years of education reduce the number of depressive symptoms (model 2). Model 3 regresses the number of depressive symptoms on family background, on education, and on the interaction effect between family background and education. Given an average family background (equals zero), an increase in education by one educational level decreases the number of depressive symptoms at a rate of -0.112 units. Given the lowest level of education, each unit increase in family background lowers the number of depressive symptoms by -0.13 units. As predicted by the theory, the interaction effect is significant and has a positive value of 0.029. That is, at increasing levels of education, the effect of family background becomes smaller by 0.029 units. In other words, the higher the levels of personal education, the smaller the impact of family background becomes. Figure 1 displays the interaction effect from table 2, model 3: For persons with high educational levels (ISCED code 5 = first stage of tertiary education), family background has no impact on the number of depressive symptoms. On the other hand, for persons with a low educational (ISCED code 1 = primary education or first stage of basic education), family background plays a crucial role: low educated persons from a well-off family background report significantly lower numbers of depressive symptoms compared to low educated persons from families with a low socio-economic status.

Model 4 adds variables on past and current work and economic conditions to model 3. Currently being able to make ends meet significantly reduces the number of depressive symptoms. Phases of financial hardship in the past are associated with an increased number of depressive symptoms. Retirees do not differ from currently employed respondents (=reference category) regarding the number of depressive symptoms. Unemployed and disabled persons as well as homemakers report more depressive symptoms than employed persons. The indicator for phases of past unemployment is not associated with an increase or a decrease in the number of depressive symptoms.

[Table 2 about here]

[Figure 1 about here]

Age differences

The next set of models (table 3) tests, whether family background, personal education, and the interaction effect between family background and education are moderated by age. Models 1 and 2 of table 3 are identical with models 2 and 3 of table 2, the only difference being displaying the quadratic age trend in table 3, which was not shown in table 2.

Model 3 of table 3 regresses the number of depressive symptoms on family background, personal education, age, age squared, and the interaction term between family background and age (and the covariates country, gender, living with a partner, chronic diseases, and wave). Age has a quadratic effect on depression. The negative coefficient for age and the positive coefficient for age squared indicate a u-shaped pattern: the number of depressive symptoms decreases in midlife, but increases again in older age groups. At age 50 (equals zero) higher levels of family background reduce the number of depressive symptoms by -0.043 units. However, this coefficient is barely significant (only at the 10% level). The interaction term between family background and age is zero and insignificant. In other words, the gap in

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depression between individuals from well-off family backgrounds and poor family backgrounds remains constant throughout age (see also figure 2).

[Table 3 about here]

[Figure 2 about here]

Model 4 regresses the number of depressive symptoms on family background, personal education, age, and the interaction term between education and age (and the covariates country, gender, living with a partner, chronic diseases, and wave). At age 50, increasing levels of education are associated with a decrease in depressive symptoms by -0.059 units. As individuals age this rate becomes larger by -0.003 units. In other words, the gap between higher educated individuals and lower educated individuals regarding depression becomes larger with age (see also figure 3).

[Figure 3 about here]

Model 5 includes all main effects (family background, personal education, age) and the two-way interaction terms between the main effects. The interaction terms between family background and education as well as between education and age remain significant.

Model 6 finally adds the three-way interaction between the main effects to model 5. The coefficients of the two-way interactions are all significant, including the interaction between family background and age, which was insignificant in model 3: at age 50 better family background is associated with an decrease in depressive symptoms, but with each year this association becomes smaller by 0.007 units. The three-way interaction is significant and is best interpreted graphically. Figure 4 displays the slopes for four different combinations of education and family background across age. Comparing the slopes for the high-educated (ISCED level 5 = first stage of tertiary education) shows that differences in family

background (one standard deviation above average vs. one standard deviation below average) have no impact on the number depressive symptoms across age. Thus, the buffering effect of high education on the association between family background and depression remains constant throughout the later life-course. Comparing individuals with low levels of education (ISCED level 1= primary education or first stage of basic education) shows that the gap in depressive symptoms between individuals with a wealthy family background and those with a poor family background becomes smaller with age. Thus, a prosperous family background helps overcoming the negative consequences of low education in (late) midlife, but this buffering effect decreases as individuals age.

For individuals coming from a poor family background (one standard deviation below average), the gap in depressive symptoms between high levels of education (ISCED level 5) and low levels of education (ISCED level 1) is stable across age. Finally, comparing individuals from a well-off family background (one standard deviation above average), the educational gap in depressive symptoms becomes larger with age.

Discussion

Family background and personal education are important factors for health in later life. The significant interaction between family background and education has two sides: On the upside, higher education helps overcoming the negative consequences of a poor family background. The more years of education one accomplishes, the weaker the impact of family background on mental well-being becomes. Additionally, the results show that persons with a poor family background benefit most from high education. These results are in line with other studies (e.g. Brand & Xie, 2010; Schafer et al., 2013), which find the highest returns to

college education for those who are least likely to obtain college education (i.e. those with a poor family background during childhood)[3].

But there is also a downside: since people from poor families are less likely to attain higher educational levels, they lack exactly the resource they need in order to overcome the negative consequences their non-prosperous background has on depressive symptoms. Thus, low family background and low personal education amplify each other. But is this association constant across age?

The results suggest that the moderating effect of education in the association between family background and depressive symptoms as stated in the theory of resource substitution and structural amplification persists: throughout the later life course low educated individuals originating from a poor family background show the highest levels of depressive symptoms. This educational gap in depression compared to individuals who attained high educational levels remains constant. At the same time, high education buffers the negative consequences of a poor family background: across the later life course, there is no difference in psychological well-being between high educated individuals with a low childhood SES and high educated individuals with a high childhood SES. Thus, contrasting persons with low levels of education coming from a disadvantaged family background with other persons who attained high educational levels (regardless of background) cautiously supports the theory of persistent inequalities.

However, among the low educated, the impact of family background diminishes with age, which supports aspects of the age-as-leveler hypothesis. Low educated individuals with a well-off family background show the steepest increase in the number of depressive symptoms

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[3] However, one must not neglect the possible role "exceptional resilience". As Schafer et al. state: "In contrast, people with very low college completion propensities that defy their statistical odds may represent individuals of unusual resilience possessing a disproportional reserve of valuable personal traits. These characteristics, in turn, should manifest in better health and lower susceptibility to disease and death over the life course." (Schafer et al., 2013, p. 1026). Hence, it might not be high education, which leads to the same low levels of depressive symptoms among those with a low family background compared to those with a well-off family background. Other (character) traits may be responsible for this observed pattern.

in later life. While their number of depressive symptoms equals those of the high educated during midlife, they end up with the same high number of depressive symptoms as the low educated who originate from a disadvantaged family background.

At the same time the results indicate that the cumulative (dis-)advantage theory regarding education is valid: individuals from well-off family background show diverging educational gaps in depressive symptoms.

These results add to the lively debate on the age-dependent effect of socioeconomic status on (psychological) health and suggest that all three approaches – cumulative (dis-)advantage, age-as-leveler, persistent inequalities - might apply, depending on which social groups are compared as well as which aspect of socio-economic status is examined.

This study has several limitations. The moderator model applied in this study gives a very basic overview only over the pathways of how family background and education influence health. A more specific analysis and more detailed examination of further moderators and mediators between family background, education and psychological health (such as childhood health for instance) is needed in order to fully understand how childhood circumstances and educational attainment impact health in adulthood and later life. Moreover, a clearer distinction between associations and causal effects is necessary. This study only observes associations and it is possible that it is not family background per se but rather confounding factors, which drive the relationship between family background, education, and health.

Furthermore, this study is based on a cross-sectional data structure. This does not allow distinguishing between age effects and cohort effects. Since the educational systems underwent many reforms and changes and people who are considered old-aged nowadays experienced a very different educational system compared to people who will be considered old-aged in a few decades, separating cohort from age effects is important. Future studies should exploit the longitudinal dimension of the applied dataset or other datasets.

Selective mortality and selective survey attrition is not taken into account. Thus, the results may overestimate the persistent health inequality between high and low educated individuals from low parental background. The decline in the effect of childhood SES among the group of the low educated might be overestimated as well.

Future research should also elaborate whether role of education as a moderator between family background and health differs across the European context. Unfortunately, this is out of the scope of this study, but tentative analyses suggest some country differences. However, it is not clear yet, which factors account for these differences and which characteristics and qualities of the different welfare systems are most helpful to explain these differences. Thus, detailed analyses, which take into account expenditures on schooling and schooling reforms are needed to answer the question whether and why differences exist in the moderating effects of personal education in the association between family background and (mental) health across European countries.

This study has been carried out using data from persons who are nowadays 50 years or older and who finished school at least 30 years ago. But if the results can be translated into policy implications for younger generations, then one has to acknowledge that education policy is also health policy. This is in accordance with the conclusion of Ross & Mirowsky (2011), who state that efforts need to be taken to improve the situation of children with a non-prosperous family background. First, policy makers should address the health situation of those children, since health disadvantages accumulate and poor health in childhood leads to poorer health in adulthood. Second, policies are needed which promote intergenerational educational mobility in order to break the link between low socio-economic status in childhood and educational attainment, since education is a important moderating link that can suppress the health disadvantages in later life which are the result of socially disadvantaged family background.

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Tables

Table 1: Pooled sample characteristics (unweighted), N=20,999

	mean	standard deviation
number of depressive symptoms (EURO-D)	2.32	2.24
Life history explanatory variables		
education (ISCED-97)		
- ISCED-97 level 1	0.26	-
- ISCED-97 level 2	0.18	-
- ISCED-97 level 3	0.30	-
- ISCED-97 level 4	0.03	-
- ISCED-97 level 5	0.19	-
- ISCED-97 level 6	0.004	-
no education	0.04	-
number of book shelves[*]	2.09	1.20
skill level of main breadwinner[*]	2.03	0.75
number of rooms per capita[*]	0.80	0.52
number of facitilies[*]	1.99	1.76
family background (index, first principal component)	0.03	1.39
past episodes of financial hardship (yes/no)	0.29	-
ever unemployed (yes/no)	0.11	-
Contemporary explanatory variables		
ability to make ends meet (yes/no)	2.84	0.98
retired	0.58	-
unemployed	0.02	-
employed	0.24	-
disabled	0.03	-
homemaker	0.13	-
Control variables		
gender (1=female)	0.56	-
age (in years)	67.30	9.54
living with a spouse/partner (yes/no)	0.74	-
more than 2 chronic conditions (yes/no)	0.45	-

Notes: SHARE waves 1 to 4; own calculations
[*]uncentered

Table 2: OLS regression coefficients (standard errors); number of depressive symptoms regressed on family background (model 1), education (model 2), the interaction effect of family background and education (model 3), and effects of education (model 4); SHARE waves 1 to 4

	model 1 education	model 2 EURO-D	model 3 EURO-D	model 4 EURO-D
family background	0.411***	-0.041***	-0.130***	-0.114***
	(0.006))	(0.011)	(0.026)	(0.026)
education		-0.110***	-0.112***	-0.053***
		(0.011)	(0.011)	(0.011)
family background x education			0.029***	0.027***
			(0.007)	(0.007)
ability to make ends meet				-0.326***
				(0.018)
retired[a]				0.010
				(0.045)
unemployed[a]				0.344**
				(0.112)
disabled[a]				1.090***
				(0.101)
homemaker[a]				0.144*
				(0.060)
past eps. of financial hardship				0.308***
				(0.033)
ever unemployed				-0.023
				(0.046)
constant	3.716***	2.221***	2.214***	2.600***
	(0.055)	(0.104)	(0.104)	(0.116)
N	20,716	20,716	20,716	20,716
R-sq	0.153	0.157	0.157	0.187

Notes: Adjusted for gender, age, age squared, living with spouse/partner, chronic conditions, country, and wave; standard errors in parentheses
[a] reference category: employed
$^+$ p<0.10, * p<0.05, ** p<0.01, *** p<0.00

Table 3: OLS regression coefficients (standard errors); number of depressive symptoms regressed on family background, education, age, and age squared (model 1), the interaction between education and family background (model 2), the interaction between age and family background (model 3), the interaction between age and education (model 4), all three interaction terms (model 5), the threeway interaction between age, family background, and education (model 6); SHARE waves 1 to 4

	model 1 EURO-D	model 2 EURO-D	model 3 EURO-D	model 4 EURO-D	model 5 EURO-D	model 6 EURO-D
family background	-0.041***	-0.130***	-0.043+	-0.041***	-0.163***	-0.250***
	(0.011)	(0.026)	(0.022)	(0.011)	(0.036)	(0.057)
education	-0.110***	-0.112***	-0.110***	-0.059**	-0.063**	-0.068**
	(0.011)	(0.011)	(0.011)	(0.022)	(0.023)	(0.024)
age	-0.049***	-0.050***	-0.050***	-0.039***	-0.042***	-0.042***
	(0.006)	(0.006)	(0.006)	(0.007)	(0.008)	(0.008)
age squared	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
education x family background		0.029***			0.027***	0.055***
		(0.007)			(0.007)	(0.016)
age x family background			0.000		0.002+	0.007*
			(0.001)		(0.001)	(0.003)
age x education				-0.003**	-0.003*	-0.003*
				(0.001)	(0.001)	(0.001)
education x family background x age						-0.002*
						(0.001)
constant	2.221***	2.214***	2.222***	2.065***	2.086***	2.083***
	(0.104)	(0.104)	(0.105)	(0.122)	(0.123)	(0.123)
N	20,716	20,716	20,716	20,716	20,716	20,716
R-sq	0.157	0.157	0.157	0.157	0.158	0.158

Notes: age = (age in years − 50). Adjusted for gender, living with spouse/partner, chronic conditions, country, and wave; standard errors in parentheses
[+] $p<0.10$, [*] $p<0.05$, [**] $p<0.01$, [***] $p<0.001$

Figures

Figure 1: Depressive symptoms by family background at five levels of education (based on table 2, model 3)
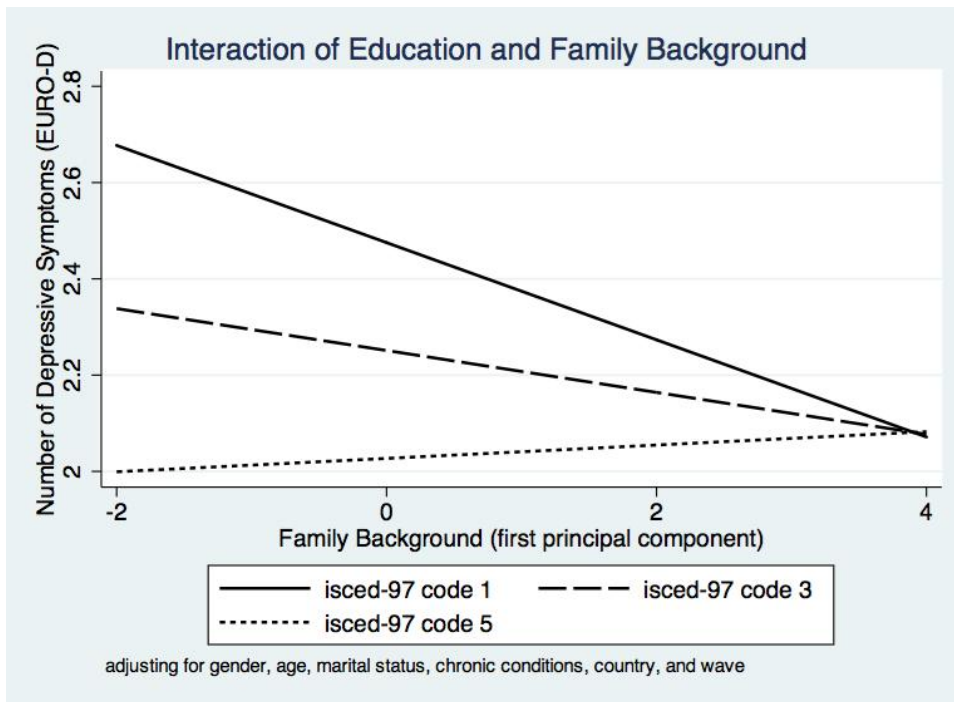

Figure 2: Depressive symptoms by age at five levels of family background (based on table 3, model 3)
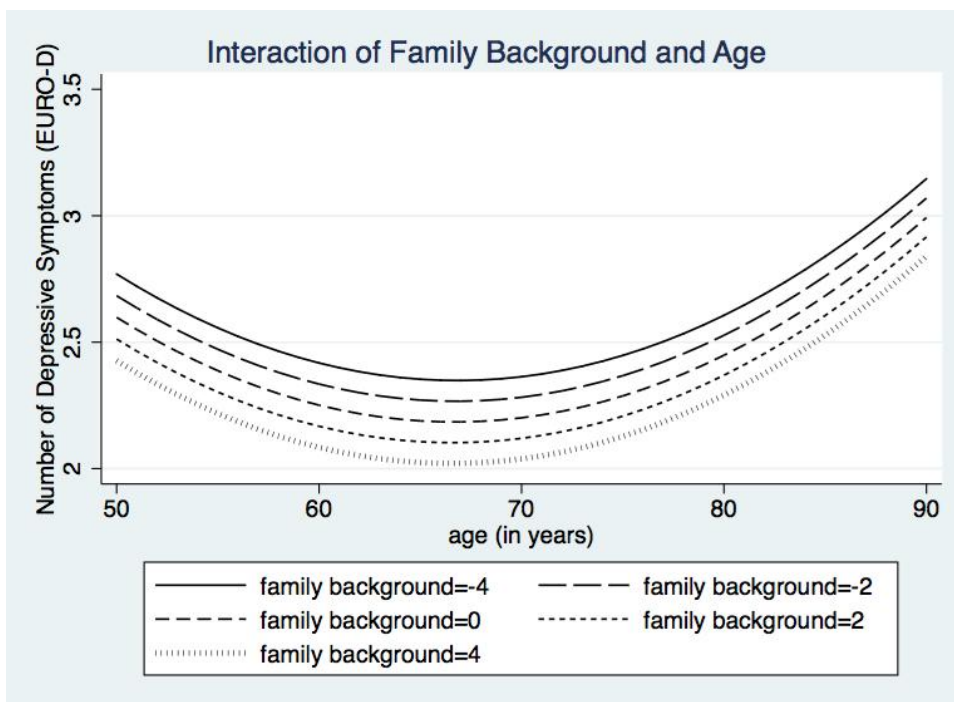
Figure 3: Depressive symptoms by age at five levels of education (based on table 3, model 4)
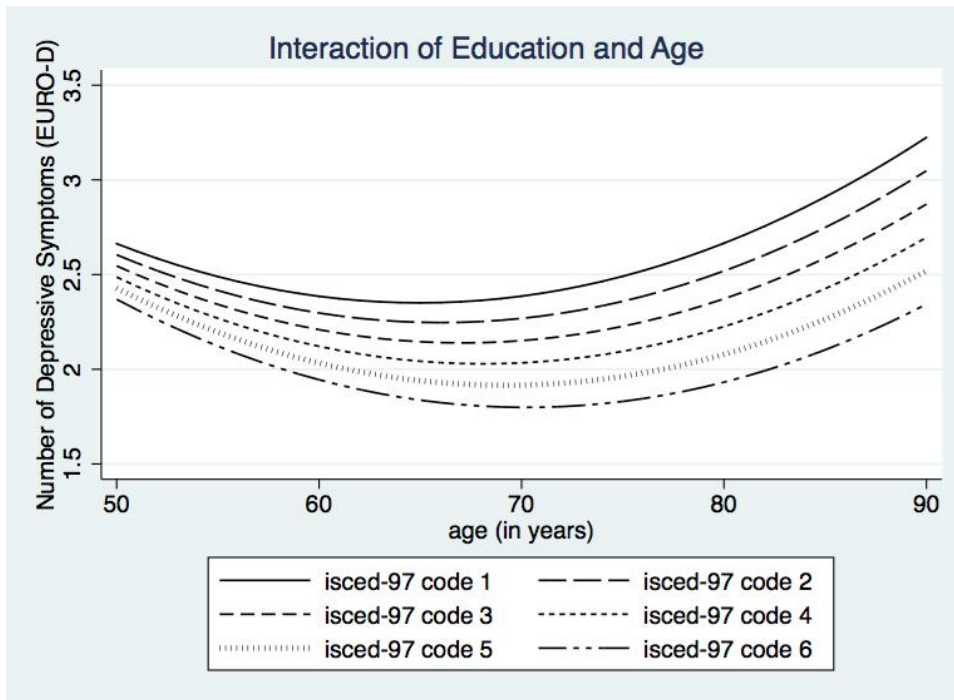

Figure 4: Depressive symptoms by family background, education, and age (based on table 3, model 6)