

**Accepted refereed manuscript of: Mousteri V, Daly M & Delaney L  
(2018) The scarring effect of unemployment on psychological well-being across Europe, *Social Science Research*, 72, pp. 146-169. DOI:  
[10.1016/j.ssresearch.2018.01.007](https://doi.org/10.1016/j.ssresearch.2018.01.007)**

**© 2018, Elsevier. Licensed under the Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International  
<http://creativecommons.org/licenses/by-nc-nd/4.0/>**

# **The Scarring Effect of Unemployment on Psychological Well-Being across Europe**

Victoria Mousteri, Behavioural Science Centre, Stirling Management School, Stirling University

Michael Daly, Behavioural Science Centre, Stirling Management School, Stirling University

Liam Delaney, UCD Geary Institute, University College Dublin

## **Abstract**

Past unemployment may have a pervasive psychological impact that occurs across nations. We investigate the association between unemployment events across working life and subsequent psychological well-being across 14 European countries.

Additionally, we consider the influence of between-country differences in labour market institutions and conditions on the cross-country well-being effects of unemployment. Data detailing life-long employment trajectories and contemporary life conditions are drawn from the Survey of Health, Ageing and Retirement in Europe. The well-being impact of unemployment is modeled using linear, multi-level specifications. Each six-month spell of past unemployment is found to predict reduced quality of life and life satisfaction after the age of 50, having adjusted for a broad range of individual and country-specific covariates. In contrast, the impact of past unemployment on depression is explained by individual demographic factors. We identify the first **comparative long-term** evidence that unemployment welfare scarring may be a broad, international phenomenon.

**Keywords:** cross-country survey; life satisfaction; quality of life; depression; unemployment; psychological scarring

## 1. Introduction

In the aftermath of the Great Recession, the majority of the European countries experienced a series of economic adversities including a sharp rise in unemployment with potentially profound welfare consequences. Although the recession affected European countries in unique ways, most of them have experienced a persistent increase in unemployment (e.g. Blanchflower, 2015; Scarpetta et al., 2010). Evidently, the average unemployment rate of the member-states of the European Union reached the level of 10.2% in 2014, approximately 3% higher than its 2008 level.<sup>1</sup> Even though unemployment has recently started to move towards its pre-crisis levels, with the European average rate falling to 8.5% in 2016, it is important to understand how the accumulation of unemployment experiences may affect human welfare over prolonged periods.

Unemployment has been shown to adversely affect psychological well-being, predicting poor mental health and reduced life-satisfaction (e.g. Paul and Moser, 2009). Further, the harmful impacts of involuntary joblessness on well-being have been found to persist through time, remaining evident long after the spell has ended, a phenomenon known as *psychological scarring* (Clark et al., 2001). Reduced well-being is likely to have consequential downstream repercussions for later economic outcomes such as earnings and employment (Binder and Coad, 2010; De Neve and Oswald, 2012; Egan et al., 2016) as well as negative social consequences including social deprivation. Hence, understanding the general long-term effect of unemployment on future well-being is an important step forward in informing public

---

<sup>1</sup> While average unemployment rates are informative of the macro-economic trends prevailing in Europe, the increase in unemployment was not uniform across all countries. For instance, in the Euro area, the unemployment rate in 2014 was 4% higher compared to 2008. In some countries, such as Spain, Greece and Italy, the rise was more dramatic (i.e 18.7% in Greece, 13% in Spain, 6% in Italy). The relevant figures are retrieved from:  
[http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=une\\_rt\\_a&lang=en](http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=une_rt_a&lang=en)

debates and recommending policy measures to protect individuals from the long-run adverse welfare consequences of unemployment.

Thus far, existing research examining psychological scarring following unemployment, has chiefly relied on single-country panel and cohort studies limited to a small subset of European countries; mainly, Germany, Sweden and the UK (Daly and Delaney, 2013; Clark et al., 2001; Knabe and Rätzel, 2011; Strandh et al., 2014). It is, therefore, not currently known whether unemployment has long-run well-being influences that could occur across a broad range of social settings, or whether scarring is a unique context and potentially country-specific phenomenon. We contribute to prior work on the long-term psychological impact of unemployment by tackling this question directly. Using a sample of workers drawn from contemporaneous and retrospective waves of the Survey of Health, Ageing and Retirement in Europe (SHARE), we test whether past unemployment has long-term repercussions for psychological well-being in fourteen European countries; Germany, France, Belgium, Austria, Switzerland, Netherlands, Spain, Italy, Greece, Ireland, Sweden, Denmark, Poland and Czech Republic. Taking into consideration the structure of our sample, which consists of individual observations of labour market trajectories and life conditions nested within countries, we estimate linear multi-level models with mixed-effects techniques.

Further, we identify the influence of contextual variation in policies towards unemployment and prevailing labour market conditions on unemployment scarring across countries. Adjusting for differences in passive labour market policies and unemployment rates across the 14 sampled countries will reveal whether scarring is a phenomenon which occurs across countries, regardless of the specific institutional and socio-economic background where the unemployment events occur. Moreover, we test whether country-specific labour market policies and conditions can predict

differences in the magnitude of the scarring effect across countries. Finally, we extend the literature on the psychological impact of unemployment by shedding further light on the importance of unemployment as a determinant of various components of well-being. Particularly, we explore the effects of prolonged unemployment on cognitive evaluations of life, mental health and positive functioning, a concept which incorporates feelings, moods and sense of life meaning and purpose (Vanhouette, 2014).

## **2. Theoretical background and expectations**

Empirical evidence detailing the association between unemployment and well-being is unequivocal. Meta-analyses, summarizing the findings of numerous studies on the subject, indicate that being unemployed predicts substantial decrements in psychological well-being as long as the spell lasts (McKee-Ryan et al., 2005; Murphy and Athanasou, 1999; Paul and Moser, 2009). Moreover, numerous theories have been developed to explain the mechanisms driving the adverse psychological consequences of unemployment.

According to the latent deprivation theory (Jahoda, 1981;1982), employment serves universal psycho-social needs. Therefore, involuntary joblessness, defined as the absence of employment, is expected to have negative effects on well-being irrespective of the individual and country-specific settings where the unemployment events take place. On the contrary, alternative theoretical frameworks take into consideration the unique influence of individual perceptions and social factors on the well-being impact of unemployment. According to these theories, unemployment can be seen as a disruption to life-plans developed to validate individuals' social identities (Ezzy, 1993). Further, unemployment can be considered as depriving workers from resources, which are necessary to cover social needs and pursue socially defined goals

(Nordenmark and Strandh, 1999). The primary assumption of both theories is that the psychological impact of unemployment depends on how central employment is to workers' social identities.

Taken together, these theories suggest that the psychological consequences of unemployment depend on the extent to which joblessness interferes with the fulfilment of purposes pertaining to specific social identities. The formation of such identities is determined by cultural and social factors (Abrahams and Hogg, 1990) which are likely to vary across countries. Therefore, the psychological impact of unemployment is potentially influenced by the country-specific settings, where individuals' employment trajectories are shaped. Particularly, labour market conditions and welfare policies could affect the well-being impact of unemployment. For example, generous unemployment benefits reduce the financial impact of unemployment and prevent workers from having to take up insecure, unstable or low-quality jobs. Thus, unemployment insurance potentially mitigates the psychological harm caused by job loss, by protecting unemployed workers from financial strain and motivating them to think positive about the future. However, such passive labour market policies are not expected to fully offset the psychologically deleterious effects of unemployment, as they cannot substitute employment itself (e.g. Wulfgramm, 2014).

In summary, whilst unemployment is understood to be a detrimental experience, the magnitude of its effects on well-being potentially depends on the interaction between socio-economic stimuli and individual perceptions and self-concepts. Important international institutes point to the importance of unemployment as a determinant of psychological well-being across various Western economies. For instance, in OECD's reports and working papers, unemployment is identified as a major well-being component across member countries (see for example Fleche et al.,

2012; OECD, 2015). Therefore, we anticipate that despite the potential cross-country nuances in the psychological impact of unemployment, this impact will be negative both in the short- and the long-run in all examined countries.

### **3. Prior empirical research on the well-being scarring effect of unemployment**

#### **3.1 Evidence of long-term effects of unemployment on individual well-being**

A growing set of studies indicates that the psychological effects of unemployment may persist for years after the initial spell occurred. The key studies examining this topic are longitudinal and draw on panel samples of individuals living in a specific country and/or belonging to a specific birth cohort (Clark et al., 2001; Daly and Delaney, 2013; Knabe and Rätzel, 2011; Lucas et al., 2004; Strandh et al., 2014; Wadsworth et al., 1999). For example, Clark and colleagues (2001) use eleven consecutive waves from the German Socio-Economic Panel (GSOEP) to show that the longer the duration of past unemployment the lower the life satisfaction level respondents reported, even if they were currently employed. Utilising the same panel study, Knabe and Rätzel (2011) further explore the above relationship by showing that the scarring effect is driven by expectations of future unemployment among German workers. Particularly, they show that past unemployment triggers feelings of insecurity, which, in turn, may generate persistent psychological damage. Strandh et al. (2014) follow the 1965 birth cohort who lives in northern Sweden and show that multiple exposures to unemployment predict poor mental health in the long-term. Finally, Daly and Delaney (2013) strengthen this argument by finding the positive relationship between past unemployment and current psychological distress to persist even after controlling for childhood mental health, intelligence, and social background in the 1958 National Child Development Study cohort in the UK.

The studies discussed above attempt to address reverse causality and endogeneity issues; a common problem involved in well-being studies. Specifically, they aim to account for the possibility that the relationship between past unemployment and well-being later in life could be driven by poor mental health prior to labour market entry causing self-selection into prolonged unemployment. The longitudinal nature of the panel samples used in these studies allows for the implementation of various econometric techniques, which control for unobserved heterogeneity at the individual level, thus, enabling the observation of the path from past unemployment to future psychological well-being. Taken together, these studies provide support for the idea that experiencing unemployment throughout working life could detrimentally affect subsequent well-being years or even decades later.

However, past unemployment has only been shown to affect future subjective well-being in a limited number of countries; mainly, Germany, UK and Sweden. It is the goal of this paper to elucidate whether there is evidence for the presence of such long-run welfare scars resulting from prior unemployment across a range of European nations.

### 3.2 Cross-country evidence of unemployment scarring

To date, the literature on the cross-country scarring effects of unemployment has focused on the economic consequences of involuntary joblessness. Unemployment has been linked to various economic hardships in the long run, including reduced earnings and poorer occupational prospects and mobility, evident on a multinational scale (Brandt and Hank, 2014; Ekert-Jaffé and Terraz, 2011; Gangl, 2004; 2006). For example, Brandt and Hank (2014) find that past unemployment spells lasting at least six months are associated to increased risk of becoming unemployed after the age of 50, across eleven European countries participating in SHARE. Further, the authors

find that these permanent scars inflicted by unemployment are quite stable across the countries they examine.

Further, it has been shown that the generosity of the welfare state towards the unemployed, the wage-setting institutions, and employment protection can reduce the scars in a number of economic outcomes, such as occupational status and mobility, probability of future unemployment and engaging in unstable employment contracts and earnings (Ekert-Jaffé and Terraz, 2011; Gangl, 2004; 2006). Ekert-Jaffé and Terraz (2011) find that the financial consequences of unemployment are harsher in more flexible economies. Similarly, Gangl (2004; 2006) shows that the impact of unemployment on future earnings is moderated by generous benefit systems and strict employment protection legislation in a set of countries including USA and countries in northern, centre and southern Europe. Exploring various economic repercussions of unemployment, Gangl (2004) suggests that generous welfare-state transfers to the unemployed alleviate the adverse impact of unemployment on future labour market outcomes.

However, there has not been cross-national research on unemployment's potential well-being scarring effect as yet. The few studies that look into the psychological impact of unemployment across countries have examined the relationships between unemployment and individual well-being contemporarily using cross-sectional data (Gallie, 2000; Whelan and McGinnity, 2000; Wulfgramm, 2014). Wulfgramm (2014) identifies unemployment as a predictor of reduced life satisfaction in 21 Western countries. Further, the findings of the study indicate that low levels and short duration of unemployment benefits magnify the psychological harm caused by unemployment. Given that the moderating effect of unemployment benefits generosity remains active after adjusting for individual income, it is suggested that non-pecuniary mechanisms,

such as stigmatisation, potentially drive the observed influence of passive labour market policies on the psychological repercussions of being unemployed.

Building on evidence that the contemporary welfare effects of current unemployment are a broad, cross-country phenomenon (Wulfgramm, 2014), the objective of the present study is to explore the long-term effect of past unemployment on future well-being across a range of socio-economic settings. We draw on unique historical and contemporary data from SHARE to observe workers' unemployment experiences throughout working life and link these experiences to their contemporary well-being. Despite memory bias being a potential limitation, there is evidence to suggest that survey participants can reliably recall their childhood circumstances (Havari and Mazzona, 2011; Smith, 2009), unemployment histories (Dex and McCulloch, 1998) and past socio-economic conditions (Berney and Blane, 1997) and that this data can be used to explain later life events (Smith, 2009).

Further, we adjust for level and duration of benefit replacement rates, which reflect between-country differences in welfare provision for the unemployed. The inclusion of such covariates allows to test whether unemployment has a scarring effect across all countries irrespective of differences in labour market institutions. Additionally, we distinguish between different aspects of well-being (Steptoe et al., 2015; Vanhoutte, 2014) and examine cognitive evaluations of life, psychological distress, and quality of life measures. Finally, in order to isolate the link from past unemployment to contemporary well-being, we consider the influence of child characteristics and socio-economic factors, which could influence both labour market experiences and psychological well-being. Specifically, we adjust for indicators of childhood health, cognitive ability, and socio-economic background, which are unlikely to have been influenced by labour market experiences and have been shown to lead to low well-being and self-selection into unemployment (e.g. Currie, 2009; Haas, 2007).

## 4. Data and methods

### 4.1 Study sample

We use contemporaneous and retrospective data from the second and third wave of SHARE to examine the relationship between past unemployment and contemporary well-being. SHARE is a longitudinal, cross-country survey, following individuals close to retirement who lived in sampled households drawn from 20 European countries. All household members aged 50 and over, as well as their possibly younger partners, were interviewed using Computer Assisted Personal Interviews. Respondents were asked to document various aspects of their contemporary lives in consecutive waves, including evaluations of life quality and emotional health. Such data were collected between 2006 and 2007 in the context of the second SHARE wave (Börsch-Supan, 2017). The third wave of SHARE (Börsch-Supan, 2017), entitled SHARELIFE and conducted between 2008 and 2009, was retrospective and reported detailed information about the life histories of around 27,000 individuals who lived across 14 countries in Europe (Börsch-Supan et al., 2011; Börsch-Supan et al., 2013; Schröder, 2011). Respondents were interviewed, using the Life History Calendar approach, which facilitates accurate memory recollection. This extensive retrospective panel, which covers the lifelong employment trajectories of a large sample of participants, contains a very low share (1-2%) of missing observations (Brugiavini et al., 2013).

Despite SHARE being a longitudinal survey, the present study uses a sample drawn from the cross-section of a single survey wave and the retrospective SHARE wave which allows the observation of the largest shares of respondents and countries.<sup>2</sup>

---

<sup>2</sup> Since the first wave was launched, various changes have occurred in the structure of the SHARE waves, ranging from the selection of countries participating in the survey to the formulation of questionnaires and variables. Therefore, conducting a longitudinal analysis would require sacrificing valuable information regarding respondents' past trajectories in the labour market and their contemporary experiences and limiting the number of countries included in the sample. Instead, we

Variables regarding past unemployment experiences were constructed using SHARELIFE's retrospective micro-data on respondents' full employment trajectories spanning from the 1950s to the time of the survey. SHARELIFE was also used to create measures on socio-economic background and health during childhood. Indicators for contemporary unemployment experiences, psychological well-being measures and other demographic confounding factors were drawn from the second SHARE wave.

From the 25,341 participants of the original sample, 15,610 had either retired, reported that they had never been in paid employment or were permanently sick. As retirement has been identified as a life-changing event, which may remove concerns about future employment and/or compensate for the loss in subjective well-being of workers who have experienced unemployment in the past (Hetschko et al., 2014), we chose to focus on active populations and thus, exclude the retirees from the study sample. Further, respondents older than 75 years old were eliminated from the sample, as they were very close to retirement. One particular concern regarding the sample of non-retirees is that it may be selective. Prolonged unemployment might result in early retirement among older workers, depending on the specific regulations across countries and gender (Tatsiramos, 2010). Therefore, we may underestimate the scarring effect of past unemployment, as those who potentially suffered the most from unemployment scarring are likely to self-select into early retirement and thus, be excluded from the study sample. One possible way to observe whether past unemployment led to early retirement is to examine the association between age and accumulation of past unemployment spells in the pooled sample. A negative and substantial correlation between past unemployment and age would indicate that older workers with experiences of past unemployment might have chosen to retire and thus,

---

combined SHARELIFE with the second survey wave as this combination produced the sample with the largest number of both individual observations and number of countries.

are not represented in the study sample. The association between past unemployment and age in the pooled, cross-country sample was not found to be significant ( $\rho = -0.011$ ,  $p > 0.05$ ). Therefore, we can assume that the potentially selective nature of the group of non-retirees is not substantially related to their past unemployment experiences.

The final sample consisted of 9,464 participants, aged less than 75, who were active in the market at the time of the survey and who lived in 14 European countries; Germany (7.77%), France (8.35%), Belgium (10.08%), Austria (2.11%), Switzerland (6.53%), Netherlands (9.68%), Spain (7.15%), Italy (7.13%), Greece (10.21%), Ireland (3.48%), Sweden (7.12%), Denmark (9.97%), Czech Republic (5.62%) and Poland (4.80%).<sup>3</sup>

## 4.2 Variables description

### 4.2.1 Subjective well-being

The outcomes of interest capture a range of aspects of psychological well-being; namely, the affective component, positive functioning and cognitive evaluations of life (Vanhoutte, 2014). The affective well-being component is assessed using the EURO-D measure, a depression scale developed for international comparisons (mean = 1.969, SD = 2.011). The respondents were asked to report whether they had experienced 12 depression symptoms, including irritability, fatigue, poor appetite, sleeping disorders, sadness, anger etc. during the last month. The binary indicators for each symptom were then aggregated to form a scale, ranging from 0 (“*not depressed*”) to 12 (“*very depressed*”). The EURO-D scale has been shown to be

---

<sup>3</sup> Respondents from Czech Republic and Poland are expected to have experienced different labour market trajectories from the 1950s onwards compared to the rest of the study sample. Despite being post-communist, the two countries are kept in the sample to examine whether unemployment experiences have different psychological impacts in formerly socialist countries compared to the rest of Europe.

internally consistent and also, highly correlated to other, more common measures of depression (Prince et al., 1999).

Positive functioning was assessed using the Control, Autonomy, Self-Realisation and Pleasure (CASP) scale, which measures subjective quality of life at later age (mean= 38.497, SD=5.412), specifically assessing pleasure, self-realisation, autonomy, meaning and purpose of life (Hyde et al., 2003). The CASP scale comprises 12 items reporting participants' judgements on the four dimensions that form its acronym (control, autonomy, self-realisation and pleasure). Participants were asked to evaluate how often they had experienced moods, thoughts and feelings related to self-fulfilment, happiness, enjoyment of life, and self-determination during the past four weeks (1=“often”, 2=“sometimes”, 3=“rarely”, 4= “never”). The CASP scale, which ranges from 12 to 48, has been found to be a reliable and valid measure of quality of life enabling cross-country comparisons (Hyde et al., 2015; Kim et al., 2015).

Finally, the cognitive dimension of individual well-being was examined using life satisfaction, broadly used as a valid measure of subjective well-being (Dolan et al., 2011; Kahneman and Krueger, 2006). Additionally, it has been shown that life satisfaction is comparable across countries (Bolle and Kemp, 2009). In the second SHARE wave, life satisfaction was measured using a single item ranging from 0 to 10, with 0 standing for “*completely dissatisfied*” and 10 for “*completely satisfied*” (mean= 7.820, SD=1.563).<sup>4</sup>

---

<sup>4</sup> It has been show that despite appearing to be cardinal, subjective well-being measures could be treated as being ordinal without causing substantial biases. Thus, all the outcomes of interest are assumed to be ordinal in the present study (Ferrer-i-Carbonell and Frijters, 2004). Descriptive statistics for the outcomes of interest and all other variables by country are displayed in table A1 in appendix A.

#### 4.2.2 Past unemployment

The variable we used to assess past unemployment was constructed using the job episodes panel, a dataset generated from the first two regular SHARE waves and SHARELIFE (Antonova et al., 2017). The job episodes panel is a longitudinal dataset, including information regarding respondents' employment situation for every single year from the time they entered the market onwards. We used this information to create a count measure of the number of times the study subjects reported that they had been unemployed for six months or longer. It has been shown that the share of missing observations in the job episode panel is quite low, with missing data on employment and unemployment events being retrieved from other information provided at SHARELIFE (Brugiavini et al., 2013). However, some inconsistencies, potentially emerging from memory bias, were identified: overlap was found between working and unemployment status in 0.007% of person-year observations. Further, 0.16% of observations overlapped between retirement and unemployment status. These events were not included in this analysis for consistency purposes.

In SHARELIFE's job episode panel, unemployment spells were recorded annually. A binary variable was used indicating whether the respondent had gone through unemployment for at least six months in each year, starting from the time they entered the labour market. Annual unemployment indicators were then aggregated to produce a count measure of past unemployment spells, which lasted at least six months, covering the period from the beginning of 1950s onwards. Since the outcome data used in this study were collected between 2006 and 2007, we only included past unemployment experiences up to 2005. Binary variables indicating the decade when the unemployment spells occurred for each respondent were included in the models to adjust for the influence of older versus more recent events.

The variable measuring past unemployment is skewed towards zero, with 88% of the participants reporting that they had never spent six months or more in unemployment. An alternative, categorical measure of past unemployment spells (0= 0 spells, 1= 1-3 spells, 2= 4-6 spells, 3= more than 6 spells) was constructed and used as the basic explanatory variable instead of the count measure, to test the robustness of the scarring effect.

#### 4.2.3 Individual confounding factors

Controls for individual demographic characteristics during adulthood and childhood were constructed to account for observed differences in socio-economic background, which could potentially influence the accumulation of past unemployment spells and/or contemporary well-being. Binary indicators were used for gender (1= “*female*”, 0= “*male*”), marital status (1= “*married*” and “*in registered partnership*”, 0= “*never married*”, “*divorced*” and “*widowed*”) and currently being unemployed (1= “*unemployed*”, 0= “*employed*” or “*homemaker*”). Moreover, age, number of children and highest educational level, measured using the International Standard Classification of Education (ISCED-1997 levels 0-6) scale, were adjusted for. Household monthly income, derived by the aggregation of all income components at the household level, measured in euro and adjusted for power purchase parity, was also used.

Moreover, the influence of socio-economic background and health during childhood was considered, in order to reduce the possibility that the scarring effect is driven by self-selection into prolonged unemployment. As participation in the labour force is highly unlikely before age 15, parental socio-economic status, self-reported cognitive ability and health up to age 15 are most probably not influenced by labour market experiences. Thus, we adjusted for self-reported psychiatric, emotional and

nervous problems (1= “*Having experienced such illness or health condition*”, 0 = “*No such illness or health condition*”) and being hospitalised for at least one month (1= “*Yes*”, 0= “*No*”) up to age 15, parental socio-economic status at age 10 and self-rated cognitive ability at the same age. As done before in the literature using the SHARE survey (Brandt and Hank, 2014), parental socio-economic status was measured using two variables: number of books in the household (0= “*none or very few (0-10 books)*”, 1= > 10 books) and number of rooms per person at age 10. Further, cognitive ability was assessed using self-reported relative performance in mathematics and language compared to other classmates (1= “*much better*”, 2= “*better*”, 3= “*about the same*”, 4= “*worse*”, 5= “*much worse*”). These two variables were reversed and used for the construction of a composite measure of cognitive ability, ranging in a scale from 1 to 5.

#### 4.2.4 Country-specific confounding characteristics

Country-specific characteristics were included in the models in order to: (1) evaluate whether the potential scarring effects of past unemployment persist when substantial between-country differences in labour market institutions and prevailing macro-economic conditions are accounted for and, (2) to test whether the strength of scarring effects remains constant or varies systematically as a function of between-country differences in labor market institutions and economic conditions. We used unemployment benefit replacement rates both at the initial phase of unemployment, not lasting longer than a year, and after five years of unemployment to account for both level and duration of unemployment benefits. As suggested in the literature, the level and duration of net benefit replacement rates are indicative of the generosity of welfare state towards the unemployed (Di Tella et al., 2003; Ochsens and Welsch, 2012; Wulfgramm, 2014). Measures of annual average benefit replacement rates,

averaged over 2006 and 2007, aggregated over six family types (“*single person*”, “*one-earner married couple*”, “*two-earners married couple*” having no children and two children) and two previous income levels (67% and 100%) were used (OECD, 2007). Additionally, levels of harmonised unemployment rates, averaged over years 2006 and 2007, were retrieved from the OECD online database and included in the specifications to adjust for exogenous labour market conditions in the sampled countries.

Finally, we conducted supplementary analyses to adjust for the influence of differences in benefit generosity in the past, covering the majority of the period when past unemployment was observed. We used historical data on net benefit replacement rates drawn from the BGHS dataset (Baker et al., 2004).<sup>5</sup> The latter includes detailed information about benefit generosity and unemployment rates for 20 major OECD countries, covering the period between 1960 and 2000. Average benefit replacement rates during initial period of unemployment and after five years of unemployment were calculated and weighted using annual unemployment rates for each country. Unfortunately, no historical data were available for three of the countries included in our sample: Poland, the Czech Republic and Greece. Thus, we had to exclude them from the additional analysis, which considers the effects of between-country variation in the development of passive labour market policies.

#### 4.3 Model specification and methodology

The structure of the dataset, consisting of 14 national subsamples, allows for adopting the multilevel approach to model the relationship between past unemployment and subjective well-being in a cross-country context (Snijders and Bosker, 1999). As shown in Figure 1, we assume that there is a link from past

---

<sup>5</sup> The dataset was retrieved from: <http://ceprdata.org/other-data/bghs/>

unemployment to contemporary well-being at the individual level, which is influenced by observed and unobserved factors operating at the national level, such as labour market conditions and institutions. We examine the extent to which permanent characteristics of countries can explain the scarring phenomenon, by exploring cross-level interactions, reflecting potential cross-country variability in the scarring effect. Further, we consider individual employment trajectories and subjective well-being as possibly being dependent on country-specific factors. We adjust for the confounding effects of country-level factors, by incorporating country-level macro-economic variables in the empirical specifications.

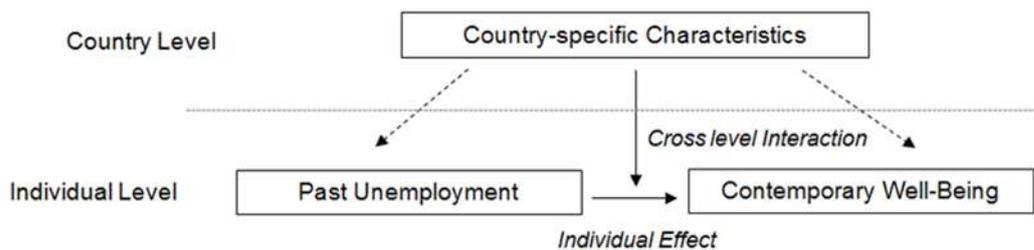


Figure 1. Multilevel construct of the psychological scarring hypothesis

We estimate the following empirical specification which reflects the relationship described above:

$$WB_{ic} = (b_0 + \beta_{0c}) + (b_1 + \beta_{1c})PU_{ic} + u_{ic} \quad (1)$$

where  $i$  and  $c$  are indices representing individuals and countries respectively.  $WB_{ic}$  stands for subjective well-being indicators (EURO-D, CASP and life satisfaction scales).  $PU_{ic}$  is the number of unemployment spells lasting at least six months participants had gone through since they entered the labour market. In order to account for cross-country variability in the scarring effect, we allow the well-being

impact of past unemployment to have two components; a fixed one, which is the same for all individuals in the sample ( $b_1$ ) and a random one ( $\beta_{1c}$ ), which varies by country. The coefficient  $b_1$  reflects the scarring effect within each country, which is assumed to be the same across countries. The between-group coefficient  $\beta_{1c}$  demonstrates the long-term psychological repercussions of past unemployment in each country. In other words, the relationship between past unemployment and subjective well-being is allowed to differ between countries, with the slope of past unemployment in model 1 randomly varying across countries. Further, psychological well-being, is assumed to have a fixed, average value in the pooled sample ( $b_0$ ) as well as country-specific mean levels ( $\beta_{0c}$ ), modelled as random intercepts. Finally,  $u_{ic}$  stands for the individual error term.

A set of individual confounding factors is then included in specification 1 to test whether individual adult and childhood background can explain the psychological effect of past unemployment within the countries. First, an indicator for being currently in unemployment is added to examine whether contemporary unemployment ( $U_{ic}$ ) could be an indirect pathway linking past unemployment to contemporary subjective well-being. Further, various socio-economic characteristics ( $XI_{ic}$ ), such as gender, age, marital status, number of children, household income and educational background are included in the model at a later stage, to account for heterogeneity at the individual level. At the final stage, childhood health and socio-economic background ( $CH_{ic}$ ) are adjusted for to control for potential self-selection into unemployment due to ill-health and low socio-economic background prior to labour market entry. The full specification is the following:

$$WB_{ic} = (b_0 + \beta_{0c}) + (b_1 + \beta_{1c})PU_{ic} + b_2U_{ic} + b_3 \sum XI_{ic} + b_4 \sum CH_{ic} + u_{ic} \quad (2)$$

Moreover, we conduct supplemental analysis to examine whether the effects of past unemployment on contemporary psychological well-being vary across gender

and employment state, adding interaction terms between past unemployment and current unemployment and past unemployment and gender to specification 2. Existing literature uncovers evidence of habituation to unemployment (Clark et al., 2001; Knabe and Rätzel, 2011), suggesting that unemployment scarring is larger among workers who are currently employed compared to the unemployed, who are likely to have experienced more unemployment in the past (Knabe and Rätzel, 2011).

Additionally, it is suggested that the experience of unemployment is not homogeneous across gender (Artazcoz et al. 2004; Knabe and Rätzel, 2011). Women are shown to be less vulnerable to the detrimental consequences of both past and contemporary unemployment compared to men, potentially because of differences in family responsibilities and social roles across gender (Artazcoz et al., 2004; Strandh et al., 2013).

Then, we add country-specific factors ( $CI_c$ ) to test whether between-country labour market differences moderate the scarring effect of past unemployment on subjective well-being. In specification 3, interaction terms between past unemployment and labour market policies of each country stand for cross-level interactions. National unemployment rates and net benefit replacement rates during initial period of unemployment and after five years spent in unemployment are adjusted for in specification (3). These factors serve as proxies for the differences in macro-economic conditions and passive labour market policies across the countries. By interacting measures of welfare state's generosity towards the unemployed with past unemployment, we examine whether labour market policies can explain the cross-country variability in the impact of past unemployment on psychological well-being.

$$WB_{ic} = (b_0 + \beta_{0c}) + (b_1 + \beta_{1c})PU_{ic} + b_2U_{ic} + b_3 \sum XI_{ic} + b_4 \sum CH_{ic} + a_1 PU_{ic} * \sum_h^k CI_c + a_2 \sum CI_c + u_{ic} \quad (3)$$

Finally, we test the influence of the cross-country evolution of labour market policies on the scarring effect by substituting the contemporary labour market characteristics with variables on unemployment benefit generosity during the period from 1960 to 2000 in specification 3. Given that the available measures are aggregated during the period of interest, cross-level interactions based on historical data are mainly indicative of the between-country differences in labour market policies through time rather than reflecting nationally distinct trajectories of institutional developments. However, the available information certainly reflects historic trends and could indicate the potentially moderating impact of past labour market policies on unemployment's psychological scarring.

## **5. Results**

### **5.1 Descriptive statistics**

Detailed descriptive statistics for all variables examined in the sample are shown in table 1. An initial examination of descriptive trends in the pooled, cross-country sample showed that past unemployment is associated with low psychological well-being. Those that had experienced at least one unemployment event during their working life reported substantially lower levels of life quality, measured using the CASP-12 scale, (Diff= -1.739, SD= 0.175, CI= [-2.076, -1.402]) and elevated levels of distress (Diff= 0.451, SD= 0.064, CI= [0.325, 0.576]). Additionally, they were less satisfied with their lives on average, with the mean difference between the two groups being statistically significant (Diff= -0.487, SD= 0.050, CI= [-0.585, -0.390]).

Evidently, the two groups were different in their socio-economic characteristics as well. Participants who had reported any unemployment experience in the past were evidently more likely to find themselves again in unemployment. They also reported

lower average household income and educational achievements. Moreover, the share of married people was lower in this group. They had fewer books in their households and have lived in smaller houses during childhood, indicating lower socio-economic background, compared to those who spent their working life without having to deal with unemployment. Finally, the share of those having suffered from psychiatric, emotional and nervous problems during childhood was also slightly larger in the group with past unemployment experiences. However, the difference in the prevalence of childhood mental health conditions between those who had experienced at least one past spell of unemployment and those with no such experience was not significant.

Table 1. Descriptive Statistics

	No spells			At least one spell			Group Difference <sup>a</sup>	
	Mean	SD	Min/Max	Mean	SD	Min/Max	t	p
<b>Subjective well-being</b>								
EURO-D	1.916	1.976	0-11	2.366	2.214	0-11	7.035	<0.001
CASP-12	38.701	5.318	12-48	36.962	5.855	12-48	-10.115	<0.001
Life satisfaction	7.877	1.529	0-10	7.390	1.735	0-10	-9.813	<0.001
<b>Contemporary SES</b>								
Currently unemployed	0.033	0.178	0-1	0.253	0.435	0-1	30.813	<0.001
Female	0.579	0.494	0-1	0.619	0.486	0-1	2.539	<0.01
Age	56.710	5.517	32-75	55.57	4.990	33-74	-6.529	<0.001
Married	0.825	0.380	0-1	0.755	0.430	0-1	-5.692	<0.001
No of children	2.187	1.256	0-12	2.022	1.333	0-9	-4.098	<0.001
Hhd income	36,398	52,303	0-1,218,168	26,619	36,764	0-522,099	-6.037	<0.001
Education	3.069	1.460	0-6	2.872	1.378	0-6	-4.257	<0.001
<b>Childhood SES</b>								
No of books	0.684	0.465	1-5	0.583	0.493	1-5	-6.740	<0.001
Rooms/person	0.783	0.409	0-6.25	0.734	0.389	0.06-4.33	-3.796	<0.001
Cognitive skills	3.346	0.744	1-5	3.292	0.737	1-5	-2.312	<0.05
Hospitalisation	0.060	0.238	0-1	0.058	0.233	0-1	-0.314	>0.05
Mental health conditions	0.010	0.097	0-1	0.015	0.123	0-1	1.780	>0.05
Obs	8,353			1,111				

<sup>a</sup> t-statistics and p-values from t-tests on the equality of mean levels of subjective well-being and all socio-economic characteristics of those who had gone through at least 6 months of unemployment in the past and those who had never experienced long term unemployment are displayed.

## 5.2 Regression models

Tables 2, 3 and 4 display the results from the estimation of mixed-effects models linking past unemployment to three different measures of psychological well-being; quality of life, life satisfaction and depression. Evidently, accumulation of past unemployment spells has long-lasting effects on self-perceived life quality and satisfaction with life, within the sampled countries. Specifically, having gone through one more unemployment spell lasting six months or longer is associated to a 0.017 SD reduction in quality of life and a 0.014 SD decrease in life satisfaction in the full models, accounting both for individual and country-specific confounding factors. On the contrary, the impact of prolonged past unemployment on self-reported depression symptoms appears to be fully explained by individual socio-economic factors in the examined countries.

Being currently unemployed predicts lower psychological well-being across all specifications and outcomes of interest, pointing to the traumatising consequences following unemployment in all European countries included in the study sample. Contemporary unemployment accounts for approximately 26% (column 2 of Tables 2, 3 and 4) of the effects of past unemployment on depression, life quality and satisfaction with life, respectively. Frequently entering unemployment, as a consequence of having gone through multiple spells of involuntary joblessness in the past (Arulampalam et al., 2001; Gregg, 2001; Heckman and Borjas, 1980; Nordström, 2011), could trigger feelings of resignation and low self-confidence, harming individual well-being. Hence, contemporary unemployment is possibly an indirect pathway linking past unemployment to current life satisfaction. Further, supplementary analysis conducted to examine whether past unemployment scarring varies with contemporary employment state revealed that going through prolonged unemployment spells is psychologically damaging for workers irrespective of whether

they are currently employed or unemployed. As shown in tables B1, B2 and B3 in appendix B, the interaction effects between past and contemporary unemployment are not statistically significant, suggesting that there are no major differences in unemployment scarring between employed and unemployed respondents.

Socio-economic background appears to influence the scarring effect of unemployment on life satisfaction and quality but not fully explain it. Models including indicators for adult background were estimated separately for each characteristic and revealed that controls for educational achievement were responsible for the largest share of the 22% and 32% reductions of the scarring effects on quality of life and life satisfaction, respectively, which are presented in column 3 of Tables 2, 3 and 4. This result suggests that scarring could be partly driven by those with low educational qualifications self-selecting into prolonged unemployment and facing various economic adversities, which, in turn, may lead to reduced well-being. For instance, going through long-term unemployment spells could be the outcome of unsuccessful school-to-work transitions, potentially influenced by low educational achievement. Further, parental socio-economic background, cognitive ability and mental health during childhood do not appear to substantially affect unemployment scarring. Finally, results from the supplemental analysis presented in tables B4, B5 and B6 in appendix B revealed that differences in the magnitude of unemployment's psychological scarring effects between men and women are not substantial.

Table 2. Past unemployment &amp; CASP (random intercepts &amp; random slopes model)

Variables	(1) <sup>a,b</sup>	(2) <sup>a,b</sup>	(3) <sup>a,b</sup>	(4) <sup>a,b</sup>	(5) <sup>a, b</sup>	(6) <sup>a, b</sup>
			<i>CASP</i>			
Past unemployment	-0.031*** (0.007)	-0.023*** (0.006)	-0.018** (0.005)	-0.017** (0.005)	-0.016** (0.005)	-0.017*** (0.004)
Being currently unemployed <sup>c</sup>		-0.491*** (0.043)	-0.459*** (0.042)	-0.452*** (0.042)	-0.454*** (0.042)	-0.457*** (0.042)
Unemployment rate					-0.078 (0.067)	-0.089 (0.063)
Benefit replacement rate (1 <sup>st</sup> yr)					0.097 (0.072)	0.149 (0.083)
Benefit replacement rate (5 yrs)					0.084 (0.057)	0.037 (0.067)
<i>Interactions with past unemployment</i>						
x Benefit replacement rate (1 <sup>st</sup> year)						-0.006 (0.004)
x Benefit replacement rate (5 years)						0.006 (0.004)
Adult SES <sup>d</sup>	-	-	Yes	Yes	Yes	Yes
Childhood SES & health <sup>e</sup>	-	-	-	Yes	Yes	Yes
Country-specific characteristics <sup>f</sup>	-	-	-	-	Yes	Yes
<i>Random part<sup>g</sup></i>						
Random slope (SD) <sup>h</sup>	0.018*** (0.006)	0.015*** (0.006)	0.012*** (0.005)	0.012*** (0.005)	0.011*** (0.005)	0.008*** (0.003)
Random intercept (SD) <sup>i</sup>	0.360*** (0.069)	0.357*** (0.068)	0.329*** (0.063)	0.322*** (0.062)	0.265*** (0.056)	0.256*** (0.050)
Individual level (SD)	0.922*** (0.007)	0.916*** (0.007)	0.903*** (0.007)	0.899*** (0.007)	0.899*** (0.007)	0.899*** (0.007)
Observations	9,464	9,464	9,464	9,464	9,464	9,464
Number of groups (countries)	14	14	14	14	14	14

<sup>a</sup> Robust standard errors in parentheses- significance levels are denoted as: \*p<0.05; \*\* p<0.01; \*\*\* p<0.001<sup>b</sup>

Standardised coefficients are reported <sup>c</sup> The “current unemployment” variable is an indicator which takes the value 1 if the participant was unemployed in the 2nd SHARE wave (vs. employed, in education, homemaker, permanently sick etc.) <sup>d</sup>

Controls for age, gender, marital status, number of children, highest educational qualification and monthly household income are included <sup>e</sup> Indicators for numbers of books in the household; number of rooms per person; relative performance at mathematics and language at 10; Hospitalisation for one month or longer; and, suffering from psychiatric, emotional or nervous problems before age 15 <sup>f</sup> Country-specific characteristics are averaged over 2006 and 2007 and

include net benefit replacement rates during initial period of unemployment, net benefit replacement rates after 5 years of unemployment and national unemployment rates <sup>g</sup> In the random part of the table, the standard deviation of the random effects and their standard errors are presented. All variances and covariances are estimated distinctly using the unstructured covariance matrix for the random effects. <sup>h</sup> The term “random slope” represents country dependent

deviations from the average effect of past unemployment (slope) <sup>i</sup> the term “random intercept” represents country-dependent deviations of the pooled-sample mean CASP level (intercept).

Table 3. Past unemployment &amp; life satisfaction (random intercepts &amp; random slopes model)

Variables	(1) <sup>a,b</sup>	(2) <sup>a,b</sup>	(3) <sup>a,b</sup>	(4) <sup>a,b</sup>	(5) <sup>a, b</sup>	(6) <sup>a, b</sup>
	<i>Life Satisfaction</i>					
Past unemployment	-0.030*** (0.007)	-0.022*** (0.006)	-0.015** (0.006)	-0.014* (0.006)	-0.014* (0.006)	-0.014* (0.006)
Being currently unemployed <sup>c</sup>		-0.553*** (0.044)	-0.510*** (0.043)	-0.505*** (0.043)	-0.504*** (0.043)	-0.505*** (0.043)
Unemployment rate					-0.154*** (0.041)	-0.148** (0.042)
Benefit replacement rate (1 <sup>st</sup> yr)					0.111* (0.046)	0.109* (0.047)
Benefit replacement rate (5 yrs)					0.017 (0.036)	0.022 (0.037)
<i>Interactions with past unemployment</i>						
x Benefit replacement rate (1 <sup>st</sup> year)						-0.003 (0.005)
x Benefit replacement rate (5 years)						0.004 (0.005)
Adult SES <sup>d</sup>	-	-	Yes	Yes	Yes	Yes
Childhood SES & health <sup>e</sup>	-	-	-	Yes	Yes	Yes
Country-specific characteristics <sup>f</sup>	-	-	-	-	Yes	Yes
<i>Random part<sup>g</sup></i>						
Random slope (SD) <sup>h</sup>	0.020*** (0.007)	0.016*** (0.006)	0.014*** (0.006)	0.014*** (0.005)	0.015*** (0.007)	0.012*** (0.007)
Random intercept (SD) <sup>i</sup>	0.301*** (0.058)	0.294*** (0.056)	0.271*** (0.052)	0.261*** (0.051)	0.136*** (0.028)	0.135*** (0.028)
Individual level (SD)	0.948*** (0.007)	0.940*** (0.007)	0.922*** (0.007)	0.919*** (0.007)	0.919*** (0.007)	0.919*** (0.007)
Observations	9,464	9,464	9,464	9,464	9,464	9,464
Number of groups (countries)	14	14	14	14	14	14

<sup>a</sup> Robust standard errors in parentheses- significance levels are denoted as: \*p<0.05; \*\* p<0.01; \*\*\* p<0.001<sup>b</sup> Standardised coefficients are reported<sup>c</sup> The “current unemployment” variable is an indicator which takes the value 1 if the participant was unemployed in the 2nd SHARE wave (vs. employed, in education, homemaker, permanently sick etc.)<sup>d</sup> Controls for age, gender, marital status, number of children, highest educational qualification and monthly household income are included<sup>e</sup> Indicators for numbers of books in the household; number of rooms per person; relative performance at mathematics and language at 10; Hospitalisation for one month or longer; and, suffering from psychiatric, emotional or nervous problems before age 15<sup>f</sup> Country-specific characteristics are averaged over 2006 and 2007 and include net benefit replacement rates during initial period of unemployment, net benefit replacement rates after 5 years of unemployment and national unemployment rates<sup>g</sup> In the random part of the table, the standard deviation of the random effects and their standard errors are presented. All variances and covariances are estimated distinctly using the unstructured covariance matrix for the random effects<sup>h</sup> The term “random slope” represents country dependent deviations from the average effect of past unemployment (slope)<sup>i</sup> The term “random intercept” represents country-dependent deviations of the pooled-sample mean life satisfaction level (intercept).

Table 4. Past unemployment &amp; EUOD (random intercepts &amp; random slopes model)

Variables	(1) <sup>a,b</sup>	(2) <sup>a,b</sup>	(3) <sup>a,b</sup>	(4) <sup>a,b</sup>	(5) <sup>a,b</sup>	(6) <sup>a,b</sup>
	<i>EURO-D</i>					
Past unemployment	0.023** (0.007)	0.017* (0.007)	0.008 (0.006)	0.007 (0.006)	0.006 (0.006)	0.007 (0.005)
Being currently unemployed <sup>c</sup>		0.305*** (0.045)	0.325*** (0.044)	0.318*** (0.044)	0.318*** (0.044)	0.319*** (0.044)
Unemployment rate					0.150*** (0.041)	0.148*** (0.041)
Benefit replacement rate (1 <sup>st</sup> yr)					0.059 (0.044)	0.075 (0.048)
Benefit replacement rate (5 yrs)					0.022 (0.035)	0.009 (0.039)
<i>Interactions with past unemployment</i>						
x Benefit replacement rate (1 <sup>st</sup> yr)						0.005 (0.005)
x Benefit replacement rate (5 yrs)						-0.004 (0.005)
Adult SES <sup>d</sup>	-	-	Yes	Yes	Yes	Yes
Childhood SES & health <sup>e</sup>	-	-	-	Yes	Yes	Yes
Country-specific characteristics <sup>f</sup>	-	-	-	-	Yes	Yes
<i>Random part<sup>g</sup></i>						
Random slope (SD) <sup>h</sup>	0.020*** (0.007)	0.018*** (0.007)	0.014*** (0.005)	0.014*** (0.005)	0.014*** (0.005)	0.012*** (0.005)
Random intercept (SD) <sup>i</sup>	0.224*** (0.044)	0.220*** (0.043)	0.206*** (0.041)	0.193*** (0.038)	0.144*** (0.030)	0.143*** (0.029)
Individual level (SD)	0.972*** (0.007)	0.969*** (0.007)	0.937*** (0.007)	0.932*** (0.007)	0.932*** (0.007)	0.932*** (0.007)
Observations	9,464	9,464	9,464	9,464	9,464	9,464
Number of groups (countries)	14	14	14	14	14	14

<sup>a</sup> Robust standard errors in parentheses- significance levels are denoted as: \*p<0.05; \*\* p<0.01; \*\*\* p<0.001<sup>b</sup> Standardised coefficients are reported<sup>c</sup> The “current unemployment” variable is an indicator which takes the value 1 if the participant was unemployed in the 2nd SHARE wave (vs. employed, in education, homemaker, permanently sick etc.)<sup>d</sup> Controls for age, gender, marital status, number of children, highest educational qualification and monthly household income are included<sup>e</sup> Indicators for numbers of books in the household; number of rooms per person; relative performance at mathematics and language at 10; Hospitalisation for one month or longer; and, suffering from psychiatric, emotional or nervous problems before age 15<sup>f</sup> Country-specific characteristics are averaged over 2006 and 2007 and include net benefit replacement rates during initial period of unemployment, net benefit replacement rates after 5 years of unemployment and national unemployment rates<sup>g</sup> In the random part of the table, the standard deviation of the random effects and their standard errors are presented. All variances and covariances are estimated distinctly using the unstructured covariance matrix for the random effects<sup>h</sup> The term “random slope” represents country dependent deviations from the average effect of past unemployment (slope)<sup>i</sup> The term “random intercept” represents country-dependent deviations of the pooled-sample mean EUOD level (intercept).

Columns 5 and 6 in Tables 2,3 and 4 present the results of estimating the full model, including controls for country-specific labour market characteristics and interactions of unemployment benefit generosity with past unemployment, for each outcome of interest. Benefit replacement rates during first year of unemployment and after five years spent in unemployment do not appear to affect the within-country effects of past unemployment on the various aspects of psychological well-being. Further, the estimated cross-level interactions, which indicate whether scarring varies systematically across countries as a function of benefits generosity, are not statistically significant. However, introducing these factors in the model appears to reduce the variance of the random slopes, which reflect the between-country differences in the impact of past unemployment on contemporary well-being. Namely, comparing the results from estimating the full specification including both country-specific controls and cross-level interactions (column 6) with the results from estimating the model without any country-specific controls (column 4) reveals that adjusting for benefit duration and generosity explains 33% of the country-dependent deviations from the average effect of past unemployment on life quality in the pooled sample and 14% from the average effect on life satisfaction respectively. **Despite being quite small in magnitude, particularly in the case of life satisfaction, reductions in the variances of the country-specific effects potentially indicate that differences in labour market policies might predict differences in the magnitude of the scarring effect of unemployment across countries.**

Further, Table 5 displays the effects of past unemployment on the three measures of subjective well-being by country. **The country-specific random effects were calculated using best linear unbiased predictors, which are essentially estimates of the country-specific random slopes.** Evidently, the relationship between past unemployment and quality of life and life satisfaction is negative across all sampled

countries. Italy is an exception, with past unemployment appearing to have a positive effect on evaluations of life quality in the fully adjusted model. However, the estimated effect is very weak indicating that individual and country-specific confounding characteristics may explain the effect of past unemployment on future life quality in the case of Italy. Despite the differences in the magnitude of the effects across countries, potentially reflecting the importance of country-specific socio-economic characteristics in shaping employment trajectories and psychological well-being, Table 5 uncovers evidence that the long-term psychological repercussions of unemployment are not a country-specific phenomenon.

Table 5. Predicted scarring effects by country <sup>a b</sup>

Countries <sup>c</sup>	CASP		Life Satisfaction		EURO-D	
	Unadjusted (model 1)	Fully adjusted (model 6)	Unadjusted (model 1)	Fully adjusted (model 6)	Unadjusted (model 1)	Fully adjusted (model 6)
Denmark	-0.056	-0.024	-0.059	-0.021	0.042	0.016
Switzerland	-0.051	-0.021	-0.042	-0.015	0.029	0.009
Germany	-0.048	-0.022	-0.032	-0.009	0.009	-0.012
Poland	-0.042	-0.027	-0.039	-0.023	0.040	0.027
Austria	-0.037	-0.014	-0.048	-0.024	0.025	0.009
France	-0.036	-0.015	-0.035	-0.018	0.046	0.020
Sweden	-0.035	-0.022	-0.029	-0.005	0.033	0.001
Netherlands	-0.033	-0.026	-0.023	-0.012	0.016	0.006
Czech Republic	-0.026	-0.002	-0.046	-0.024	0.041	0.004
Belgium	-0.023	-0.015	-0.020	-0.007	0.014	0.005
Ireland	-0.022	-0.019	-0.021	-0.010	0.013	0.011
Spain	-0.012	-0.013	-0.003	-0.001	0.006	0.000
Italy	-0.011	0.002	-0.028	-0.019	0.014	0.010
Greece	-0.006	-0.020	-0.001	-0.005	-0.007	-0.006

<sup>a</sup> The random effects are calculated using best linear unbiased predictors, estimated using the full model which controls for both individual and country specific characteristics. <sup>b</sup> All slopes are standardised <sup>c</sup> Countries are listed in the order of the magnitude of the unadjusted effect of past unemployment on CASP (from largest to smallest)

### 5.3 Robustness tests

Further, controls for benefit generosity and duration during the period between 1960 and 2000 were added in the models to test whether historical trends in labour market institutions explain the between-country variability of the scarring effect. Additional analysis excludes Greece, Czech Republic and Poland, as data on historical replacement rates were not available for these countries. As shown in Tables C1, C2 and C3 presented in appendix C, between-country differences in the development of labour market policies in the past do reduce the variance in the random slopes but do not explain the within-country scarring effect. Scarring is robust to the inclusion of cross-level interactions between the accumulation of past unemployment spells and between-country differences in historical benefit generosity and duration.

Additionally, we estimated alternative specifications where past unemployment was measured by a categorical variable instead of using a count measure of past spells. Thus far, the estimated effect of the accumulation of past unemployment spells on future well-being was modeled as being linear. Hence, the well-being effect of having spent at least six months in unemployment compared to having no such experiences was considered to be the same as going through one more unemployment spell; for example, moving from one past unemployment event to two of them. We used a categorical measure of past unemployment to distinguish between different levels of past unemployment. As shown in Table D1 in appendix D, the scarring effect of unemployment varies across different levels of past spells accumulation (1-3 spells; 4-6 spells; more than 6 spells), with the greatest harm inflicted by having gone through four to six unemployment spells. Evidently, the psychological scarring effect is robust to different measures of past unemployment.

In summary, despite the importance of each country's specificities reflected in the between-country variation, unemployment is found to be psychologically harmful across countries, with the effect being time-persistent. Therefore, it is suggested that unemployment is a psychologically detrimental event potentially of global nature, with its well-being consequences being negative across all countries analysed here, apart from Italy where the effect of past unemployment on life quality is found to be positive but not substantial. Notwithstanding the small and disparate in size national subsamples, these results uncover evidence that unemployment has long-term repercussions for individual well-being across Europe. On the grounds of this finding, the mechanisms driving the differences in unemployment's influence on well-being in each country emerge as an area for further investigation.

## **6. Conclusions and discussion**

The present study uncovers evidence that the effect of past unemployment on contemporary life satisfaction and self-reported quality of life is present across nations. Experiencing unemployment predicts reduced well-being after age 50 in 14 European countries. This finding replicates country-specific analyses of unemployment scarring and moves beyond existing research to demonstrate that these associations are evident at a broader, cross-country level. In line with prior work (e.g. Clark et al., 2001; Daly and Delaney, 2013), the negative influence of unemployment is present both contemporarily and over the long-run. Furthermore, the persistent link between past unemployment spells and subjective and psychological well-being could not be accounted for by other observed factors operating at the individual or country level. Thus, this study suggests that unemployment is likely to have long-term, psychologically damaging effects both within and across countries.

Across working life, spanning from the beginning of the survey participants' careers to their mid-50s, each six-month spell of past unemployment is found to predict a 0.017 SD reduction in self-reported quality of life and a 0.014 SD reduction in satisfaction with life after age 50, after adjusting for various confounding factors at the individual and country level. On the contrary, the within-country effect of past unemployment on self-reported depression symptoms appears to be explained by individual demographic factors, such as gender, marital status and highest academic achievement. Taken together, the main results of the present study indicate that past unemployment appears to detrimentally affect positive functioning and individual evaluations of life. Specifically, we found that prolonged time spent in unemployment may impact negatively on perceptions of satisfaction with life and self-development, self-actualisation and autonomy, which are captured in the CASP scale (Vanhouette, 2014). The CASP also captures the ability to take pleasure in one's life pointing towards a potential affective impact of the accumulation of past unemployment. Yet, we found little evidence that past unemployment generated a robust increase in depressive symptoms. This could be attributed to the fact that the distress measure we use in this study is clustered around zero, possibly making it less sensitive to picking up changes in subjective well-being compared to the highly granular, normally distributed measure of life quality.

The long-term, within-country psychological consequences of past unemployment, which persist after the age of 50, could be indicative of the long-term scarring effect of unemployment on labour market outcomes, such as earnings and occupational status. It has been shown that the psychological impact of past unemployment experiences, occurring at any point of individual employment trajectories, could trigger feelings of resignation, low self-esteem and pessimism (Goldsmith et al., 1996). Consequently, damaged coping mechanisms may predict poor performance,

increased absenteeism, inadequate job-seeking skills and low on-the-job productivity, thus leading to poor career prospects (Waters and Moore, 2002). Further research is necessary to identify possible pathways linking the mental impact of unemployment to future economic adversities.

The current findings suggest that unemployment may detrimentally affect long-run well-being *across countries*, after adjusting for different sources of inter-personal and between-country heterogeneity, using a detailed set of individual and country-specific controls. Our findings are limited in that we rely on retrospective accounts of employment history and childhood background and health. Additionally, we were not able to eliminate completely the probability that the observed results are driven by self-selection into prolonged unemployment. Data limitations did not allow us to observe study subjects prospectively over long time periods and thus, control for time-invariant unobserved confounding characteristics, as done previously in the key studies examining the psychological scarring effect of unemployment (e.g. Clark et al., 2001; Knabe and Rätzl, 2011). While adjusting for psychological health prior to respondents' entry in the labour market reduces the probability of self-selection bias, it does not ensure that there are not unobserved factors which may predict both increased unemployment and damaged psychological well-being.

Measurement error in the assessment of unemployment may have attenuated the magnitude of the potential welfare scarring we observe. Conversely, correcting for measurement error in the assessment of childhood characteristics and adjusting for the presence of unobserved confounders may reduce the strength of the association we identified between past unemployment and contemporary well-being. However, previous studies incorporating prospectively assessed measures of childhood characteristics and well-being have identified similar scarring effects (e.g. Daly and Delaney, 2013) suggesting these issues may not explain the long-run welfare impact

of unemployment. Moreover, the scarring effect of past unemployment may be underestimated because older workers with experiences of prolonged unemployment may self-select into early retirement and thus, be excluded from the study sample of non-retirees. Additionally, the probability of early retirement is likely to differ systematically across countries (Tatsiramos, 2010). We found that age of respondents is not significantly associated with past unemployment, suggesting that selection into early retirement is not substantially related to accumulation of past unemployment spells in the study sample. Regardless of these limitations, we identify evidence of the presence of unemployment well-being scarring across Europe. The observed associations between past long-term spells of joblessness and reduced well-being across 14 European countries, irrespective of their different labour market structure and socioeconomic background, is a strong indication of psychological scarring being a broad, international phenomenon.

Despite using imperfect measures of contemporary and past income support policies for the unemployed, adjusting for permanent country-specific characteristics produces a small reduction in the random slopes reflecting between-country variability of the observed scarring effect. This could point to country-specific institutional characteristics as potential moderators of scarring. For example, passive labour market policies could reflect prevailing perceptions of unemployment and attitudes towards the unemployed. Such perceptions and attitudes could determine the extent to which unemployment events impact psychological well-being in the long run. In a country where unemployment is considered to be a personal failure, as is shown to be the case in many liberal welfare regimes where unemployment benefits levels are low, the unemployed may suffer greater social stigma, among other adversities (Biewen and Steffes, 2010). Consequently, the psychological damage

following unemployment in this context could be greater compared to a country where being jobless is regarded as an accidental event that can happen to anyone.

Furthermore, there are numerous national specificities not observed in the current study that could influence the welfare scarring effect of unemployment. These include employment policies and cultural differences in work norms, values, and beliefs regarding the causes of unemployment. Whilst the current results chiefly point to the universal nature of scarring effects, they also suggest that labour market characteristics, such as the generosity of unemployment benefits, play at least some role in shaping the strength of scarring effects across nations. Further work is now needed to identify whether there are robust between-country modifiers of the long-run well-being effects of unemployment.

In conclusion, our findings demonstrate that unemployment may have long-run well-being effects that persist for many years and are evident across nations. The potential broad, cross-country nature of well-being scarring suggests that the total welfare cost of unemployment and economic downturns may be greater and longer-lasting than previously estimated. Our results also highlight potential additional benefits of successful labour market activation policies and skills enhancement programmes, which aim to foster resilience, compensate for impaired well-being (Liu et al., 2014), and ameliorate the psychological effects of unemployment.

## Appendix A

Table A1. Descriptive statistics by country <sup>a</sup>

	Austria	Germany	Netherlands	France	Switzerland	Belgium
<b>Well-Being</b>						
EURO-D	1.787 (1.929)	1.815 (1.731)	1.928 (1.920)	2.588 (2.343)	1.828 (1.848)	2.391 (2.213)
CASP	38.640 (5.725)	39.364 (5.131)	41.136 (4.401)	37.980 (5.189)	40.619 (4.551)	38.378 (5.231)
Life satisfaction	7.875 (1.886)	7.830 (1.577)	8.020 (1.089)	7.524 (1.783)	8.380 (1.352)	7.720 (1.261)
<b>Unemployment</b>						
Past unemployment	0.345 (1.943)	0.888 (2.863)	0.415 (2.283)	0.634 (2.522)	0.180 (1.163)	1.372 (4.220)
Currently unemployed	0.040 (0.197)	0.124 (0.330)	0.020 (0.139)	0.063 (0.244)	0.028 (0.164)	0.098 (0.297)
<b>Adult SES</b>						
Female	0.635 (0.483)	0.614 (0.487)	0.642 (0.480)	0.596 (0.491)	0.605 (0.489)	0.592 (0.492)
Age	56.985 (6.098)	56.805 (5.117)	57.942 (5.564)	54.506 (4.570)	57.382 (5.820)	56.244 (5.680)
Married	0.790 (0.408)	0.840 (0.367)	0.834 (0.373)	0.748 (0.434)	0.761 (0.427)	0.812 (0.391)
No of children	2.255 (1.349)	1.906 (1.146)	2.203 (1.311)	2.215 (1.362)	2.079 (1.258)	2.103 (1.228)
Monthly hhd income	24,286 (21,769)	37,440 (41,626)	48,072 (52,370)	43,882 (38,866)	56,590 (88,450)	34,039 (68,387)
Educational qualification	3.095 (1.278)	3.612 (1.055)	3.000 (1.347)	3.089 (1.675)	3.159 (1.097)	3.120 (1.415)
<b>Childhood SES</b>						
Hospitalisation <sup>b</sup>	0.080 (0.272)	0.108 (0.310)	0.073 (0.261)	0.052 (0.222)	0.081 (0.273)	0.054 (0.226)
Mental health <sup>c</sup>	0.015 (0.122)	0.010 (0.097)	0.008 (0.087)	0.028 (0.165)	0.010 (0.098)	0.011 (0.102)
Cognitive skills <sup>d</sup>	3.351 (0.750)	3.356 (0.676)	3.275 (0.684)	3.260 (0.759)	3.402 (0.730)	3.394 (0.794)
Rooms/ person	0.746 (0.427)	0.804 (0.355)	0.831 (0.339)	0.841 (0.399)	0.923 (0.411)	1.022 (0.465)
Books (ref: none/few) <sup>e</sup>	0.640 (0.481)	0.761 (0.427)	0.779 (0.415)	0.692 (0.477)	0.777 (0.417)	0.665 (0.472)
<b>Country-Specific Characteristics</b>						
NBRR (1 yr) <sup>f</sup>	0.678	0.754	0.770	0.739	0.818	0.680
NBRR (5 yrs) <sup>f</sup>	0.579	0.425	0.192	0.371	0.159	0.655
Unemployment rate <sup>f</sup>	5.059	9.409	4.592	8.421	4.480	7.875
Past NBRR (1 yr) <sup>g</sup>	0.311	0.379	0.681	0.579	0.656	0.487
Past NBRR (5 yrs) <sup>g</sup>	0.606	0.635	0.596	0.392	0.132	0.801
Obs	200	735	916	790	618	954

Table A1. Descriptive statistics by country (cont). <sup>a</sup>

	Sweden	Denmark	Spain	Italy	Greece	Ireland	Czech R	Poland
<b>Well-Being</b>								
EURO-D	1.582 (1.605)	1.701 (1.721)	2.510 (2.476)	2.480 (2.302)	1.409 (1.814)	1.793 (1.707)	1.440 (1.774)	3.143 (2.275)
CASP	40.020 (4.088)	41.232 (3.998)	36.986 (5.877)	34.962 (5.553)	36.177 (5.175)	39.472 (4.688)	35.649 (5.225)	37.095 (5.976)
Life satisfaction	8.461 (1.271)	8.641 (1.147)	7.428 (1.701)	7.581 (1.566)	7.270 (1.526)	8.307 (1.393)	7.397 (1.759)	6.927 (1.922)
<b>Unemployment</b>								
Past unemployment	0.236 (1.361)	0.464 (1.882)	0.708 (3.387)	1.237 (4.612)	0.907 (3.307)	0.380 (2.491)	0.096 (0.786)	1.617 (4.427)
Currently unemployed	0.034 (0.182)	0.048 (0.213)	0.072 (0.259)	0.044 (0.206)	0.025 (0.156)	0.027 (0.163)	0.062 (0.241)	0.141 (0.348)
<b>Adult SES</b>								
Female	0.555 (0.497)	0.534 (0.499)	0.635 (0.482)	0.625 (0.482)	0.499 (0.500)	0.632 (0.483)	0.515 (0.500)	0.542 (0.499)
Age	58.383 (4.162)	55.724 (4.842)	55.724 (4.842)	56.739 (5.705)	56.530 (5.561)	57.863 (5.773)	54.504 (3.974)	54.556 (4.406)
Married	0.829 (0.376)	0.771 (0.420)	0.771 (0.420)	0.890 (0.313)	0.890 (0.313)	0.848 (0.360)	0.801 (0.400)	0.830 (0.376)
No of children	2.399 (1.227)	2.216 (1.217)	2.216 (1.217)	2.024 (1.104)	1.858 (0.928)	2.900 (1.853)	2.060 (0.197)	2.403 (1.403)
Monthly hhd income	42,070 (35,53)	55,666 (26,03)	20,247 (29,75)	26,106 (33,837)	16,906 (27,700)	56,555 (111,84)	9,154 (9,803)	6,701 (5,067)
Educational qualification	3.365 (1.434)	3.906 (1.290)	1.968 (1.481)	2.370 (1.325)	2.747 (1.569)	3.590 (1.596)	2.737 (1.050)	2.778 (1.191)
<b>Childhood SES</b>								
Hospitalisation <sup>b</sup>	0.056 (0.231)	0.066 (0.248)	0.018 (0.132)	0.046 (0.210)	0.007 (0.085)	0.058 (0.234)	0.085 (0.279)	0.104 (0.305)
Mental health <sup>c</sup>	0.013 (0.115)	0.015 (0.121)	0.007 (0.086)	0.004 (0.067)	0.001 (0.032)	0.009 (0.095)	0.004 (0.061)	0.011 (0.105)
Cognitive skills <sup>d</sup>	3.516 (0.720)	3.472 (0.803)	3.155 (0.688)	3.191 (0.720)	3.279 (0.761)	3.437 (0.741)	3.3210 (0.758)	3.244 (0.679)
Rooms/ person	0.840 (0.385)	0.976 (0.437)	0.644 (0.350)	0.593 (0.323)	0.552 (0.237)	0.780 (0.463)	0.629 (0.277)	0.431 (0.253)
Books (ref: none/ few) <sup>e</sup>	0.902 (0.297)	0.869 (0.338)	0.433 (0.496)	0.347 (0.476)	0.434 (0.496)	0.684 (0.466)	0.923 (0.267)	0.533 (0.500)
<b>Country-Specific Characteristics</b>								
NBRR (1 yr) <sup>f</sup>	0.747	0.779	0.768	0.703	0.403	0.639	0.642	0.527
NBRR (5 yrs) <sup>f</sup>	0.217	0.240	0.175	0.180	0.177	0.590	0.239	0.211
Unemployment rate <sup>f</sup>	6.580	3.829	8.342	6.434	8.725	4.596	6.229	11.788
Past NBRR (1 yr) <sup>g</sup>	0.702	0.727	0.670	0.152	-	0.340	-	-
Past NBRR (5 yrs) <sup>g</sup>	0.041	0.708	0.208	0.023	-	0.534	-	-
Obs	674	944	677	675	966	329	532	454

<sup>a</sup> Country- specific mean values are displayed for each variable. Standard deviations are in parentheses. <sup>b</sup> Hospitalisation for 1 month or longer for any reason up to age 15 (binary), <sup>c</sup> Binary indicator for having experienced any psychiatric, emotional or nervous condition during childhood <sup>d</sup> Self-rated skills in maths and language compared to class-mates at age 10 <sup>e</sup> 0= 0-10 books, 1>10 books <sup>f</sup> Country-specific characteristics are averaged over 2006 and 2007. NBRR stands for net benefit replacement rate <sup>g</sup> Average net benefit replacement rate for the period between 1960-2000 weighted with annual unemployment rate.

## Appendix B

Table B1. Past unemployment & CASP (interactions between contemporary and past unemployment)

Variables	(1) <sup>a,b</sup>	(2) <sup>a,b</sup>	(3) <sup>a,b</sup>	(4) <sup>a,b</sup>	(5) <sup>a, b</sup>	(6) <sup>a, b</sup>
	CASP					
Past unemployment	-0.031*** (0.007)	-0.022*** (0.006)	-0.017** (0.005)	-0.016** (0.005)	-0.015** (0.005)	-0.015** (0.005)
Being currently unemployed <sup>c</sup>		-0.484*** (0.047)	0.446*** (0.047)	-0.439*** (0.047)	-0.440*** (0.047)	-0.439*** (0.047)
Past unemployment * being currently unemployed		-0.003 (0.008)	-0.005 (0.008)	-0.005 (0.008)	-0.005 (0.008)	-0.007 (0.008)
Unemployment rate					-0.071 (0.067)	-0.082 (0.063)
Benefit replacement rate (1 <sup>st</sup> yr)					0.100 (0.072)	0.152 (0.083)
Benefit replacement rate (5 yrs)					0.090 (0.057)	0.038 (0.067)
<i>Interactions with past unemployment</i>						
x Benefit replacement rate (1 <sup>st</sup> year)						-0.006 (0.004)
x Benefit replacement rate (5 years)						0.007 (0.004)
Adult SES <sup>d</sup>	-	-	Yes	Yes	Yes	Yes
Childhood SES & health <sup>e</sup>	-	-	-	Yes	Yes	Yes
Country-specific characteristics <sup>f</sup>	-	-	-	-	Yes	Yes
Random part <sup>g</sup>						
Random slope (SD) <sup>h</sup>	0.018*** (0.006)	0.015*** (0.006)	0.012*** (0.005)	0.012*** (0.005)	0.011*** (0.005)	0.008*** (0.003)
Random intercept (SD) <sup>i</sup>	0.360*** (0.069)	0.357*** (0.068)	0.329*** (0.063)	0.322*** (0.062)	0.265*** (0.056)	0.256*** (0.050)
Individual level (SD)	0.922*** (0.007)	0.916*** (0.007)	0.903*** (0.007)	0.899*** (0.007)	0.899*** (0.007)	0.899*** (0.007)
Observations	9,464	9,464	9,464	9,464	9,464	9,464
Number of groups (countries)	14	14	14	14	14	14

<sup>a</sup> Robust standard errors in parentheses- significance levels are denoted as: \*p<0.05; \*\* p<0.01; \*\*\* p<0.001<sup>b</sup>

Standardised coefficients are reported <sup>c</sup> The “current unemployment” variable is an indicator which takes the value 1 if the participant was unemployed in the 2nd SHARE wave (vs. employed, in education, homemaker, permanently sick etc.)<sup>d</sup>

Controls for age, gender, marital status, number of children, highest educational qualification and monthly household income are included <sup>e</sup> Indicators for numbers of books in the household; number of rooms per person; relative

performance at mathematics and language at 10; Hospitalisation for one month or longer; and, suffering from psychiatric, emotional or nervous problems before age 15 <sup>f</sup> Country-specific characteristics are averaged over 2006 and 2007 and include net benefit replacement rates during initial period of unemployment, net benefit replacement rates after 5 years of unemployment and national unemployment rates <sup>g</sup> In the random part of the table, the standard deviation of the random effects and their standard errors are presented. All variances and covariances are estimated distinctly using the unstructured covariance matrix for the random effects. <sup>h</sup> The term “random slope” represents country dependent deviations from the average effect of past unemployment (slope) <sup>i</sup> the term “random intercept” represents country-dependent deviations of the pooled-sample mean CASP level (intercept).

Table B2. Past unemployment &amp; life satisfaction (interactions between contemporary and past unemployment)

Variables	(1) <sup>a,b</sup>	(2) <sup>a,b</sup>	(3) <sup>a,b</sup>	(4) <sup>a,b</sup>	(5) <sup>a,b</sup>	(6) <sup>a,b</sup>
	<i>Life Satisfaction</i>					
Past unemployment	-0.030*** (0.007)	-0.019* (0.007)	-0.013* (0.006)	-0.013* (0.006)	-0.012 (0.006)	-0.012* (0.006)
Being currently unemployed <sup>c</sup>		-0.535*** (0.049)	-0.490*** (0.048)	-0.484*** (0.048)	-0.483*** (0.048)	-0.483*** (0.048)
Past unemployment * being currently unemployed		-0.007 (0.008)	-0.008 (0.008)	-0.008 (0.008)	-0.008 (0.008)	-0.009 (0.008)
Unemployment rate					-0.155*** (0.042)	-0.148** (0.042)
Benefit replacement rate (1 <sup>st</sup> yr)					0.109* (0.046)	0.109* (0.047)
Benefit replacement rate (5 yrs)					0.016 (0.036)	0.022 (0.037)
<i>Interactions with past unemployment</i>						
x Benefit replacement rate (1 <sup>st</sup> year)						-0.003 (0.005)
x Benefit replacement rate (5 years)						0.005 (0.005)
Adult SES <sup>d</sup>	-	-	Yes	Yes	Yes	Yes
Childhood SES & health <sup>e</sup>	-	-	-	Yes	Yes	Yes
Country-specific characteristics <sup>f</sup>	-	-	-	-	Yes	Yes
<i>Random part<sup>g</sup></i>						
Random slope (SD) <sup>h</sup>	0.020*** (0.007)	0.016*** (0.006)	0.014*** (0.006)	0.014*** (0.005)	0.015*** (0.007)	0.012*** (0.007)
Random intercept (SD) <sup>i</sup>	0.301*** (0.058)	0.294*** (0.056)	0.271*** (0.052)	0.259*** (0.051)	0.136*** (0.028)	0.135*** (0.028)
Individual level (SD)	0.948*** (0.007)	0.940*** (0.007)	0.922*** (0.007)	0.919*** (0.007)	0.919*** (0.007)	0.919*** (0.007)
Observations	9,464	9,464	9,464	9,464	9,464	9,464
Number of groups (countries)	14	14	14	14	14	14

<sup>a</sup> Robust standard errors in parentheses- significance levels are denoted as: \*p<0.05; \*\* p<0.01; \*\*\* p<0.001<sup>b</sup> Standardised coefficients are reported <sup>c</sup> The “current unemployment” variable is an indicator which takes the value 1 if the participant was unemployed in the 2nd SHARE wave (vs. employed, in education, homemaker, permanently sick etc.) <sup>d</sup> Controls for age, gender, marital status, number of children, highest educational qualification and monthly household income are included <sup>e</sup> Indicators for numbers of books in the household; number of rooms per person; relative performance at mathematics and language at 10; Hospitalisation for one month or longer; and, suffering from psychiatric, emotional or nervous problems before age 15 <sup>f</sup> Country-specific characteristics are averaged over 2006 and 2007 and include net benefit replacement rates during initial period of unemployment, net benefit replacement rates after 5 years of unemployment and national unemployment rates <sup>g</sup> In the random part of the table, the standard deviation of the random effects and their standard errors are presented. All variances and covariances are estimated distinctly using the unstructured covariance matrix for the random effects <sup>h</sup> The term “random slope” represents country dependent deviations from the average effect of past unemployment (slope) <sup>i</sup> The term “random intercept” represents country-dependent deviations of the pooled-sample mean life satisfaction level (intercept).

Table B3. Past unemployment &amp; EUROD (interactions between contemporary and past unemployment)

Variables	(1) <sup>a,b</sup>	(2) <sup>a,b</sup>	(3) <sup>a,b</sup>	(4) <sup>a,b</sup>	(5) <sup>a, b</sup>	(6) <sup>a, b</sup>
	<i>EURO-D</i>					
Past unemployment	0.023** (0.007)	0.019** (0.007)	0.008 (0.006)	0.008 (0.006)	0.007 (0.006)	0.007 (0.006)
Being currently unemployed <sup>c</sup>		0.326*** (0.050)	0.330*** (0.049)	0.322*** (0.048)	0.322*** (0.048)	0.321*** (0.048)
Past unemployment * being currently unemployed		-0.009 (0.009)	-0.002 (0.008)	-0.002 (0.008)	-0.001 (0.008)	-0.001 (0.008)
Unemployment rate					0.150*** (0.041)	0.148*** (0.041)
Benefit replacement rate (1 <sup>st</sup> yr)					0.059 (0.044)	0.075 (0.048)
Benefit replacement rate (5 yrs)					0.021 (0.035)	0.009 (0.039)
<i>Interactions with past unemployment</i>						
x Benefit replacement rate (1 <sup>st</sup> yr)						0.005 (0.005)
x Benefit replacement rate (5 yrs)						-0.004 (0.005)
Adult SES <sup>d</sup>	-	-	Yes	Yes	Yes	Yes
Childhood SES & health <sup>e</sup>	-	-	-	Yes	Yes	Yes
Country-specific characteristics <sup>f</sup>	-	-	-	-	Yes	Yes
<i>Random part<sup>g</sup></i>						
Random slope (SD) <sup>h</sup>	0.020*** (0.007)	0.018*** (0.007)	0.014*** (0.005)	0.014*** (0.005)	0.014*** (0.005)	0.012*** (0.005)
Random intercept (SD) <sup>i</sup>	0.224*** (0.044)	0.220*** (0.043)	0.206*** (0.041)	0.193*** (0.038)	0.144*** (0.030)	0.143*** (0.029)
Individual level (SD)	0.972*** (0.007)	0.969*** (0.007)	0.937*** (0.007)	0.932*** (0.007)	0.932*** (0.007)	0.932*** (0.007)
Observations	9,464	9,464	9,464	9,464	9,464	9,464
Number of groups (countries)	14	14	14	14	14	14

<sup>a</sup> Robust standard errors in parentheses- significance levels are denoted as: \*p<0.05; \*\* p<0.01; \*\*\* p<0.001<sup>b</sup>

Standardised coefficients are reported <sup>c</sup> The “current unemployment” variable is an indicator which takes the value 1 if the participant was unemployed in the 2nd SHARE wave (vs. employed, in education, homemaker, permanently sick etc.) <sup>d</sup> Controls for age, gender, marital status, number of children, highest educational qualification and monthly household income are included <sup>e</sup> Indicators for numbers of books in the household; number of rooms per person; relative performance at mathematics and language at 10; Hospitalisation for one month or longer; and, suffering from psychiatric, emotional or nervous problems before age 15<sup>f</sup> Country-specific characteristics are averaged over 2006 and 2007 and include net benefit replacement rates during initial period of unemployment, net benefit replacement rates after 5 years of unemployment and national unemployment rates <sup>g</sup> In the random part of the table, the standard deviation of the random effects and their standard errors are presented. All variances and covariances are estimated distinctly using the unstructured covariance matrix for the random effects <sup>h</sup> The term “random slope” represents country dependent deviations from the average effect of past unemployment (slope) <sup>i</sup> The term “random intercept” represents country-dependent deviations of the pooled-sample mean EUROD level (intercept).

Table B4. Past unemployment &amp; CASP (interactions between past unemployment and gender)

Variables	(1) <sup>a,b</sup>	(2) <sup>a,b</sup>	(3) <sup>a,b</sup>	(4) <sup>a,b</sup>	(5) <sup>a,b</sup>	(6) <sup>a,b</sup>
	CASP					
Past unemployment	-0.031*** (0.007)	-0.022*** (0.006)	-0.024** (0.008)	-0.022** (0.008)	-0.021** (0.007)	-0.023** (0.007)
Being currently unemployed <sup>c</sup>		-0.484*** (0.047)	0.453*** (0.042)	-0.447*** (0.042)	-0.449*** (0.042)	-0.452*** (0.042)
Female			-0.076*** (0.020)	-0.080*** (0.020)	-0.080*** (0.020)	-0.080*** (0.020)
Past unemployment * female			0.008 (0.007)	0.007 (0.007)	0.007 (0.007)	0.007 (0.007)
Unemployment rate					-0.075 (0.067)	-0.087 (0.063)
Benefit replacement rate (1 <sup>st</sup> yr)					0.095 (0.072)	0.150 (0.083)
Benefit replacement rate (5 yrs)					0.086 (0.057)	0.037 (0.067)
<i>Interactions with past unemployment</i>						
x Benefit replacement rate (1 <sup>st</sup> year)						-0.007 (0.004)
x Benefit replacement rate (5 years)						0.006 (0.003)
Adult SES <sup>d</sup>	-	-	Yes	Yes	Yes	Yes
Childhood SES & health <sup>e</sup>	-	-	-	Yes	Yes	Yes
Country-specific characteristics <sup>f</sup>	-	-	-	-	Yes	Yes
<i>Random part<sup>g</sup></i>						
andom slope (SD) <sup>h</sup>	0.018*** (0.006)	0.015*** (0.006)	0.012*** (0.005)	0.012*** (0.005)	0.011*** (0.005)	0.008*** (0.003)
Random intercept (SD) <sup>i</sup>	0.360*** (0.069)	0.357*** (0.068)	0.327*** (0.063)	0.320*** (0.061)	0.265*** (0.056)	0.256*** (0.050)
Individual level (SD)	0.922*** (0.007)	0.916*** (0.007)	0.900*** (0.007)	0.899*** (0.007)	0.899*** (0.007)	0.899*** (0.007)
Observations	9,464	9,464	9,464	9,464	9,464	9,464
Number of groups (countries)	14	14	14	14	14	14

<sup>a</sup> Robust standard errors in parentheses- significance levels are denoted as: \*p<0.05; \*\* p<0.01; \*\*\* p<0.001<sup>b</sup>

Standardised coefficients are reported <sup>c</sup> The “current unemployment” variable is an indicator which takes the value 1 if the participant was unemployed in the 2nd SHARE wave (vs. employed, in education, homemaker, permanently sick etc.) <sup>d</sup>

Controls for age, gender, marital status, number of children, highest educational qualification and monthly household income are included <sup>e</sup> Indicators for numbers of books in the household; number of rooms per person; relative

performance at mathematics and language at 10; Hospitalisation for one month or longer; and, suffering from psychiatric, emotional or nervous problems before age 15 <sup>f</sup> Country-specific characteristics are averaged over 2006 and 2007 and

include net benefit replacement rates during initial period of unemployment, net benefit replacement rates after 5 years of unemployment and national unemployment rates <sup>g</sup> In the random part of the table, the standard deviation of the random

effects and their standard errors are presented. All variances and covariances are estimated distinctly using the

unstructured covariance matrix for the random effects. <sup>h</sup> The term “random slope” represents country dependent deviations from the average effect of past unemployment (slope) <sup>i</sup> the term “random intercept” represents country-

dependent deviations of the pooled-sample mean CASP level (intercept).

Table B5. Past unemployment &amp; life satisfaction (interactions between past unemployment and gender)

Variables	(1) <sup>a,b</sup>	(2) <sup>a,b</sup>	(3) <sup>a,b</sup>	(4) <sup>a,b</sup>	(5) <sup>a,b</sup>	(6) <sup>a,b</sup>
	<i>Life Satisfaction</i>					
Past unemployment	-0.030*** (0.007)	-0.019* (0.007)	-0.017* (0.008)	-0.016 (0.008)	-0.015 (0.008)	-0.015 (0.008)
Being currently unemployed <sup>c</sup>		-0.535*** (0.049)	-0.508*** (0.043)	-0.504*** (0.043)	-0.503*** (0.043)	-0.503*** (0.043)
Female			-0.076*** (0.020)	-0.079*** (0.020)	-0.080*** (0.020)	-0.080*** (0.020)
Past unemployment * female			0.003 (0.008)	0.002 (0.008)	0.002 (0.008)	0.002 (0.008)
Unemployment rate					-0.155*** (0.042)	-0.148** (0.042)
Benefit replacement rate (1 <sup>st</sup> yr)					0.109* (0.046)	0.109* (0.047)
Benefit replacement rate (5 yrs)					0.016 (0.036)	0.022 (0.037)
<i>Interactions with past unemployment</i>						
x Benefit replacement rate (1 <sup>st</sup> year)						-0.003 (0.005)
x Benefit replacement rate (5 years)						0.005 (0.005)
Adult SES <sup>d</sup>	-	-	Yes	Yes	Yes	Yes
Childhood SES & health <sup>e</sup>	-	-	-	Yes	Yes	Yes
Country-specific characteristics <sup>f</sup>	-	-	-	-	Yes	Yes
<i>Random part<sup>g</sup></i>						
Random slope (SD) <sup>h</sup>	0.020*** (0.007)	0.016*** (0.006)	0.014*** (0.006)	0.014*** (0.005)	0.015*** (0.007)	0.012*** (0.007)
Random intercept (SD) <sup>i</sup>	0.301*** (0.058)	0.294*** (0.056)	0.260*** (0.052)	0.259*** (0.050)	0.136*** (0.030)	0.135*** (0.028)
Individual level (SD)	0.948*** (0.007)	0.940*** (0.007)	0.922*** (0.007)	0.919*** (0.007)	0.919*** (0.007)	0.919*** (0.007)
Observations	9,464	9,464	9,464	9,464	9,464	9,464
Number of groups (countries)	14	14	14	14	14	14

<sup>a</sup> Robust standard errors in parentheses- significance levels are denoted as: \*p<0.05; \*\* p<0.01; \*\*\* p<0.001<sup>b</sup> Standardised coefficients are reported <sup>c</sup> The “current unemployment” variable is an indicator which takes the value 1 if the participant was unemployed in the 2nd SHARE wave (vs. employed, in education, homemaker, permanently sick etc.) <sup>d</sup> Controls for age, gender, marital status, number of children, highest educational qualification and monthly household income are included <sup>e</sup> Indicators for numbers of books in the household; number of rooms per person; relative performance at mathematics and language at 10; Hospitalisation for one month or longer; and, suffering from psychiatric, emotional or nervous problems before age 15 <sup>f</sup> Country-specific characteristics are averaged over 2006 and 2007 and include net benefit replacement rates during initial period of unemployment, net benefit replacement rates after 5 years of unemployment and national unemployment rates <sup>g</sup> In the random part of the table, the standard deviation of the random effects and their standard errors are presented. All variances and covariances are estimated distinctly using the unstructured covariance matrix for the random effects <sup>h</sup> The term “random slope” represents country dependent deviations from the average effect of past unemployment (slope) <sup>i</sup> The term “random intercept” represents country-dependent deviations of the pooled-sample mean life satisfaction level (intercept).

Table B6. Past unemployment &amp; EUROD (interactions between past unemployment and gender )

Variables	(1) <sup>a,b</sup>	(2) <sup>a,b</sup>	(3) <sup>a,b</sup>	(4) <sup>a,b</sup>	(5) <sup>a,b</sup>	(6) <sup>a,b</sup>
	<i>EURO-D</i>					
Past unemployment	0.023** (0.007)	0.019** (0.007)	0.006 (0.008)	0.005 (0.008)	0.005 (0.008)	0.006 (0.008)
Being currently unemployed <sup>c</sup>		0.326*** (0.050)	0.319*** (0.044)	0.320*** (0.044)	0.320*** (0.044)	0.320*** (0.048)
Female			0.428*** (0.020)	0.429*** (0.020)	0.429*** (0.020)	0.429*** (0.020)
Past unemployment * female			0.002 (0.007)	0.002 (0.008)	0.001 (0.007)	0.001 (0.008)
Unemployment rate					0.150*** (0.041)	0.148*** (0.041)
Benefit replacement rate (1 <sup>st</sup> yr)					0.059 (0.044)	0.075 (0.048)
Benefit replacement rate (5 yrs)					0.021 (0.035)	0.009 (0.039)
<i>Interactions with past unemployment</i>						
x Benefit replacement rate (1 <sup>st</sup> yr)						0.005 (0.005)
x Benefit replacement rate (5 yrs)						-0.004 (0.005)
Adult SES <sup>d</sup>	-	-	Yes	Yes	Yes	Yes
Childhood SES & health <sup>e</sup>	-	-	-	Yes	Yes	Yes
Country-specific characteristics <sup>f</sup>	-	-	-	-	Yes	Yes
<i>Random part<sup>g</sup></i>						
Random slope (SD) <sup>h</sup>	0.020*** (0.007)	0.018*** (0.007)	0.014*** (0.005)	0.014*** (0.005)	0.014*** (0.005)	0.012*** (0.005)
Random intercept (SD) <sup>i</sup>	0.224*** (0.044)	0.220*** (0.043)	0.195*** (0.039)	0.145*** (0.030)	0.144*** (0.030)	0.143*** (0.029)
Individual level (SD)	0.972*** (0.007)	0.969*** (0.007)	0.932*** (0.007)	0.932*** (0.007)	0.932*** (0.007)	0.932*** (0.007)
Observations	9,464	9,464	9,464	9,464	9,464	9,464
Number of groups (countries)	14	14	14	14	14	14

<sup>a</sup> Robust standard errors in parentheses- significance levels are denoted as: \*p<0.05; \*\* p<0.01; \*\*\* p<0.001<sup>b</sup>

Standardised coefficients are reported <sup>c</sup> The “current unemployment” variable is an indicator which takes the value 1 if the participant was unemployed in the 2nd SHARE wave (vs. employed, in education, homemaker, permanently sick etc.) <sup>d</sup> Controls for age, gender, marital status, number of children, highest educational qualification and monthly household income are included <sup>e</sup> Indicators for numbers of books in the household; number of rooms per person; relative performance at mathematics and language at 10; Hospitalisation for one month or longer; and, suffering from psychiatric, emotional or nervous problems before age 15<sup>f</sup> Country-specific characteristics are averaged over 2006 and 2007 and include net benefit replacement rates during initial period of unemployment, net benefit replacement rates after 5 years of unemployment and national unemployment rates <sup>g</sup> In the random part of the table, the standard deviation of the random effects and their standard errors are presented. All variances and covariances are estimated distinctly using the unstructured covariance matrix for the random effects <sup>h</sup> The term “random slope” represents country dependent deviations from the average effect of past unemployment (slope) <sup>i</sup> The term “random intercept” represents country-dependent deviations of the pooled-sample mean EUROD level (intercept).

## Appendix C

Table C1. Past unemployment &amp; CASP (random intercepts &amp; random slopes-historical data)

Variables	(1) <sup>a,b</sup>	(2) <sup>a,b</sup>	(3) <sup>a,b</sup>	(4) <sup>a,b</sup>	(5) <sup>a, b</sup>	(6) <sup>a, b</sup>
	CASP					
Past unemployment	-0.032*** (0.007)	-0.023*** (0.006)	-0.018** (0.006)	-0.017** (0.006)	-0.019** (0.005)	-0.021*** (0.006)
Being currently unemployed <sup>c</sup>		-0.493*** (0.047)	-0.473*** (0.047)	-0.464*** (0.047)	-0.469*** (0.047)	-0.470*** (0.047)
Past benefit replacement rate (1 <sup>st</sup> yr)					0.158*** (0.036)	0.195*** (0.052)
Past benefit replacement rate (5 yrs)					0.120** (0.037)	0.121** (0.055)
<i>Interactions with past unemployment</i>						
x Past benefit replacement rate (1 <sup>st</sup> year)						-0.005 (0.005)
x Past benefit replacement rate (5 years)						0.001 (0.005)
Adult SES <sup>d</sup>	-	-	Yes	Yes	Yes	Yes
Childhood SES & health <sup>e</sup>	-	-	-	Yes	Yes	Yes
Country-specific characteristics <sup>f</sup>	-	-	-	-	Yes	Yes
<i>Random part<sup>g</sup></i>						
Random slope (SD) <sup>h</sup>	0.017*** (0.007)	0.014*** (0.006)	0.012*** (0.006)	0.012*** (0.006)	0.011*** (0.005)	0.011*** (0.005)
Random intercept (SD) <sup>i</sup>	0.331*** (0.071)	0.328*** (0.071)	0.311*** (0.067)	0.300*** (0.065)	0.177*** (0.041)	0.173*** (0.039)
Individual level (SD)	0.904*** (0.007)	0.898*** (0.007)	0.887*** (0.007)	0.883*** (0.007)	0.883*** (0.007)	0.884*** (0.007)
Observations	7,512	7,512	7,512	7,512	7,512	7,512
Number of groups (countries)	11	11	11	11	11	11

<sup>a</sup> Robust standard errors in parentheses- significance levels are denoted as: \*p<0.05; \*\* p<0.01; \*\*\* p<0.001<sup>b</sup> Coefficients standardised across the pooled sample are reported <sup>c</sup> The “current unemployment” variable is an indicator which takes the value 1 if the participant was unemployed in the 2nd SHARE wave (vs. employed, in education, homemaker, permanently sick etc.) <sup>d</sup> Controls for age, gender, marital status, number of children, highest educational qualification and monthly household income are included <sup>e</sup> Indicators for numbers of books in the household; number of rooms per person; relative performance at mathematics and language at 10; Hospitalisation for one month or longer; and, suffering from psychiatric, emotional or nervous problems before age 15 <sup>f</sup> Historical controls include the weighted averages of benefit replacement rates and benefit duration over the period 1990-2000 for each country <sup>g</sup> In the random part of the table, the standard deviation of the random effects and their standard errors are presented. All variances and covariances are estimated distinctly using the unstructured covariance matrix for the random effects <sup>h</sup> The term “random slope” represents country dependent deviations from the average effect of past unemployment (slope) <sup>i</sup> The term “random intercept” represents country-dependent deviations of the pooled-sample mean CASP level (intercept).

Table C2. Past unemployment &amp; life satisfaction (random intercepts &amp; random slopes model- historical data)

Variables	(1) <sup>a,b</sup>	(2) <sup>a,b</sup>	(3) <sup>a,b</sup>	(4) <sup>a,b</sup>	(5) <sup>a, b</sup>	(6) <sup>a, b</sup>
	<i>LIFE SATISFACTION</i>					
Past unemployment	-0.030*** (0.007)	-0.020*** (0.007)	-0.015* (0.006)	-0.015* (0.006)	-0.015* (0.006)	-0.014* (0.007)
Being currently unemployed <sup>c</sup>		-0.519*** (0.048)	-0.489*** (0.047)	-0.483*** (0.047)	-0.483*** (0.047)	-0.482*** (0.047)
Past benefit replacement rate (1 <sup>st</sup> yr)					0.506 (0.315)	0.087 (0.055)
Past benefit replacement rate (5 yrs)					0.023 (0.213)	0.007 (0.059)
<i>Interactions with past unemployment</i>						
x Past benefit replacement rate (1 <sup>st</sup> year)						0.002 (0.006)
x Past benefit replacement rate (5 years)						-0.001 (0.006)
Adult SES <sup>d</sup>	-	-	Yes	Yes	Yes	Yes
Childhood SES & health <sup>e</sup>	-	-	-	Yes	Yes	Yes
Country-specific characteristics <sup>f</sup>	-	-	-	-	Yes	Yes
<i>Random part<sup>g</sup></i>						
Random slope (SD) <sup>h</sup>	0.017*** (0.007)	0.015*** (0.006)	0.013*** (0.006)	0.013*** (0.006)	0.013*** (0.006)	0.012*** (0.007)
Random intercept (SD) <sup>i</sup>	0.247*** (0.054)	0.241*** (0.053)	0.215*** (0.047)	0.206*** (0.048)	0.185*** (0.041)	0.185*** (0.041)
Individual level (SD)	0.911*** (0.007)	0.905*** (0.007)	0.889*** (0.007)	0.887*** (0.007)	0.887*** (0.007)	0.887*** (0.007)
Observations	7,512	7,512	7,512	7,512	7,512	7,512
Number of groups (countries)	11	11	11	11	11	11

<sup>a</sup> Robust standard errors in parentheses- significance levels are denoted as: \*p<0.05; \*\* p<0.01; \*\*\* p<0.001 <sup>b</sup> Coefficients standardised across the pooled sample are reported <sup>c</sup> The “current unemployment” variable is an indicator which takes the value 1 if the participant was unemployed in the 2nd SHARE wave (vs. employed, in education, homemaker, permanently sick etc.) <sup>d</sup> Controls for age, gender, marital status, number of children, highest educational qualification and monthly household income are included <sup>e</sup> Indicators for numbers of books in the household; number of rooms per person; relative performance at mathematics and language at 10; Hospitalisation for one month or longer; and, suffering from psychiatric, emotional or nervous problems before age 15 <sup>f</sup> Historical controls include the weighted averages of benefit replacement rates and benefit duration over the period 1990-2000 for each country <sup>g</sup> In the random part of the table, the standard deviation of the random effects and their standard errors are presented. All variances are estimated using the independent covariance matrix, calculating one variance parameter per random effect <sup>h</sup> The term “random slope” represents country dependent deviations from the average effect of past unemployment (slope) <sup>i</sup> The term “random intercept” represents country-dependent deviations of the pooled-sample mean life satisfaction level (intercept).

Table C3. Past unemployment &amp; EURO-D (random intercepts &amp; random slopes model –historical data)

Variables	(1) <sup>a,b</sup>	(2) <sup>a,b</sup>	(3) <sup>a,b</sup>	(4) <sup>a,b</sup>	(5) <sup>a, b</sup>	(6)
	<i>EURO-D</i>					
Past unemployment	0.025*** (0.007)	0.020*** (0.007)	0.011 (0.006)	0.010 (0.006)	0.010 (0.006)	0.012 (0.005)
Being currently Unemployed <sup>c</sup>		0.305*** (0.051)	0.338*** (0.050)	0.328*** (0.050)	0.328*** (0.050)	0.331*** (0.050)
Past benefit replacement rate (1 <sup>st</sup> yr)					-0.027 (0.037)	-0.030 (0.038)
Past benefit replacement rate (5 yrs)					-0.023 (0.040)	-0.020 (0.040)
<i>Interactions with past unemployment</i>						
x Past benefit replacement rate (1 <sup>st</sup> year)						0.007 (0.005)
x Past benefit replacement rate (5 years)						-0.007 (0.005)
Adult SES <sup>d</sup>	-	-	Yes	Yes	Yes	Yes
Childhood SES & health <sup>e</sup>	-	-	-	Yes	Yes	Yes
Country-specific characteristics <sup>f</sup>	-	-	-	-	Yes	Yes
Random part <sup>g</sup>						
Random slope (SD) <sup>h</sup>	0.015*** (0.007)	0.015*** (0.007)	0.013*** (0.006)	0.013*** (0.006)	0.013*** (0.007)	0.010*** (0.007)
Random intercept (SD) <sup>i</sup>	0.166*** (0.037)	0.164*** (0.037)	0.139*** (0.032)	0.127*** (0.030)	0.122*** (0.029)	0.121*** (0.029)
Individual level (SD)	0.977*** (0.008)	0.975*** (0.008)	0.944*** (0.008)	0.938*** (0.008)	0.938*** (0.008)	0.938*** (0.008)
Observations	7,512	7,512	7,512	7,512	7,512	7,512
Number of groups (countries)	11	11	11	11	11	11

<sup>a</sup> Robust standard errors in parentheses- significance levels are denoted as: \*p<0.05; \*\* p<0.01; \*\*\* p<0.001<sup>b</sup>

Coefficients standardised across the pooled sample are reported <sup>c</sup> The “current unemployment” variable is an indicator which takes the value 1 if the participant was unemployed in the 2nd SHARE wave (vs. employed, in education, homemaker, permanently sick etc.) <sup>d</sup> Controls for age, gender, marital status, number of children, highest educational qualification and monthly household income are included <sup>e</sup> Indicators for numbers of books in the household; number of rooms per person; relative performance at mathematics and language at 10; Hospitalisation for one month or longer; and, suffering from psychiatric, emotional or nervous problems before age 15. <sup>f</sup> Historical controls include the weighted averages of benefit replacement rates and benefit duration over the period 1990-2000 for each country <sup>g</sup> In the random part of the table, the standard deviation of the random effects and their standard errors are presented. All variances and covariances are estimated distinctly using the unstructured covariance matrix for the random effects <sup>h</sup> The term “random slope” represents country dependent deviations from the average effect of past unemployment (slope) <sup>i</sup> The term “random intercept” represents country-dependent deviations of the pooled-sample mean EURO-D level (intercept).

## Appendix D

Table D1. Past Unemployment (categorical indicator) & Contemporary Well-being

Variables	(1) <sup>a,b</sup>	(2) <sup>a,b</sup>	(3) <sup>a,b</sup>
	<i>CASP</i>	<i>Life satisfaction</i>	<i>EURO-D</i>
Past unemployment <sup>c</sup>			
1-3 spells	-0.101*	-0.048	0.078
	(0.050)	(0.045)	(0.048)
4-6 spells	-0.188**	-0.193**	0.104
	(0.070)	(0.067)	(0.069)
>6 spells	-0.175**	-0.105**	0.029
	(0.066)	(0.063)	(0.065)
Being currently unemployed <sup>d</sup>	-0.433***	-0.505***	0.309***
	(0.043)	(0.044)	(0.045)
Adult SES <sup>e</sup>	Yes	Yes	Yes
Childhood SES & health <sup>f</sup>	Yes	Yes	Yes
Country-specific characteristics <sup>g</sup>	Yes	Yes	Yes
Random part <sup>h</sup>			
Random Effects (SD) <sup>i</sup>	0.244**	0.140***	0.160***
	(0.046)	(0.030)	(0.032)
Individual level (SD)	0.898***	0.919***	0.932***
	(0.007)	(0.007)	(0.007)
Observations	9,464	9,464	9,464
Number of groups (countries)	14	14	14

<sup>a</sup> Robust standard errors in parentheses- significance levels are denoted as: \*p<0.05; \*\* p<0.01; \*\*\* p<0.001<sup>b</sup> Coefficients standardised across the pooled sample are reported <sup>c</sup> The past unemployment variable is a categorical indicator (0= 0 spells, 1= 1-3 spells, 2= 4-6 spells, 3= >6 spells) <sup>d</sup> The “current unemployment” variable is an indicator which takes the value 1 if the participant was unemployed in the 2nd SHARE wave (vs. employed, in education, homemaker, permanently sick etc.)<sup>e</sup> Controls for age, gender, marital status, number of children, highest educational qualification and monthly household income are included <sup>f</sup> Indicators for numbers of books in the household; number of rooms per person; relative performance at mathematics and language at 10; hospitalisation for one month or longer; and, suffering from psychiatric, emotional or nervous problems before age 15 <sup>g</sup> Country-specific characteristics are averaged over 2006 and 2007 and include net benefit replacement rates during initial period of unemployment, net benefit replacement rates after 5 years of unemployment and national unemployment rates. <sup>h</sup> In the random part of the table, the standard deviations of the random effects and their standard errors are presented. All variances are estimated distinctly using the exchangeable covariance matrix for the random effects <sup>i</sup> the term “random slope” represents country dependent deviations from the average effect of past unemployment (slope)

## **Acknowledgements**

The SHARE data collection has been primarily funded by the European Commission through FP5 (QLK6-CT-2001-00360), FP6 (SHARE-I3: RII-CT-2006-062193, COMPARE: CIT5-CT-2005-028857, SHARELIFE: CIT4-CT-2006-028812) and FP7 (SHARE-PREP: N°211909, SHARE-LEAP: N°227822, SHARE M4: N°261982).

Additional funding from the German Ministry of Education and Research, the Max Planck Society for the Advancement of Science, the U.S. National Institute on Aging (U01\_AG09740-13S2, P01\_AG005842, P01\_AG08291, P30\_AG12815, R21\_AG025169, Y1-AG-4553-01, IAG\_BSR06-11, OGHA\_04-064, HHSN271201300071C) and from various national funding sources is gratefully acknowledged (see [www.share-project.org](http://www.share-project.org)).

## **Funding sources**

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

## **References**

Abrams, D., Hogg, M.A., 1990. Social identification, self-categorization and social influence. *European Review of Social Psychology*, 1(1), 195-228.

Arulampalam, W., Gregg, P., Gregory, M., 2001. Unemployment scarring. *The Economic Journal*, 111(475), 577-584.

Artazcoz, L., Benach, J., Borrell, C., Cortès, I., 2004. Unemployment and mental health: understanding the interactions among gender, family roles, and social class. *American Journal of Public Health*, 94(1), 82-88.

Baker, D., Glyn, A., Howell, D., Schmitt, J., 2004. Unemployment and labour market institutions: the failure of the empirical case for deregulation. New York: New School University, Center for Economic Policy Analysis Working Paper.

Berney, L.R., Blane, D.B., 1997. Collecting retrospective data: accuracy of recall after 50 years judged against historical records. *Social Science & Medicine*, 45(10), 1519-1525.

Biewen, M., Steffes, S., 2010. Unemployment persistence: is there evidence for stigma effects? *Economics Letters*, 106(3), 188-190.

Binder, M., Coad, A., 2010. An examination of the dynamics of well-being and life events using vector autoregressions. *Journal of Economic Behavior & Organization*, 76(2), 352-371.

Blanchflower, D. G., 2015. As good as it gets? The UK labour market in recession and recovery. *National Institute Economic Review*, 231(1), F76-F80.

Bolle, F., Kemp, S., 2009. Can we compare life satisfaction between nationalities? Evaluating actual and imagined situations. *Social Indicators Research*, 90(3), 397-408.

Brandt, M., Hank, K., 2014. Scars that will not disappear: long-term associations between early and later life unemployment under different welfare regimes. *Journal of Social Policy*, 43(04), 727-743.

Brugiavini, A., Cavapozzi, D., Pasini, G., Trevisan, E., 2013. Working life histories from SHARELIFE: a retrospective panel. *SHARE WP Series*, 11-13.

Börsch-Supan, A., Brandt, M., Hank, K., Schröder, M., 2011. The individual and the welfare state: life histories in Europe. Heidelberg: Springer Science & Business Media.

Börsch-Supan, A., Brandt, M., Hunkler, C., Kneip, T., Korbmacher, J., Malter, F.,..., Zuber, S., 2013. Data resource profile: the Survey of Health, Ageing and Retirement in Europe (SHARE). *International Journal of Epidemiology*, 42(4), 992-1001.

Clark, A. E., Georgellis, Y., Sanfey, P., 2001. Scarring: the psychological impact of past unemployment. *Economica*, 68(270), 221-241.

Currie, J., 2009. Healthy, wealthy, and wise: socioeconomic status, poor health in childhood, and human capital development. *Journal of Economic Literature*, 47, 87-122.

Daly, M., Delaney, L., 2013. The scarring effect of unemployment throughout adulthood on psychological distress at age 50: estimates controlling for early adulthood distress and childhood psychological factors. *Social Science & Medicine*, 80, 19-23.

De Neve, J. E., Oswald, A. J., 2012. Estimating the influence of life satisfaction and positive affect on later income using sibling fixed effects. *Proceedings of the National Academy of Sciences of the United States of America*, 109(49), 19953-19958.

Dex, S., McCulloch, A., 1998. The reliability of retrospective unemployment history data. *Work, Employment and Society*, 12(3), 497-509.

Di Tella, R., MacCulloch, R. J., Oswald, A. J., 2003. The macroeconomics of happiness. *Review of Economics and Statistics*, 85(4), 809-827.

Dolan, P., Layard, R., Metcalfe, R., 2011. *Measuring subjective wellbeing for public policy: recommendations on measures*. London: Centre for Economic Performance, LSE.

Egan, M., Daly, M., Delaney, L., 2016. Adolescent psychological distress, unemployment, and the great recession: evidence from the national longitudinal study of youth 1997. *Social Science & Medicine*, 156, 98-105.

Ekert-Jaffé, O., Terraz, I., 2011. The scarring effect of unemployment in ten European countries: an analysis based on the ECHP. Strasburg: Bureau d' Economie Theorique et Appliquee, UDS, report no.2011-09.

Ezzy, D., 1993. Unemployment and mental health: a critical review. *Social Science & Medicine*, 37(1), 41-52.

Ferrer-i-Carbonell, A., Frijters, P., 2004. How important is methodology for the estimates of the determinants of happiness? *The Economic Journal*, 114(497), 641-659.

Fleche, S., Smith, C., Sorsa, P., 2012. Exploring determinants of subjective wellbeing in OECD countries: evidence from the World Value Survey. OECD Statistics Working Papers, No. 2012/01. Paris: OECD Publishing, Paris, <http://dx.doi.org/10.1787/5k9ffc6p1rvb-en>

Gallie, D., 2000. The experience of unemployment in Europe: the debate. In D. Gallie D. & Paugam S. (Eds.), *Welfare regimes and the experience of unemployment in Europe*. Oxford: Oxford University Press.

Gangl, M., 2004. Welfare states and the scar effects of unemployment: a comparative analysis of the United States and west Germany. *American Journal of Sociology*, 109(6), 1319-1364.

Gangl, M., 2006. Scar effects of unemployment: an assessment of institutional complementarities. *American Sociological Review*, 71(6), 986-1013.

Goldsmith, A. H., Veum, J. R., William, D., 1996. The impact of labor force history on self-esteem and its component parts, anxiety, alienation and depression. *Journal of Economic Psychology*, 17(2), 183-220.

Gregg, P., 2001. The impact of youth unemployment on adult unemployment in the NCDS. *The Economic Journal*, 111(475), 626-653.

Haas, S. A., 2007. The long-term effects of poor childhood health: an assessment and application of retrospective reports. *Demography*, 44(1), 113-135.

Havari, E., Mazzonna, F., 2011. Can we trust older people's statements on their childhood circumstances? Evidence from SHARELIFE. SHARE Working Paper 05/2011.

Heckman, J. J., Borjas, G. J., 1980. Does unemployment cause future unemployment? Definitions, questions and answers from a continuous time model of heterogeneity and state dependence. *Economica*, 47(187), 247-283.

Hetschko, C., Knabe, A., Schob, R., 2014. Looking back in anger? Retirement and unemployment scarring. Berlin: SOEP Papers on Multidisciplinary Panel Data Research 652.

Hyde, M., Higgs, P., Wiggins, R.D., Blane, D., 2015. A decade of research using the CASP scale: key findings and future directions. *Aging & Mental Health*, 19(7), 571-575.

Hyde, M., Wiggins, R.D., Higgs, P., Blane, D.B., 2003. A measure of quality of life in early old age: the theory, development and properties of a needs satisfaction model (CASP-19). *Aging & Mental Health*, 7(3), 186-194.

Jahoda, M., 1981. Work, employment and unemployment: values, theories and approaches in social research. *American Psychologist*, 36, 184-191.

- Jahoda, M., 1982. *Employment and unemployment: a social-psychological analysis*. Cambridge: Cambridge University Press.
- Kahneman, D., Krueger, A. B., 2006. Developments in the measurement of subjective well-being. *The Journal of Economic Perspectives*, 20(1), 3-24.
- Kim, G. R., Netuveli, G., Blane, D., Peasey, A., Malyutina, S., Simonova, G., ...  
Pikhart, H., 2015. Psychometric properties and confirmatory factor analysis of the CASP-19, a measure of quality of life in early old age: the HAPIEE study. *Aging & Mental Health*, 19(7), 595-609.
- Knabe, A., Rätzkel, S., 2011. Scarring or scaring? The psychological impact of past unemployment and future unemployment risk. *Economica*, 78(310), 283-293.
- Liu, S., Huang, J.L., Wang, M., 2014. Effectiveness of job search interventions: a meta-analytic review. *Psychological Bulletin*, 140(4), 1009-1041.
- Lucas, R. E., Clark, A. E., Georgellis, Y., Diener, E., 2004. Unemployment alters the set point for life satisfaction. *Psychological Science*, 15(1), 8-13.
- McKee-Ryan, F., Song, Z., Wanberg, C. R., Kinicki, A. J., 2005. Psychological and physical well-being during unemployment: a meta-analytic study. *Journal of Applied Psychology*, 90(1), 53-71.
- Murphy, G. C., Athanasou, J. A., 1999. The effect of unemployment on mental health. *Journal of Occupational and Organizational Psychology*, 72(1), 83-99.
- Nordenmark, M., Strandh, M., 1999. Towards a sociological understanding of mental well-being among the unemployed: the role of economic and psychosocial factors. *Sociology*, 33(3), 577-597.

- Nordström, O., 2011. Scarring effects of the first labour market experience: a sibling based analysis. Bonn: IZA Discussion Paper, No. 5565.
- Ochsen, C., Welsch, H., 2012. Who benefits from labor market institutions? Evidence from surveys of life satisfaction. *Journal of Economic Psychology*, 33(1), 112-124.
- OECD, 2007. Benefits and wages: OECD indicators. Paris: OECD Publishing, [http://dx.doi.org/10.1787/ben\\_wages-2007-en](http://dx.doi.org/10.1787/ben_wages-2007-en)
- OECD, 2015. How's life? 2015: measuring well-being. Paris: OECD Publishing, [http://dx.doi.org/10.1787/how\\_life-2015-en](http://dx.doi.org/10.1787/how_life-2015-en)
- Paul, K. I., Moser, K., 2009. Unemployment impairs mental health: meta-analyses. *Journal of Vocational Behavior*, 74(3), 264-282.
- Prince, M. J., Reischies, F., Beekman, A. T., Fuhrer, R., Jonker, C., Kivela, S. L., ... ,Van Oyen, H., 1999. Development of the EURO-D scale: a European Union initiative to compare symptoms of depression in 14 European centres. *The British Journal of Psychiatry*, 174(4), 330-338.
- Scarpetta, S., Sonnet, A., Manfredi, T., 2010. Rising youth unemployment during the crisis: how to prevent negative long-term consequences on a generation? OECD Social, Employment and Migration Working Papers, No. 106. Paris: OECD Publishing, <http://dx.doi.org/10.1787/5kmh79zb2mmv-en>
- Schröder M., 2011. Retrospective data collection in the Survey of Health, Ageing and Retirement in Europe. Mannheim: Mannheim Research Institute for the Economics of Ageing (MIA).
- Smith, J. P., 2009. Reconstructing childhood health histories. *Demography*, 46(2), 387-403.

- Snijders, T., Bosker, R., 1999. *Multilevel analysis: an introduction to basic and applied multilevel analysis*. London: SAGE Publications.
- Stephoe, A., Deaton, A., Stone, A. A., 2015. Subjective wellbeing, health, and ageing. *The Lancet*, 385(9968), 640-648.
- Strandh, M., Hammarström, A., Nilsson, K., Nordenmark, M., Russel, H., 2013. Unemployment, gender and mental health: the role of the gender regime. *Sociology of Health & Illness*, 35(5), 649-665.
- Strandh, M., Winefield, A., Nilsson, K., Hammarstrom, A., 2014. Unemployment and mental health scarring during the life course. *European Journal of Public Health*, 24(3), 440-445.
- Tatsiramos, K., 2010. Job displacement and the transitions to re-employment and early retirement for non-employed older workers. *European Economic Review*, 54(4), 517-535.
- Vanhoutte, B., 2014. The multidimensional structure of subjective well-being in later life. *Journal of Population Ageing*, 7(1), 1-20.
- Wadsworth, M. E., Montgomery, S. M., Bartley, M. J., 1999. The persisting effect of unemployment on health and social well-being in men early in working life. *Social Science & Medicine*, 48(10), 1491-1499.
- Waters, L. E., Moore, K. A., 2002. Self-esteem, appraisal and coping: a comparison of unemployed and re-employed people. *Journal of Organizational Behavior*, 23(5), 593-604.
- Whelan, C. T., McGinnity, F., 2000. Unemployment and satisfaction: a European analysis. In D. Gallie & S. Paugam (Eds.), *Welfare Regimes and the Experience of Unemployment in Europe* (pp. 286-306). Oxford: Oxford University Press.

Wulfgramm, M., 2014. Life satisfaction effects of unemployment in Europe: the moderating influence of labour market policy. *Journal of European Social Policy*, 24(3), 258-272.

[data set] Antonova, L., Aranda, L., Brugiavini, A., Cavapozzi, D., Pasini, G., Trevisan, E., 2017. SHARE job episodes panel. Release version: 6.0.0. SHARE-ERIC, 10.6103/SHARE.w2.600

[data set] Börsch-Supan, A. 2017. Survey of Health, Ageing and Retirement in Europe (SHARE) wave 2. Release version: 6.0.0. SHARE-ERIC, 10.6103/SHARE.w2.600

[data set] Börsch-Supan, A. 2017. Survey of Health, Ageing and Retirement in Europe (SHARE) wave 3 – SHARELIFE. Release version: 6.0.0. SHARE-ERIC, 10.6103/SHARE.w3.600