

# Long shadows of the past: The effect of childhood poverty on old age mental health

## Abstract

This paper investigates the effect of childhood poverty on mental health outcomes in old age and analyses potential mitigating effects of self-perceived poverty and educational attainment. Based on SHARE data it uses a potential outcome approach with entropy balancing to address non-random exposure to poverty as well as gender and welfare-regime specific differences. The study finds a significant and substantial effect of childhood material deprivation on severe depression in late adulthood, with women in all welfare regimes being especially vulnerable. Welfare regimes that are particularly family-centered and employment-based exacerbate these gender differences. Moreover, this paper indicates that higher secondary education and the self-perception of poverty partially mediate the link between childhood poverty and major depressions in late adulthood for certain subgroups. Based on these results, policies aimed at reducing the incidence of major depressions should be addressing the root causes of childhood poverty and provide sufficient and universal social protection measures.

**JEL:** I14, I32, J14, J16

**Keywords:** childhood poverty, mental health, depression, lifecourse

# 1 Introduction

Children, who experience poverty, often suffer from its long lasting effects, which become visible when they manifest in educational and economic outcomes later in life. Adverse consequences include below-average school performance, limited years of schooling, higher unemployment risk, poor job quality, and low income (e.g. Davenport et al., 2019; Engle et al., 2008; Duncan et al., 2010; Duncan et al., 2013). Also poor health as a consequence of poverty is gaining more and more attention from the scientific community. It is well documented that low socioeconomic status (SES) is associated with adverse physical health (e.g. Currie et al., 2002; R. Wilkinson et al., 2003; Mortensen et al., 2017; Terraneo, 2017; Currie, 2009; Mazzonna, 2014). However, the causal pathways behind this relationship remain unclear due to its bidirectional nature.

The role of poverty and the pathways that might lead to poor *mental health*, has historically not been considered a priority by economists and policymakers, even though rising prevalence rates of the most common disorders like depression and anxiety are a severe problem, especially in ageing societies (Ridley et al., 2020; Naderzadeh et al., 2022). Poor mental health affected approximately 84 million European residents or 17.3% of the population in 2018 (Morrissey et al., 2020). Depression and anxiety are among the most prevalent disorders, contributing significantly to disability, premature mortality, reduced quality of life and placing a considerable burden on healthcare systems (La Arias-de Torre et al., 2021). Among older adults in Europe, depressive disorders are particularly severe, with a prevalence rate of 29% in 2018 (Horackova et al., 2019). Therefore, understanding the factors contributing to depression in later adulthood is crucial for developing effective policy interventions.

Authors from several disciplines have established a bidirectional connection between *current* SES and mental health in different stages of the life course (Ridley et al., 2020). Current material deprivation has been correlated with poor physical and mental health, as well as overall quality of life among individuals aged over 50 years in Europe Terraneo (2017). Thomson et al. (2022) look into the causal impact of income changes on mental health for working-age adults and find (small) positive results, especially in the case where policy measures move individuals out of poverty. Moreover, Paskov et al. (2021) find that even though social status inequality is only moderately associated with income inequality, the prevalence of depressive disorders is significantly higher in countries with high status inequality.

Low family income also impacts children’s well-being and development, leading to lower cognitive skills and educational outcomes, due to a less secure attachment, warmth and attention by the parents, as well as stressful, harmful and chaotic home lives and community conditions Chaudry et al. (2016). Thus, early life and childhood poverty (CP) is found to strongly predict adolescent and young adult anxiety and depression Najman et al. (2010). Pryor et al. (2019) specify that children who grow up in financial unstable households have elevated psycho-social symptoms, especially externalising behaviours and stress in early adulthood. Furthermore, Wise (2016) finds strong evidence that CP in the US is one of the most important indicators of several health conditions, including mental health conditions in adulthood.

Despite extensive analysis of the relationship between current SES and the prevalence of mental health diseases, the role of economic disadvantage over the life cycle demands closer examination. Several authors suggest that health outcomes in (later) adulthood may not only be affected by the current SES but also by childhood circumstances (Lindström et al., 2014; Domènech-Abella et al., 2021; Kuh et al., 2003). A *life course framework* focuses on the premise that the role of early life circumstances on (mental) health later in life depends on the interaction of the individual with its environment and accounts for the potential accumulation of socioeconomic and behavioural exposures over time (Angelini et al., 2019). Thus, several authors have been analysing the association of CP and mental health in later adulthood, when the sum

of life time events reveal its full effects and found that self-reported CP is strongly correlated with old age depression, even after controlling for SES indicators and physical health in adulthood (Domènech-Abella et al., 2021; Verropoulou et al., 2021; Morrissey et al., 2020; Serafetinidou et al., 2019; Angelini et al., 2019; Darin-Mattsson et al., 2018). In addition, some have been able to identify potential mediating factors, like education, employment, poor health, stress and (later) adulthood SES Verropoulou et al. (2021), Darin-Mattsson et al. (2018), and Domènech-Abella et al. (2021). Moreover, Verropoulou et al. (2021) find significant gender differences regarding the importance of different childhood factors. Angelini et al. (2019) highlight that the effect of CP seems to be more pronounced for women, whereas the results of Serafetinidou et al. (2019) and Morrissey et al. (2020) indicate that CP plays a more severe role for men. These diverging findings show the importance of looking more closely on the underlying (lifetime) pathways by gender.

While CP has consistently been linked to adverse outcomes later in life, it is crucial to determine whether this association is truly causal, i.e. if poverty *per se* influences old age mental health. Furthermore, more clearly understanding potential mediating factors for men and women in different countries of welfare regimes (WRs) is essential to inform more effective policy measures. To address these issues, the paper asks the following research questions: What is the causal relationship between CP and mental health outcomes for men and women in different European welfare regimes? To what extent is this effect mediated by self-perception of poverty and educational attainment in different European welfare regimes?

Thus, this paper contributes to the existing literature by examining the *causal* relationship between CP and old age mental health for both women and men across different European welfare state regimes. CP is a complex issue that is often linked to parents' living circumstances, like the educational background, migration history or single parenthood, resulting in a non-random distribution of material deprivation. To address this issue, the study employs a potential outcome analysis and an entropy balancing procedure to estimate the average treatment effect on the treated (ATT) of CP, controlling for observed pre-treatment variables, thereby fulfilling the selection on observables assumption (Hainmueller, 2012). Material deprivation is operationalised as a household's inability to afford basic necessities and is measured through principal component analysis (PCA). Additionally, the analysis accounts for two potential mitigating factors (educational attainment and the self-perceived financial situation during childhood) using the Karlson-Holm-Breen (KHB) method.

The results highlight the significant and substantial effect of CP on severe depression in late adulthood, particularly among women who seem to be more vulnerable to this outcome than men in all WRs. Furthermore, the study reveals that the impact of CP on mental health outcomes is more pronounced in family-centered WRs and mitigated in countries with universal redistributive measures. Additionally, the analysis indicates that higher secondary education and self-perception of poverty partially mediate the relationship between CP and major depressions in late adulthood for certain subgroups. These findings underscore the complex and nuanced nature of the relationship between CP and later-life mental health, highlighting the importance of considering socio-economic and contextual factors when developing interventions to prevent or mitigate the negative effects of poverty on mental health outcomes.

## 2 Conceptual Framework

This chapter provides a conceptual framework for analysing the role of CP on mental health later in life. It will discuss the life course approach as a theoretical basis for the analysis and the importance of a gendered perspective in different WRs.

**Life course approach** The life course approach to chronic disease epidemiology developed by Ben-Shlomo (2002) provides a powerful framework for understanding the lasting effects of early-life experiences, such as CP, on later-life health outcomes. This approach recognises that health trajectories are shaped by several social, biological, and environmental factors that interact over time. This approach serves as framework for understanding the complex relationship between CP and mental health outcomes later in life. Growing up in poverty can lead to chronic stress, limited access to socioeconomic resources and opportunities that promote mental health (Kim et al., 2013). This paper distinguishes between two approaches that build on this life course approach: the critical period model and the pathway model. The *critical period model* suggests that certain periods in life are more susceptible to external circumstances and thus, exposure to adverse conditions has particularly strong (unfavourable) effects on health outcomes which are not modified in any (significant) way by later experiences or circumstances (Kuh et al., 2003). In contrast, the *pathway model* suggests that early-life effects are mediated by later lifetime circumstances as adverse childhood circumstances might lead to disadvantageous socioeconomic outcomes later in life and subsequently to poor mental health (Pudrovska et al., 2014; Verropoulou et al., 2021).

Figure 1 shows the hypothesised relationship between childhood material deprivation and severe depressive symptoms in later adulthood, as well as the possible influence of two factors that may mediate this relationship: the self-perceived financial situation of the family during (late) childhood and educational attainment<sup>1</sup>. Specifically, it might be the case that the (diverging) perception of the financial situation or achieving higher levels of education could potentially mitigate or offset the negative effects of childhood deprivation. This is important within the context of a pathway model, which suggests that these factors may influence the long-term outcome, but not necessarily within a critical period model.

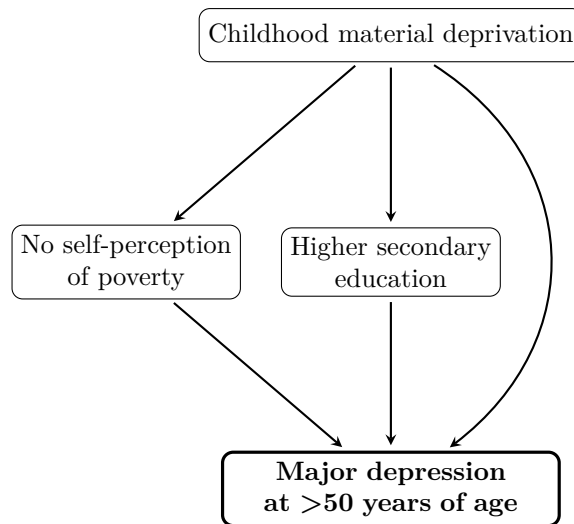


Figure 1: Potential mediating effects of the self-perceived childhood financial situation and education on the relationship between childhood material deprivation and severe depressive symptoms in adulthood

Education is known to play a crucial role in shaping life trajectories early on, and its impact on health is well-documented. Educational attainment is associated with mitigating socio-economic stressors due to better employment opportunities and job quality, higher income and wealth, as well as more favourable health behaviour, such as smoking, diet and social support (Raghupathi et al., 2020; Wu et al., 2020; Parker et al., 2020). Moreover, the self-perception of the family’s financial situation might influence the impact of CP on mental health (Stolz et al., 2017). Poverty is a multidimensional concept with more facets to it than only objective material deprivation (Chang et al., 2020; Posel et al., 2016), which

<sup>1</sup>Due to data restrictions material deprivation is measured at age 10 and self-perceived poverty is measured at age 15 (see chapter 4)

means that some individuals who are categorised as "poor" by objective poverty measures might classify themselves as "not poor" and vice versa. Hence, the self-perception of the individual economic situation might also include other dimensions of a family's living standard and several psychosocial factors such as social isolation, future prospects, commitments and opportunities, easy access to public services and social security systems or the degree of inequality within a society (Chang et al., 2020; Posel et al., 2016; Stolz et al., 2017). In societies with high levels of (economic) inequality, (all) individuals are assumed to experience higher levels of stress and status anxiety due to a more competitive environment and a more pronounced status distinction (Paskov et al., 2021; R. G. Wilkinson et al., 2006; R. Wilkinson et al., 2010)

**A gendered perspective** The development of depressive disorders is a complex interplay between various genetic, environmental and lifestyle factors (Salk et al., 2017). However, women exhibit a substantially higher prevalence of depressive disorders throughout life than men, possible due to hormonal and neurodevelopmental differences, personal traits as well as social norms that influence coping strategies for stressful and negative events, like internalising stress and negative emotions (Salk et al., 2017). In addition, girls are more prone to experience adverse circumstances in childhood and adult women experience more socioeconomic inequalities and inequities, especially on the labour market (Verropoulou et al., 2021; St Clair et al., 2015). Therefore, a gendered life course perspective is applied in this paper, acknowledging the limitations of binary gender classifications.

**The role of different welfare regimes (WR)** Comparative welfare state research, primarily coined by the work of Esping-Andersen (1990), offers a better understanding of how institutional settings produce different patterns of welfare and working conditions (van Kersbergen et al., 2014). WRs differ in their composition of major institutions that guarantee social security, enforce stratification systems and vary in their degree of decommodification (van Kersbergen et al., 2014). Even though this approach has been adjusted and criticised by many researchers, it remains a powerful framework for comparative social research. In addition, there has been a lively scientific discussion on further developing and expanding the WR typology of Esping-Andersen (1990). Additionally to the conservative and the social-democratic WR, the extensions of the post-communist regime by Cook (2007) and the Mediterranean type by Ferrera (1996) are of particular interest for this analysis.

The *conservative WR* is characterised by a strong emphasis on the premise that social rights are primarily earned based on the individual economic contribution to a society by employment, resulting in low decommodification. The family holds a central role, with women predominantly responsible for unpaid care work. Social assistance programs are limited, targeting the most vulnerable groups (van Kersbergen et al., 2014). In contrast, the *social-democratic regime* offers comprehensive welfare, high social protection, and equal distribution of economic resources. Social benefits and services, including education and healthcare, are generously provided (van Kersbergen et al., 2014). The *post-communist regime*, emerging in former communist countries which have been generally described by a high level of universalism, faced challenges of creating new social policy institutions during the market transition and the structural change accompanied by it. It features a weak welfare state, high stratification, and limited social protection (Kuitto, 2016; Szelenyi, 2011). The *Mediterranean regime* emphasizes family support and informal caregiving, with lower social spending and decommodification. Residual social assistance programs were developed later compared to other regimes (Luis Moreno, 2003; Ferrera, 1996).

### 3 Estimation Strategy

Although several papers addressed the association between childhood adversity and bad mental health later in life, there is only limited evidence if this relationship is causal. Thus, this paper uses a potential outcome approach by applying entropy balancing in order to address non-random treatment assignment. In addition, the potentially mediating role of self-perceived poverty and educational attainment is analysed using the KHB method.

#### 3.1 Potential Outcome Approach

This paper uses a potential outcome approach for causal inference in observational studies (Rubin, 1974). It follows the approach developed by Bellani et al. (2019), which use growing up in poverty as a treatment variable, where  $T_i = 1$  indicates a "treated" individual (growing up in poverty) and  $T_i = 0$  a "non-treated" individual (not growing up in poverty). For each individual  $i$ , a set of pre-treatment variables  $X_i$ , the value of the outcome variable associated with the treatment for a treated individual  $Y_{i,1}$  and for a non-treated individual  $Y_{i,0}$  is observed (Bellani et al., 2019). The following equation gives the formal definition of the average treatment on the treated (ATT) in a causal inference setting:

$$\tau(X) = E_{X_i|T_i=1}[E[Y_i(1)|T_i = 1, X_i]] - E_{X_i|T_i=1}[E[Y_i(0)|T_i = 1, X_i]] \quad (1)$$

However, in the context of CP it is not possible to conduct a randomised experiment due to ethical reasons. Thus, the causal effect of the treatment cannot be estimated without additional assumptions due to the problem of nonrandom treatment assignment. The selection on observables assumption posits that if all relevant observable characteristics are included in the analysis, then the selection into the treatment group is adequately controlled for. Bellani et al. (2019) assume that the assignment to treatment is unconfounded given a set of observable pre-treatment characteristics (e.g. parental education).

The probability of growing up in a poor household given a set of observable covariates  $X$  is denoted by  $p(X)$ . Rosenabum et al. (1983) demonstrate that if the potential outcome  $Y_{i,0}$  is independent of the treatment assignment, conditional on the covariates  $X$ , it is also independent conditional on  $p(X_i)$ . Instead of using a matching technique with propensity scores to increase similarity between treated and control group like Bellani et al. (2019) did, a reweighting technique called entropy balancing proposed by Hainmueller (2012) is used to address the problem of nonrandom treatment assignment. Entropy balancing adjusts the distribution of covariates between the treatment and control group to ensure balance in the means and higher order moments of the covariate distribution, which is achieved by minimising the distance between the empirical distribution of covariates in the treated group. The goal is to create a weighted sample that is representative of the target population, so that any difference in the outcome variable can be attributed to the treatment (Hainmueller, 2012). Entropy balancing focuses directly on balancing (pre-treatment) variables and is more effective in reducing covariate imbalance than propensity score methods.

Thus, for a given entropy balancing weight  $w_i$ , exposure to treatment can be considered random. The average effect of being poor on those exposed to poverty (ATT) can thus be estimated as follows (Bellani et al., 2019; Hainmueller, 2012):

$$\tau = E_{w_i|T_i=1}[E[Y_i(1)|T_i = 1, w_i] - E_{w_i|T_i=1}[E[Y_i(0)|T_i = 1, w_i]] \quad (2)$$

### 3.2 KHB Method

After estimating the ATT of CP on severe depressive symptoms later in life, the so-called Karlson-Holm-Breen (KHB) method proposed by Breen et al. (2013) and further developed by Breen et al. (2021) is used to identify the impact of two potentially mediating factors: education and self-perception of poverty. The KHB method is a decomposition method that separates the total effect of a treatment into direct and indirect effects, where the direct effect refers to the effect of the treatment on the outcome independent of the mediating variable(s), while the indirect effect is the effect of the treatment that operates through the mediator variable(s). The KHB-method allows to separate the impact of confounding from rescaling when comparing conditional and unconditional parameter estimates in case of nonlinear probability models such as the logit model (Breen et al., 2013). Comparing coefficients across logit models without and with potential mediating variables will reflect not only confounding and rescaling but also changes in the fit of the error to the assumed functional form. To obtain a decomposition of total effects into direct and indirect effects, the KHB-method allows to hold not only the scale constant but also the fit of the error to the assumed logistic distribution (Breen et al., 2013).

In this paper, a logit regression model for having severe depressive symptoms in later adulthood  $Y$  as a function of CP  $X$ , self-perceived poverty  $M_1$ , and education  $M_2$  is estimated using maximum likelihood estimation. The estimated coefficients are then used to calculate the predicted probabilities of  $Y = 1$  for each unit in the sample. The total effect of  $X$  on  $Y$  is decomposed into a direct effect and an indirect effect through each mediator variable separately using the R package "KHB". The KHB method offers a simple decomposition of the total effect, which is measured on the same scale:

$$\text{Direct effect: } \frac{\beta_{yxz}}{\sigma_e} \quad (3)$$

$$\text{Indirect effects } M_{1,2}: \frac{\beta_{yz_1,2x}\theta_{z_1,2x}}{\sigma_e} \quad (4)$$

$$\text{Total effect: } \frac{\beta_{yx}}{\sigma_e} = \frac{\beta_{yxz} + \beta_{yz_1x}\theta_{z_1x} + \beta_{yz_2x}\theta_{z_2x}}{\sigma_e} \quad (5)$$

where  $\beta_{yxz}$  is the coefficient of  $x$  in the reduced model,  $\beta_{yz_1,2x}$  are the coefficients of the mediators in the adjusted model,  $\theta_{z_1,2x}$  are the coefficients of  $x$  in the mediator regression models on  $X$ , and  $\sigma_e$  is the residual standard deviation of the adjusted model.

## 4 Data

The analysis is based on the Survey of Health, Ageing and Retirement in Europe (SHARE), which is a individual-level dataset that focuses only on persons who are aged 50 or older and their spouses. It includes regular waves on the current socioeconomic and health situation, as well as retrospective waves (SHARELIFE interviews). The latter offers valuable insights on various socioeconomic and health-related circumstances during the respondent's childhood. Due to the panel-structure of SHARE, it is possible to

link current and retrospective information.

For this analysis, information on the current mental health situation as well as retrospective information on the economic situation during childhood and on various pre-treatment indicators on the socioeconomic circumstances of the respondent's parents is needed. This latter information is taken from the SHARE-LIFE interview of Wave 7 (2017), whereas information on demographic variables and the current health situation comes from other waves (2004-2020). Thus all individuals, who did not or only participate in the SHARELIFE interview of Wave 7 are excluded. In addition, some countries are excluded from the analysis due to a high number of missing values, especially those who only recently started participating in the SHARE interviews. This leads to a final sample of 32.264 observations in the following 15 countries which have been categorised according to the WRs described in section 2:

- (1) **Conservative:** Austria, Germany, France, Switzerland and Belgium
- (2) **Mediterranean:** Italy, Spain, Greece
- (3) **Post-communist:** Czech, Slovenia, Croatia, Estonia
- (4) **Social-democratic:** Denmark, Sweden, Luxembourg

Table 2 in the appendix shows the mean values of the relevant variables by WR and gender, as well as the number of observations. Below the main variables of interest shall be briefly outlined in more detail.

*Major depression:* Mental health in later adulthood is analysed by the EURO-D scale, which is a widely used, self-administered screening instrument developed for non-psychotic mental illnesses, typically depressions and anxiety (Maskileyson et al., 2021). The score of the EURO-D scale ranges from 0 to 12 and a higher score indicates a higher degree of depression based on the number of depressive symptoms present. According to Guerra et al. (2015) the cut-off score for the identification of major depression is at a score of four or above. Thus, a binary variable is created indicating if an individual reports severe depressive symptoms according to the EURO-D scale or not.

*Childhood poverty (CP):* Material deprivation at age 10 is measured by an index constructed by principal component analysis (PCA) based on self-reported information on the number of rooms, the sum of basic accommodation features (fixed bath, cold running water, hot running water, inside toilet and central heating) and the number of books in the household at age 10. According to Kaiser's rule, only the scores of the first principal component with a value greater than one are used to divide the scores into quartiles (Bartholomew, 2010). Subsequently, a binary indicator for CP is created that equals one for individuals in the highest quartile and zero otherwise.

*Self-perceived poverty:* The SHARELIFE interview includes a question, where respondents are directly asked to assess the financial situation of their family at age 15, which is used to create a binary variable, that indicates if an individual perceived his or her family as poor, when she or he was 15 years old. On average, 75% of the respondents indicated the same assessment as the poverty indicator constructed by PCA.

*Educational attainment:* In order to analyse the potentially mediating role of education another binary variable is created based on the International Standard Classification of Education (ISCED). It takes the value 1 if an individual completed at least higher secondary education (ISCED level of 3 or above). Table 2 in the appendix shows that between 70% and 85% obtained an upper secondary educational degree, with the exception of individuals living in the Mediterranean WR, where only a little more than 30% completed upper secondary education. This might be due to the on average very low duration of compulsory education at the beginning of the 20th century in these countries (Garrouste, 2010).



*Pre-treatment variables:* To address the problem of non-random treatment assignment, the following variables have been considered for the entropy balancing procedure: the respondent’s year and location of birth, the respondent’s parents’ location of birth, educational attainment (more than primary education) and home-ownership, single parenthood and number of people living in the same household at age ten. The location of birth variables have been categorized according to whether they were born in the same country as they have been living in (LOC), if they were born in another EU country (EU) or if they were born in a non-member state of the EU (OTH).

## 5 Results

In this section, the results of the entropy balancing procedure, the potential outcome approach and the KHB-decomposition are displayed and discussed by WR and gender in order to analyse if CP has a causal effect on mental health outcomes in later life and to what extent the effect is mediated by the self-perception of poverty and educational attainment.

### 5.1 Entropy Balancing

Figure 2 shows the share of individuals with severe depressive symptoms for the treatment and control group for the unbalanced sample, as well as the balanced sample. First of all, we see that the share of women who report major depressions in later adulthood is higher than for men across all WRs. Moreover, the descriptive analysis reveals some substantial differences between individuals who grew up in poverty to those who did not, with the exception of men who are living in countries that belong to the social-democratic WR. The highest values are observed for Mediterranean and post-communist women who experienced material deprivation at age 10, where more than 40% of women reported major depressive symptoms, followed by those from the conservative WR (37.6%). Women in social-democratic WRs reported with 32% less often severe depressive symptoms but still a higher proportion than men in all other WRs. There are several explanations why women suffer more often from mental health difficulties in adulthood like hormonal and neurodevelopmental differences, personal characteristics and social norms that shape the life courses of women and men differently (Salk et al., 2017).

Figure 2 also shows that the difference between the treatment group and the control group is substantially reduced if the sample is adjusted for the pre-treatment variables.<sup>2</sup> However, there remain some substantial differences for most of the analysed subsamples, even after the balancing-procedure has been applied.

### 5.2 Average treatment effect on the treated (ATT)

This subsection reports the results of the potential outcome analysis based on the balanced dataset obtained by entropy balancing discussed in the previous section.

Figure 3 shows the percentage increase in the likelihood of developing severe depressive symptoms in late adulthood due to CP. After the entropy balancing procedure, exposure to treatment can be considered random (given the observed pre-treatment covariates), as poor and non-poor children should be on average equivalent (Bellani et al., 2019). In other words, figure 3 displays the average effect of poverty (treatment) on those exposed to material deprivation during childhood (the ATT). The results indicate a highly significant and substantial relationship between CP and severe depressions in later adulthood

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<sup>2</sup>See figure 5 in the appendix for the plots of the unbalanced and balanced covariates after applying the entropy balancing method (Hainmueller, 2012).

Figure 2: Share of individuals with severe depressive symptoms before and after entropy balancing

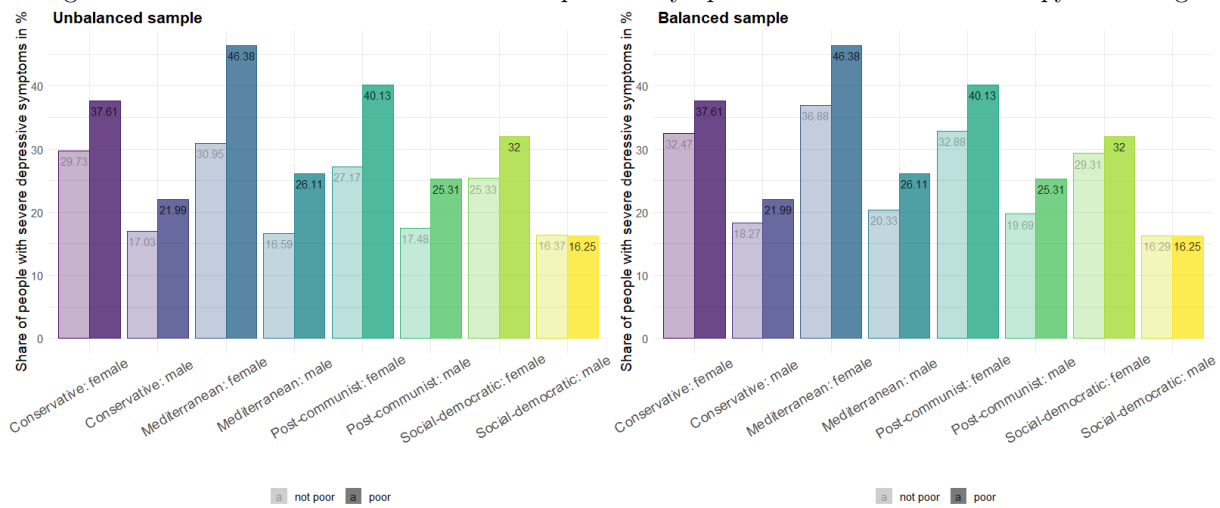
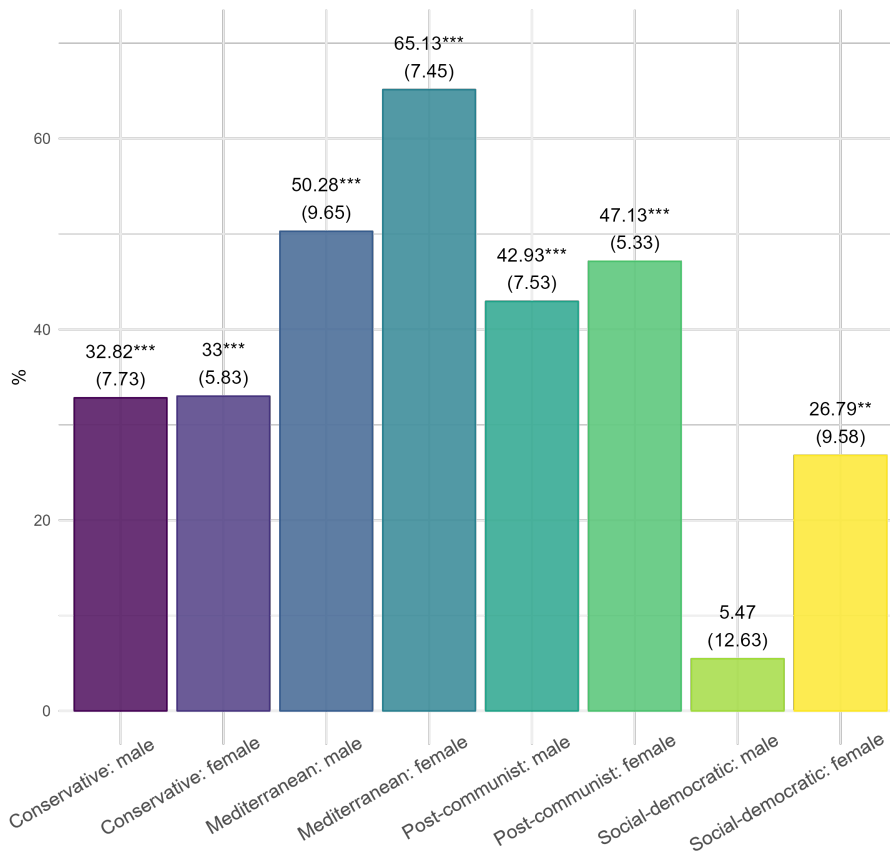


Figure 3: Percentage increase in likelihood of developing severe depression in late adulthood due to childhood material deprivation



Note: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

across most WRs. Women living in the Mediterranean WR show the highest ATT of 65.13%, i.e. they have a 65.13% higher probability to develop severe depressive symptoms in later adulthood compared to women in the same WR who did not experience poverty during childhood. Men who live in a country belonging to the Mediterranean WR also report a quite high ATT of 50.28%. This might be due to the poorly developed social assistance programs, that were only enrolled in the 1960s and 1970s (Luis Moreno, 2003). In addition, the gendered difference is particularly high compared to other WRs. A possible

explanation might be that countries that belong to the Mediterranean WR tend to be especially family-centered. The subordinate role that these states play in enabling female labour marked participation might enforce these gender differences due to underdeveloped family policies and missing welfare services, leading to potential psychosocial stressors, such as economic dependence and a low socioeconomic position in adulthood (Chung et al., 2013; Orloff, 1993).

Also women and men in post-communist WRs who experienced material deprivation during childhood have with 47.13% and 42.93% a substantially higher probability of experiencing major depressions in later adulthood than the the respective control groups. In the last three decades, the countries belonging to this WR have also been characterised by a weak welfare state and restrictive social policies (Kuitto, 2016; Chung et al., 2013). However, during the communist regime and the disintegration of the Soviet Union the living standard was relatively low and the social protection situation was very fragmented. Women and men residing in conservative WRs show an ATT of around 33%. The countries belonging to the conservative WR have a long history of social protection measures that have evolved over time, beginning in the late 19th and early 20th century. Even though social rights and thus welfare policies are primarily earned by employment, the existing redistributive and protective measures, such as unemployment benefits and (mandatory) health insurance might have mitigated the effect of CP at least partially.

Women in social-democratic WRs show an ATT of 26.79%, while the results from the potential outcome analysis reveal no significant relationship between CP and old age depression for men in social-democratic WRs. These countries have a long history of social protection measures aimed at counteracting market inequalities through universal, non-means tested social policies, which can reduce access barriers and social stigma, potentially explaining the lack of a significant effect on men in social-democratic WRs (Chung et al., 2013). However, the results indicate a substantial impact on women, suggesting that these policies may be less effective for women. This gender-specific vulnerability could be due to a variety of factors, such as gender discrimination in education, employment, and wages, as well as differences in caregiving responsibilities or coping strategies for stress and negative emotions (Salk et al., 2017). Further research is needed to fully understand the underlying mechanisms of gender-specific effects of CP on mental health in different sociodemographic contexts.

### 5.3 KHB decomposition

This section examines the potential mediating effects of an individual's self-perception of their family's financial situation during childhood and the role of educational attainment in the development of severe depression. The analysis is based on results obtained by the KHB-approach, as described in section 3.2. To investigate the mediating role of self-perceived poverty in the development of severe depression, a binary variable is constructed, indicating whether an individual reported not being poor at age 15, despite having experienced material deprivation at age 10 (as determined by the indicator constructed by PCA). Additionally, to analyze the impact of educational attainment, a binary variable indicating whether the individual has a higher secondary educational degree is also included in the full model.

Table 1 presents the results of the KHB decomposition, expressed as average marginal effects of CP (in %) for both the adjusted base model and the full model, which includes the mediating effects of self-perceived non-poverty and attaining (at least) higher secondary education, by WR and gender. The table also shows the difference between these two models in percentage points. For the full regression results, please refer to tables 3 and 4 in the appendix.

The results of table 1 indicate that the mitigating effects of the two included mediating factors are more

Table 1: Results KHB decomposition: Effect of childhood material deprivation on severe depressive symptoms in late adulthood

	Probability	Std. Error
Conservative: male		
MD: base model (%)	32.82***	(7.73)
MD: full model (%)	19.11*	(8.07)
Diff (%P)	11.51***	(3.08)
Mediterranean: male		
MD: base model (%)	50.28***	(9.65)
MD: full model (%)	21.39*	(9.86)
Diff (%P)	23.8***	(3.87)
Post-communist: male		
MD: base model (%)	42.93***	(7.53)
MD: full model (%)	29.24***	(7.73)
Diff (%P)	10.59***	(2.46)
Social-democratic: male		
MD: base model (%)	5.47	(12.63)
MD: full model (%)	-11.1	(13.46)
Diff (%P)	18.65**	(6.09)
Conservative: female		
MD: base model (%)	33***	(5.83)
MD: full model (%)	7.81	(6.21)
Diff (%P)	23.36***	(2.85)
Mediterranean: female		
MD: base model (%)	65.13***	(7.45)
MD: full model (%)	30.63***	(7.57)
Diff (%P)	26.41***	(3.72)
Post-communist: female		
MD: base model (%)	47.13***	(5.33)
MD: full model (%)	16.74**	(5.49)
Diff (%P)	26.03***	(2.27)
Social-democratic: female		
MD: base model (%)	26.79**	(9.58)
MD: full model (%)	-8.21	(10.28)
Diff (%P)	38.13***	(6.07)

Notes: \* p<0.1, \*\* p<0.05, \*\*\* p<0.01; MD=Material Deprivation; Mediating factors: Self-perceived poverty and higher secondary education

important for women than for men in every WR. For women in Mediterranean and post-communist WRs, the effect of childhood material deprivation on severe depression in later adulthood decreases by 26 percentage points, while the mediating effect is similarly high for females in the conservative WR, with a difference of 23 percentage points. The reduction for women in social-democratic WRs amounts to 38 percentage points, indicating full mediation due to a non-significant coefficient for CP in the full model. In contrast, the reduction in the probability of severe depression due to childhood material deprivation only amounts to 11 percentage points for men in conservative and post-communist WRs. Solely men in Mediterranean WRs show a quite high reduction (24 percentage points) in the probability of having major depressive symptoms in late adulthood. The significant coefficients of CP in the full model indicate that either CP or factors that are influenced by it still play a significant role for developing severe depressive symptoms over the life cycle, even if educational attainment and the self-perception of poverty is accounted for.

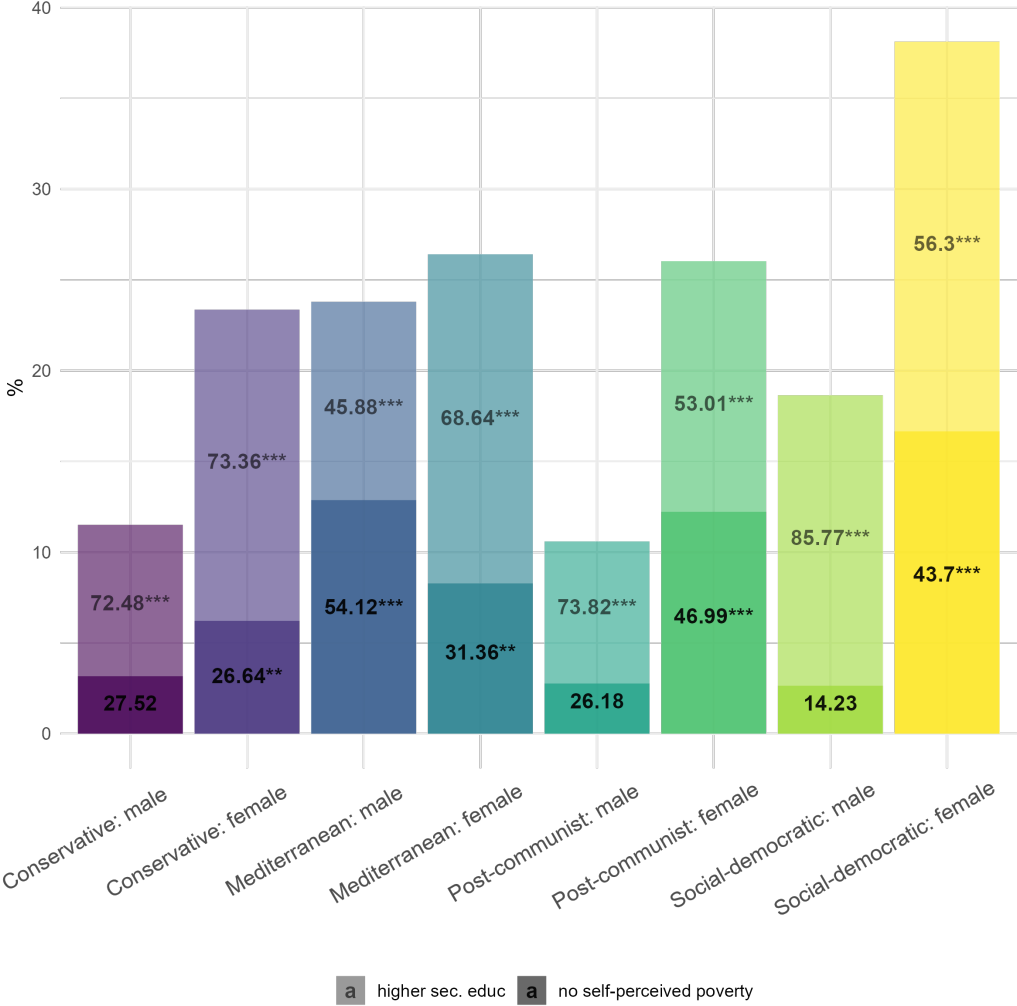
Furthermore, figure 4 graphically displays the difference in the probability of experiencing severe depression in later adulthood between the base model and the full model. The values within the bars indicate the proportion of the two mediating factors (having at least a higher secondary educational degree and having no self-perception of poverty) and their statistical significance. Overall, education appears to be more important than perceiving oneself as not poor for mental health preservation later in life, as it accounts for over 50% in most WRs (with the exception of men living in Mediterranean WRs) and seems to have a significant effect for all analysed groups. This result is in favour of the pathway-model, as this approach assumes that adverse early-life circumstances can be influenced by later life circumstances. Moreover, the findings suggest that missing self-perception of poverty only has a significant mediating effect for women in all WRs, with the only exception being men in Mediterranean WRs. For those individuals (which are primarily female) the self-perception of one's economic situation, or the relative position to others, may be more important in the development of severe depressive symptoms, due to several psychosocial factors, such as social isolation or future prospects (Chang et al., 2020; Posel et al., 2016). However, for all other (male) individuals in the treatment group, a missing self-perception of poverty seems not to play a significant mediating role. One explanation might be a different perception or reporting patterns of poverty by gender.

## 6 Conclusion

Poor mental health is a growing concern, particularly among ageing societies and depressive disorders are a significant contributor to this issue. Recent studies have demonstrated that the effects of CP may persist into old age, with detrimental impacts on both socioeconomic and health outcomes, but little is known about the specific pathways that lead to major depressive symptoms in later adulthood. Following a life course approach, this study aims at contributing to the scientific literature by analysing if poverty *per se* causes poor old age mental health. For this purpose a potential outcome approach is applied by using entropy balancing on distinct sub-samples, thereby addressing gender and welfare-regime specific differences. Moreover, the KHB method is applied to the balanced data set in order to analyse if a missing self-perception of poverty during childhood and educational attainment can mitigate the effect of CP on major depressive symptoms in later adulthood.

The potential outcome analysis reveals a highly significant and substantial effect of childhood material deprivation on the likelihood of severe depression in late adulthood. Moreover, substantial gender differences are observed, with women in all WRs showing a higher probability of developing severe depressive symptoms due to CP compared to men. These gender-specific vulnerabilities could be explained by sev-

Figure 4: Mediated share of the probability of severe depression due to childhood material deprivation by self-perceived mental health and higher secondary education



Notes: The bars display the difference in the ATT between the base model and the full model. The values within the bars indicate the proportion of the two mediating factors and their statistical significance.  
 $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

eral factors such as gender discrimination in educational and employment opportunities, multiple burdens due to care responsibilities and different coping strategies with negative stressors, such as internalising negative emotions (Salk et al., 2017). It was found that these gender differences may be reinforced by WRs that are particularly family-centered and where protective welfare measures are primarily based on the premise of employment. Furthermore, significantly higher ATTs are found for individuals living in countries belonging to the Mediterranean and post-communist WRs, especially compared to those of the social-democratic WR. A possible explanation could be the existence of universal, non-means-tested redistributive measures, which might mitigate the impact of CP on mental health outcomes. The results from the KHB decomposition reveal that higher secondary education significantly reduces the impact of CP on major depressions in late adulthood, thereby providing support for the pathway model. This suggests that adverse early-life circumstances might be at least partially mediated by later life trajectories. Further research is needed on the distinct life circumstances that lead to a preservation of mental health, besides educational attainment, in order to identify effective intervention points over the life cycle. Perceiving the family’s financial situation as “not poor” only plays a significant role for women across all WRs and men from the Mediterranean regime. These (gender-)differences might also be an interesting

topic for future research.

Some limitations should be considered when interpreting the results of this paper. The self-perception of poverty is assessed at a later age (15 years) than the variables used to construct the indicator by PCA (10 years). This means that it is not possible to distinguish between a different perception of the family's financial situation or an actual change thereof, e.g. due to a new job. Moreover, the EURO-D scale does rely on self-reporting and might thus be biased due to cultural differences. However, Maskileyson et al. (2021) examined measurement equivalence of self-reported depressive symptoms among older individuals for 17 countries using SHARE data and found that it is possible to draw valid conclusions from cross-national comparisons using the EURO-D scale. In addition, it is not known at what point in life the onset of depressive symptoms began or if there are any genetic predispositions, which might influence the results of this analysis. Moreover, retrospective information, especially on childhood circumstances, may be subject to misreporting. However, the SHARE data aims at mitigating recall bias by addressing significant life events to make the answers more consistent. This so-called life history approach has proven to be a reliable method to assess information over a long time span (Börsch-Supan et al., 2013).

Despite these limitations, the present study sheds some light on the long-lasting shadow of CP. Based on the results, policies aimed at reducing the incidence of major depressions should consider implementing policies that address the root causes of childhood poverty and provide sufficient and universal social protection measures. Additionally, educational policies that aim at making the educational system more accessible for disadvantaged children and thus enhancing equality of opportunity might mitigate the impact of adverse childhood experiences. Finally, policymakers should consider gender-sensitive policies that address the distinct needs and vulnerabilities of women, especially in WRs that are particularly family-centered.

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# Appendix

Figure 5: Covariate balance after entropy balancing by welfare regime (WR) and gender

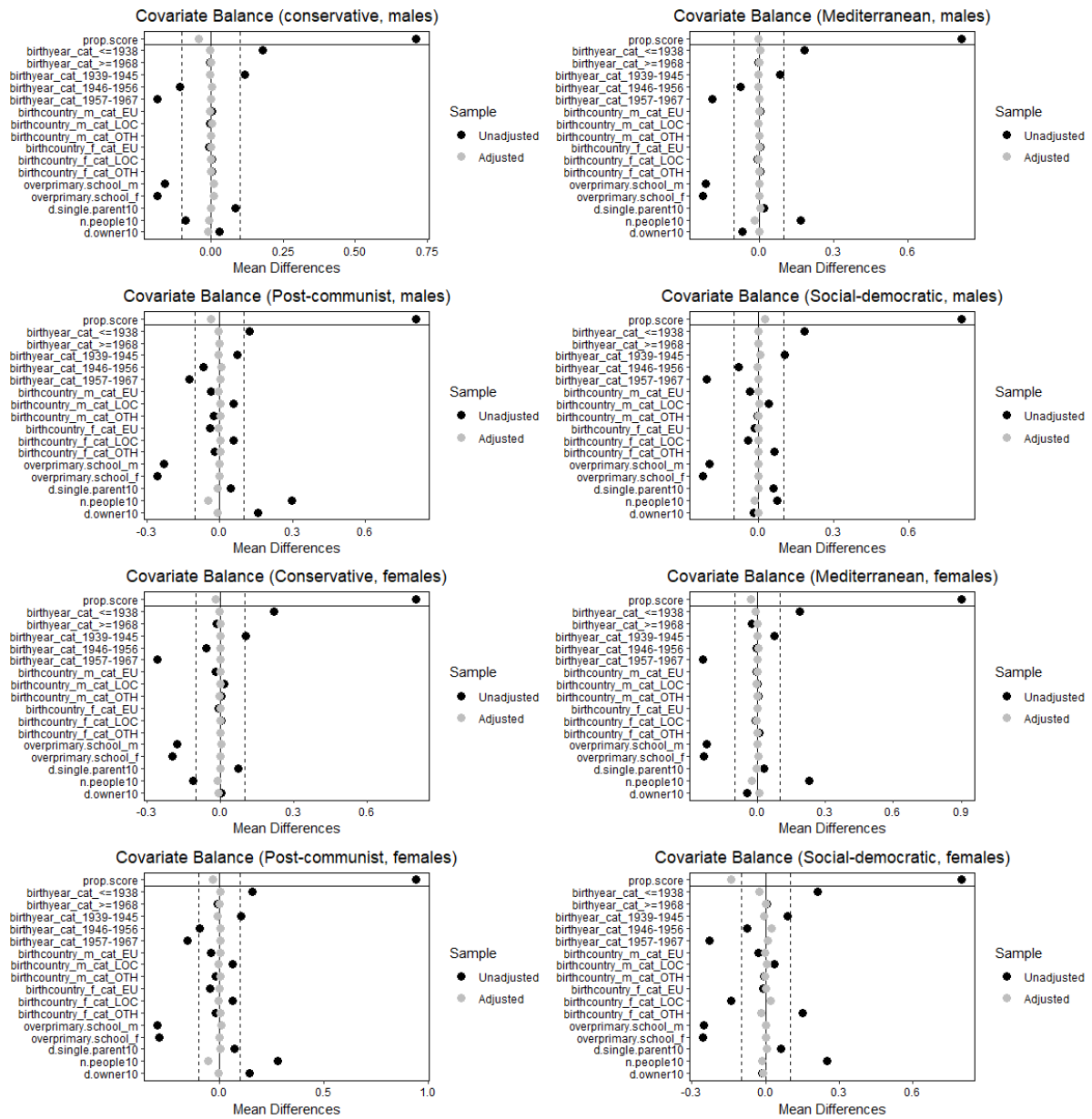


Table 2: Mean values of main variables by welfare regime and gender

	Conservative		Mediterranean		Post-communist		Social-democratic	
	female	male	female	male	female	male	female	male
severe depression	0.31	0.18	0.35	0.19	0.33	0.21	0.26	0.16
EURO-D	2.65	1.86	2.89	1.93	2.76	2.05	2.36	1.75
self-perceived: poor at 15	0.18	0.20	0.26	0.25	0.29	0.29	0.11	0.13
PCA: poor at 10	0.14	0.15	0.27	0.28	0.43	0.42	0.07	0.08
self-perceived = PCA	0.80	0.79	0.74	0.73	0.67	0.66	0.88	0.86
educ: upper secondary	0.76	0.84	0.30	0.34	0.67	0.75	0.72	0.76
n. acc. features at 10	2.85	2.81	2.40	2.28	1.53	1.56	3.58	3.51
n. of rooms at 10	4.29	4.30	3.35	3.31	2.48	2.50	4.41	4.36
n. of books at 10: 0-10	0.30	0.31	0.51	0.54	0.36	0.38	0.18	0.18
n. of books at 10: 11-25	0.24	0.25	0.26	0.25	0.23	0.24	0.20	0.23
n. of books at 10: 26-100	0.27	0.27	0.16	0.15	0.24	0.24	0.34	0.33
n. of books at 10: 101-200	0.09	0.08	0.05	0.03	0.09	0.07	0.13	0.13
n. of books at 10: >200	0.10	0.09	0.03	0.02	0.07	0.07	0.15	0.12
year of birth	1949	1949	1949	1948	1948	1948	1950	1949
birthcountry: LOC	0.89	0.90	0.96	0.97	0.87	0.87	0.88	0.88
birthcountry: EU	0.07	0.06	0.01	0.01	0.02	0.02	0.10	0.10
birthcountry: OTH	0.04	0.03	0.03	0.02	0.11	0.10	0.03	0.02
birthcountry mother: LOC	0.92	0.92	0.98	0.98	0.86	0.86	0.94	0.94
birthcountry mother: EU	0.07	0.07	0.01	0.01	0.08	0.08	0.05	0.05
birthcountry mother: OTH	0.01	0.01	0.01	0.01	0.07	0.06	0.01	0.01
birthcountry father: LOC	0.92	0.93	0.98	0.98	0.85	0.86	0.92	0.93
birthcountry father: EU	0.07	0.06	0.01	0.01	0.08	0.08	0.02	0.02
birthcountry father: OTH	0.01	0.01	0.01	0.01	0.07	0.06	0.06	0.05
educ. mother: >primary	0.62	0.60	0.27	0.26	0.44	0.43	0.27	0.22
educ. father: >primary	0.66	0.66	0.32	0.32	0.55	0.56	0.28	0.27
single parent at 10	0.08	0.08	0.04	0.04	0.11	0.10	0.06	0.06
n. people in acc. at 10	6.36	6.33	6.54	6.53	6.22	6.13	6.02	5.98
parents owned acc. at 10	0.47	0.48	0.66	0.64	0.72	0.72	0.48	0.49
Number of Obs.	5650	4626	3484	2814	6692	4472	2402	2121

Note: n.=number, acc.=accomodation, PCA=principal component analysis, LOC=born in same country, EU=born in EU-country, OTH=born in other country

Table 3: KHB Decomposition: adjusted model

	Conservative		Mediterranean		Post-communist		Social-democratic	
	male	female	male	female	male	female	male	female
Intercept	-1.571*** (0.055)	-0.800*** (0.041)	-1.466*** (0.070)	-0.650*** (0.053)	-1.452*** (0.054)	-0.794*** (0.038)	-1.713*** (0.087)	-1.005*** (0.068)
Poor (10 y.)	0.284*** (0.074)	0.285*** (0.057)	0.407*** (0.092)	0.502*** (0.072)	0.357*** (0.073)	0.386*** (0.052)	0.053 (0.119)	0.237*** (0.092)
Obs.	4626	5650	2814	3484	4472	6692	2121	2402
Nulldeviance	1356	2022	1710	2520	4036	7620	284	437

\* p &lt; 0.1, \*\* p &lt; 0.05, \*\*\* p &lt; 0.01

Table 4: KHB Decomposition: full model

	Conservative		Mediterranean		Post-communist		Social-democratic	
	male	female	male	female	male	female	male	female
Intercept	-0.974*** (0.100)	-0.247*** (0.076)	-0.954*** (0.100)	-0.242*** (0.077)	-0.993*** (0.094)	-0.153*** (0.063)	-1.275*** (0.152)	-0.336*** (0.117)
Poor (10 y.)	0.175** (0.078)	0.075 (0.060)	0.194** (0.094)	0.267*** (0.073)	0.256*** (0.074)	0.155*** (0.053)	-0.118 (0.126)	-0.086 (0.098)
No self-perc. pov.	-0.091 (0.080)	-0.180*** (0.064)	-0.381*** (0.096)	-0.220*** (0.075)	-0.099 (0.077)	-0.379*** (0.054)	-0.072 (0.135)	-0.364*** (0.102)
High Educ	-0.606*** (0.080)	-0.498*** (0.058)	-0.497*** (0.117)	-0.605*** (0.102)	-0.460*** (0.076)	-0.404*** (0.053)	-0.476*** (0.121)	-0.451*** (0.093)
Obs.	4626	5650	2814	3484	4472	6692	2121	2402
Nulldeviance	1356	2022	1710	2520	4036	7620	284	437

\* p &lt; 0.1, \*\* p &lt; 0.05, \*\*\* p &lt; 0.01