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Abstract

In this paper, we investigate whether exposure to adverse experiences during childhood such as physical and emotional abuse affects a set of health and socio-economic outcomes across the lifespan using recent European data from SHARE (The Survey of Health, Ageing and Retirement in Europe). The novelty of our approach consists in exploiting the recently published data on adverse childhood experiences for 19 SHARE countries, which enables us to account for country-specific heterogeneity and investigate the long-run effects of exposure to early-life adverse circumstances on different adult outcomes. Our results highlight a negative long-term effect of exposure to adverse childhood experiences -ACEs on risky behaviour such as smoking, as well as on socio-economic outcomes like unemployment and family dissolution.

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Adverse childhood experiences and outcomes later in life: Evidence from SHARE countries.

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Abstract

In this paper, we investigate whether exposure to adverse experiences during childhood such as physical and emotional abuse affects a set of health and socio-economic outcomes across the lifespan using recent European data from SHARE (The Survey of Health, Ageing and Retirement in Europe). The novelty of our approach consists in exploiting the recently published data on adverse childhood experiences for 19 SHARE countries, which enables us to account for country-specific heterogeneity and investigate the long-run effects of exposure to early-life adverse circumstances on different adult outcomes. Our results highlight a negative long-term effect of exposure to adverse childhood experiences -ACEs on risky behaviour such as smoking, as well as on socio-economic outcomes like unemployment and family dissolution.

Keywords: Adverse Childhood Experiences, Smoking Behaviour, Unemployment, Family Dissolution.

JEL Classification: H4, I12.

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1. Introduction

Adverse Childhood Experiences (ACEs) include a set of events such as physical, sexual and emotional abuse, physical and emotional neglect, household substance abuse, household mental illness and parental separation or divorce (Finkelhora et al., 2015). Existing studies have documented a negative association between ACEs and health and socio-economic status (SES) outcomes in adulthood. Therefore, the importance of recognizing and preventing early adversities represents a prominent public health concern because it may play an important role in promoting and improving not only the health of individuals, but also their social and economic potential within the society.

Several studies show a positive association between exposure to ACEs and poor health outcomes over the life course. Some papers have shown that exposure to ACEs is positively associated with risky behaviours (i.e., smoking and drinking), comorbid conditions and chronic diseases such as cancer in adulthood (see Chang et al., 2019). Moreover, other work have highlighted a positive correlation between early-life adversities and the insurgency of mental health problems later in life. Exposure to ACEs is associated with increased risk of adult mental and behavioral disorders, such as depression, emotional well-being and suicide (Chapman et al., 2004; Anda et al., 1999; Merrick et al., 2017, Buia et al., 2019). As regard risk behaviours, the medical literature documents the existence of a strong relationship between ACEs and smoking habit. For instance, Anda et al. (1999) reports that adverse childhood experiences (ACEs) significantly contribute to smoking initiation in adolescence and smoking continuation in adulthood among a sample of adult members of the Kaiser Permanente health maintenance organization in San Diego. In the same vein, using population-based data from five US States, Ford et al. (2011) find that the prevalence of current smoking is higher among adults who reported one or more ACEs and increases progressively as the number of ACEs increases.

An emerging strand of literature looks at the effects of ACEs on socio economic status indicators such as education, earnings, employment and show that adult individuals reporting experiences of child physical abuse or child neglect have lower levels of education, lower earnings, and fewer assets compared to those who do not report early adverse circumstances (Metzler et al., 2017; Currie & Widom, 2010). Exposure to family and/or neighborhoods violence during adolescence is associated with poorer educational attainments (higher school dropout rates) and lower adult employment and income (Covey, Menard, & Franzese, 2013; Macmillan & Hagan, 2004). To the best of our knowledge, only a few papers specifically look at the relationship between ACEs and the accumulate years or episodes of unemployment across the working career. Egan et al., (2015), for instance, use two different National surveys (i.e., the Longitudinal Study of Young People in England (LSYPE) and the National Child Development Study (NCDS)) to analyse whether childhood psychological distress places people at high risk of subsequent unemployment in the early stages of their working life. Their findings suggest the individuals who report highly distress experience accumulate more months of unemployment with respect to those who not report psychological distress.

Even though the existing literature has broadly investigated the correlation between ACEs and different adult outcomes, most studies are based on rather restricted samples, generally at national or even regional-community levels, which have a very limited generalizability. Moreover, the long-term effects of ACEs on some SES outcomes (such as unemployment and family dissolution) appear as less explored in the literature, also due to the lack of appropriate data covering individuals' lifespans.

In this paper, we attempt to overcome these issues. We focus on whether exposure to adverse experiences during childhood may affect different health and socio-economic outcomes across the lifespan using recent European data from SHARE. The novelty of our approach consists in exploiting

the recently published data on ACEs for 19 SHARE countries, which enables us to account for country-specific heterogeneity and investigate the long-run effects of exposure to early-life adverse experiences on a subset of adult outcomes, namely smoking behavior, unemployment and family disruption. Our findings confirm the negative long-term effects of exposure to ACEs on risky behaviours such as smoking, as well as on SES outcomes like unemployment experiences and family dissolution.

The paper is organized as follows. Section 2 describes the variables and the data used in the empirical analysis. Section 3 explains the estimation strategy, while in Section 4 we present the main results separately for each adult outcome considered. Section 5 provides some concluding remarks.

2. Data and Variables

The individual data employed in this study are drawn from the Survey of Health, Ageing and Retirement in Europe (SHARE). SHARE is a multidisciplinary, longitudinal survey on ageing which focuses on the individuals aged 50+ and their spouses. The survey started in 2004 and takes place every two years. It was first implemented in 11 countries and it extended gradually, to cover at present 27 countries (all the European Union countries, except for the United Kingdom and Ireland, plus Israel). The "regular" waves (1-2 and 4 to 6) collected information on the current situation of various aspects of the participants' lives: accommodation, health, working situation, social network/relations, economic situation/assets, behavioral risks, expectations. In the third and seventh waves, SHARELIFE (2008 and 2017 respectively), respondents were asked to report retrospective information on multiple aspects of their past (health, health care, accommodation, working career, household situation and performance at school during childhood, number of children, childbearing for women, etc.). It should be observed that the retrospective information collected is particularly detailed, the participants went through their entire life, with particular emphasis on the main events, allowing for a thorough reconstruction of their life history. In wave 7, a new battery of questions has been introduced, regarding emotional experiences in early life, more specifically, the relationship with the parents and whether the respondents have experienced adverse childhood conditions. The SHARELIFE retrospective interview was applied to all the participants who entered the survey after wave 3 (2008).

What makes SHARE data particularly suited for our purposes is the possibility to link the information on the respondents' current situation to the retrospective childhood/adulthood data and, hence, to follow the individual along time, so that the timing of events is properly captured and the researcher can investigate the likely effects of the early-childhood experience.

In our study, we consider all respondents that participated in at least one regular SHARE wave (between waves 4 to 6) and in the SHARELIFE interview of Wave 7. We exclude from our sample the individuals who entered the survey before wave 4 because for them we do not have the information regarding adverse early life experiences. The regular waves provide information with respect to the smoking behaviour and marital status as well as the individuals' personal characteristics (age, gender, and education of respondents). From SHARELIFE, we exploit the information on the retrospective childhood conditions, the individual unemployment experiences, the respondent's household situation and the new records on the quality of parent-child relationship and early-life emotional experiences. We end up with a data set containing individuals from 18 European countries (Austria, Germany, Sweden, Spain, Italy, France, Denmark, Greece, Switzerland, Belgium, Czech Republic, Poland, Luxembourg, Hungary, Portugal, Slovenia, Estonia, and Croatia) and Israel.

2.1 Adverse Childhood Experiences

The key explanatory variables in the regression analysis that we illustrate in the sequel are several events that may be considered as adverse early-life experiences. SHARELIFE asks respondents to report information on exposure to child neglect and childhood physical abuse referring separately to the mother and to the father of the Respondent. With respect to physical abuse in the family, the questionnaire addresses one item:

1. *How often did your mother/your father push, grab, shove, throw something at you, slap or hit you? 1. Often 2. Sometimes 3. Rarely 4. Never*

In addition, the survey also collects data on child physical abuse by persons outside the family:

2. *How often did anybody else physically harm you in any way? 1. Often 2. Sometimes 3. Rarely 4. Never.*

Although different with respect to the items used in the epidemiological research, we believe that a good indicator for child neglect could be derived from the following question:

3. *How much did your mother/your father (or the woman/man that raised you) understand your problems and worries? 1. A lot 2. Some 3. A little 4. Not at all*

Finally, we also include among the explanatory variables the self-reported quality of the relationship with each of the parents:

4. *How would you rate the relationship with your mother/your father (or the woman/man that raised you)? 1. Excellent 2. Very good 3. Good 4. Fair 5. Poor*

We note that the scales used in reporting these emotional experiences do not point in the same direction for all the questions. More specifically, in questions 1 and 2 a lower score indicates the presence of a negative event, while in questions 3 and 4 a lower score means the opposite. This requires attention in interpreting any descriptive and makes necessary a harmonization procedure before using them in the analysis.

Table 1 presents descriptive statistics of the respondents' answers to these questions, by gender and macro region in Europe.

Panel A: Women									
Region	Understanding			Relationship			Harm		
				Mother					
	Obs	Median	Mean	Obs	Median	Mean	Obs	Median	Mean
North	5066	2	1,78	5144	2	2,18	5131	4	3,58
Center	7587	2	2,00	7640	2	2,45	7644	4	3,39
South	7655	2	1,75	7668	2	2,09	7644	4	3,41
East	4732	1	1,56	4754	2	2,08	4749	4	3,40
Israel	1080	2	1,97	1108	2	2,09	1104	4	3,46
				Father					
	Obs	Median	Mean	Obs	Median	Mean	Obs	Median	Mean
North	4663	2	2,10	4707	2	2,35	4784	4	3,69
Center	7306	2	2,25	7362	3	2,58	7400	4	3,49
South	7472	2	2,02	7488	2	2,31	7503	4	3,60
East	4635	2	1,86	4646	2	2,31	4656	4	3,56
Israel	1037	2	2,11	1073	2	2,14	1078	4	3,47
				Other					

	Obs	Median	Mean	Obs	Median	Mean	Obs	Median	Mean
North							5181	4	3,76
Center							7720	4	3,74
South							7716	4	3,84
East							4772	4	3,83
Israel							1117	4	3,60

Panel B: Men

Region	Understanding			Relationship			Harm		
				Mother					
	Obs	Median	Mean	Obs	Median	Mean	Obs	Median	Mean
North	3576	2	1,76	3694	2	2,08	3695	4	3,55
Center	6011	2	1,83	6073	2	2,26	6065	4	3,36
South	5920	2	1,77	5935	2	2,09	5915	4	3,33
East	3407	1	1,55	3423	2	2,10	3419	4	3,33
Israel	793	2	1,94	819	2	1,98	810	4	3,46
				Father					
	Obs	Median	Mean	Obs	Median	Mean	Obs	Median	Mean
North	3388	2	2,10	3472	2	2,40	3503	4	3,43
Center	5790	2	2,17	5837	3	2,64	5858	3	3,25
South	5778	2	2,03	5789	2	2,40	5794	4	3,34
East	3341	2	1,80	3353	2	2,38	3361	4	3,26
Israel	764	2	2,14	780	2	2,27	785	4	3,29
				Other					
	Obs	Median	Mean	Obs	Median	Mean	Obs	Median	Mean
North							3721	4	3,64
Center							6129	4	3,67
South							5971	4	3,77
East							3446	4	3,76
Israel							821	4	3,50

The median values are generally the same between men and women and across European regions, indicating similar distributions in the occurrence of ACE's. Still some differences deserve attention. All respondents in Eastern Europe (men and women) seem to have experienced better understanding from both mother and father (lower median and mean values of the answers in questions 3) while Israeli are characterized by better relationship with either parents. Individuals in Central Europe report instead, on average, less understanding, more harm from parents and poorer relationship with both mother and father, with respect to the other regions. When comparing the means among genders we observe that women display slightly less physical harm from either parents and from persons outside the family in all the European regions. Still, in Northern and Central Europe they report, on average, less understanding from either parents and poorer relationship with the mothers with respect to male respondents, while the relationship with the fathers are always better for females.

Starting from the above questions, we first need to construct a set of variables that evaluate the exposure to some adverse childhood experience (ACE). For this, we recode the answers into dichotomous variables, where a value of 1 indicates that the individual was exposed to a negative experience in early life. We consider that an individual experienced physical abuse in the family if she/he answers '1. Often' or '2. Sometimes' at question 1, from either the mother or the father. We treated question 2 in the same manner to capture physical harm from other persons. A situation of 'child neglect' corresponds to answers '3. A little' or '4. Not at all' for question 3. The relationship with the mother/father in childhood is rated 1, that is, 'problematic'/negative, if the respondent answers '4. Fair' or '5. Poor' to the last query. Because ACEs tend to be highly interrelated (Ford et

al., 2011), we also generate an ACE index by combining the previous variables via a Principal Component Analysis (PCA), where a higher value of the index corresponds to a higher exposure to adverse conditions during childhood. For a more intuitive interpretation, we construct and use in our work the percentile ranks of the index.

2.2 Outcome Variables

The research on the Fetal Origin Hypothesis describes the child human capital formation through parents' investments before and after birth, given the in-utero circumstances, and the pre and postnatal environmental shocks.

The literature in this field has been flourishing in the recent years (see Almond, Currie, Duque, 2017 for a comprehensive overview). The main idea that stands behind the papers in this strand of literature is that many outcomes in the various life phases (childhood, adulthood) depend on the early life circumstances (shocks and parents' investments) because these determine the individuals' initial stock of human capital. On the same line, the present work explores three outcomes that may give an idea about three sides/aspects of the individual well-being in adulthood. First, we study the impact of early childhood conditions (negative parents' investments or mild shocks) on (un)healthy behaviours (determining health levels) – through smoking. Second, we analyze economic achievements – by assessing the effects of childhood circumstances on the number and length of the unemployment spells. Third, we study a socio-emotional aspect – through marital status along life. Among the potential ACE's effects in later life there is no doubt that these are more objectively measured.

In exploring the smoking behaviour, we use information elicited from regular SHARE waves. We consider two variables. On the one hand, in order to evaluate the impact that ACEs may have on the probability to start smoking, we use a *dummy* indicating whether the respondent has ever smoked on a daily basis throughout his/her life. On the other hand, for an analysis along an intensive line, for the individuals who report to be current smokers or to have ever smoked on a daily basis, we consider a variable that records the number of years of smoking.

About 44% of the respondents in our sample report to have smoked on a daily basis in their life. The percentage of ever-smoking men is nearly 57%, while for women it is about 34%. If we focus on the intensity of smoking in terms of the number of years an individual declares to have smoked, men tend to smoke for longer periods (with an average of 27 years) compared to women (23 years). These results are unconditional and may be explained by other determinant such as age and cohort, still the differences are quite remarkable: the econometric analysis below is an attempt to unravel the role of the different variables.

Information on the frequency of specific events such as unemployment spells are drawn from the SHARELIFE dataset, which collects detailed retrospective information on the respondents' working careers. SHARELIFE allows us to distinguish between the unemployment spells (unemployed and looking for a job), inactivity (unemployed but not actively searching a job) and looking after home or family. Based on this information we generate two variables that measure: (i) the total number of spells of unemployment, and (ii) the number of spells of inactivity plus the number of spells in which respondents report to look after home and family. About 5% of the individuals in our sample have not experienced any spell of unemployment, roughly 70% report to have experienced one episode of unemployment, while slightly more than 25% declare to have experienced more than one unemployment spell during their lifetime. As for the number of spells of inactivity or looking after home, about 17% of our sample report to have experienced at least one period out of the labour force.

As expected, the last figure increases substantially if we focus on females (roughly 27%) compared males (about 3%).Maternity, unpaid care work (Boeckmann et al. 2014; Pettit and Hook 2005), along with the social and cultural norms represent the key factors that may explain the high percentage of women out of the labor force, (Fernández and Fogli 2009, Algan and Cahuc 2005; Fortin 2005; Seguino 2011; Steiber and Haas 2009).

In order to analyze the probability of divorce/separation in adulthood, we use information on marital status of respondents elicited from SHARE regular waves (from 4 to 6). Then, we generate a dummy indicator assuming the value of 1 in case the individual declares to be divorced or separated, and 0 otherwise. Around 10% of respondents in our sample reports to be divorced or separated. However, we observe some differences between male and female subsamples. Indeed, 8.6% of males reports to have experienced a divorce or separation versus about 11% of women.

3.3 Other Controls

In addition to adverse childhood experience variables, we control for a rich set of information on SES in childhood, namely the occupational status of the respondent's father (employed or not), the number of books at home, the number of rooms at home, the household size and the childhood health status when the respondent was aged 10. As for the number of books at home, we generate a dummy indicator equal to 1 if the respondent reports to have had more than 100 books at home when he/she was 10 years old, and 0 otherwise. Concerning childhood self-assessed health, the following self-assessed health (SAH henceforth) status question was asked: "Would you say that your health during your childhood was in general excellent, very good, good, fair, or poor?". SAH was therefore measured on a five-point scale from "excellent" (score 5) to "poor" (score 1) and treated as an ordered categorical variable. We have dichotomized the SAH into a binary variable assuming value 1 if individuals declare that their health during childhood was excellent, very good, good, and 0 otherwise. Along with childhood characteristics, we also include information on the level of education of respondents and their parents, respectively. More precisely, we generate three distinct dummy variables that assign value 1 in case of high school completion, and 0 otherwise.

To capture some long-run trends in our outcome variables, we further consider a set of indicators for the birth cohort. Since the view of smoking as a negative health behaviour may have differed substantially between younger and older cohorts, when we focus on smoking behavior we distinguish among three generations: the "Silent Generation" (born 1926–1945), the "Baby Boomers" (born 1946–1965), and the "X Generation" (born 1966–1980) (Di Novi et al., 2019). Finally, to account for unobserved country-specific effects, in all regressions we include country dummies.

3. Empirical Strategy

In order to investigate the association between adverse circumstances in childhood and the set of adult outcomes described before, we specify different empirical models.

First, we aim at understanding whether exposure to adverse experiences during childhood may affect smoking habit of individuals across the lifespan. To explore this relationship, we first estimate a set of logistic regressions. More specifically, we estimate the following equation:

$$smoked_i = \alpha + \beta_1 ACE_i + \beta_2 X_i + \gamma_b + \delta_c + \varepsilon_i \qquad (1)$$

Where the dependent variable *smoked* is an indicator that takes value 1 if the respondent has ever smoked daily during her/his life, and 0 otherwise. ACE_i consists of a set of binary indicators (or a

single index) for exposure to adverse childhood circumstances at any age during childhood or adolescence (ages 0-17), X_i is a vector of childhood characteristics and education of respondents, γ_b is a generation fixed effect (the reference generation is the "Silent Generation"), δ_c is a fixed effect for the country of current residence, and ε_i is the error term. As a second step, we restrict our sample to individuals who declare to be current smokers or to have ever smoked on a daily basis, and estimate a set of OLS regressions using as dependent variable the total years of smoking. With respect to Model (1), we add among control variables the age respondents report at the time of interview in the regular wave.

Second, we would like to identify the effect of early-life adverse circumstances on individual experiences of unemployment during the working career. We specify a negative binomial model where the dependent variable is the number of unemployment / out of the labor force spells an individual experiences across the working career. Negative Binomial model is particularly suitable for over-dispersed count data, as in our case. Indeed, the distribution of the dependent variables is highly concentrated around zero, and the mean number of unemployment or out of the labor force spells is much lower than the variance (see Egan et al, 2015; Sturman, 1999). The formal specification of the model is described in the following equation:

$$n\_spell_i = \alpha + \beta_1 ACE_i + \beta_2 X_i + \gamma_b + \delta_c + \varepsilon_i \qquad (2)$$

where the dependent variable n_spell is a count variable that measures the total spells of unemployment or out of the labor force, respectively. The covariates considered do not substantially differ from those in Model 1, except for the inclusion of the age of respondents and a year of birth fixed effect, γ_b, instead of generation dummies.

Lastly, we are interested in analyzing the impact of being victim of adverse early life circumstances on the probability of divorce/separation in adulthood. To analyze this relationship, we specify a set of logistic regressions as for smoking behaviour (Model 1), controlling for the same set of covariates about childhood socio-economic circumstances and education. The dependent variable here is a dummy indicator assigning value 1 if respondents report to be divorced or separated in regular waves, 0 otherwise.

4. Results

4.1 Smoking behaviour

Table 1 shows the results for the probability of having ever smoked on a daily basis. All the coefficients are reported as odds ratios, where the null effect is 1. In Panel A we present the coefficients for each ACE variable separately, controlling for education dummies, SES variables, generation and country dummies. Panel B considers the ACE index instead of single variables. In addition to the previous set of controls, we also include interaction terms measuring the combined effect of (i) generation and ACE index, and (ii) more than 100 book and ACE index.

In general, our findings highlight a significant and positive relationship between adverse childhood conditions and the probability of smoking daily at some point in adulthood. In particular, exposure to child physical abuse and poor relationship with parents are significantly associated with the probability of having ever smoked daily, while having experienced physical harm from persons outside the family does not significantly affect smoking behavior later in life (Panel A). It is important to observe the differences between genders. Having experienced harm from the mother has a more important effect for men but physical abuse from the father increases more the probability of smoking

for women; for men the odd ratio in this case is slightly above 1 but it is not significant. A poor relationship with the mother increases by 1.317 the probability of smoking daily for females but is not significant for men. The relationship with the father, instead has a similar impact on both genders, increasing by about 1.2 the probability of smoking daily. When using the ACE index the overall effect is more important for women although is significant for both genders.

Rather interesting is the result for the relationship between the number of books the respondent declares to have had at home when he/she was 10 years old and the probability of having ever smoked. Having more than 100 books at home during childhood has a positive and significant impact on the probability of having ever smoked daily. However, if we look at the interaction between the number of books and the generation the respondents belong to, the effect goes in the opposite direction and it is strongly significant for both the baby boomers and the X generation. This is not surprising. Indeed, among older cohorts smoking was initially more common among people in higher socioeconomic positions, also due to a lack of information about the health-related consequences. This trend begins to invert when we look at the younger generations (as Baby Boomers and X generation), for which a higher socioeconomic status was negatively correlated with smoking behavior (Di Novi et al., 2019).

Table 1: Logit, Odds Ratio. Dependent Variable: Ever smoked daily (Yes/No)

	Panel A			Panel B		
	All	Female	Male	All	Female	Male
ACEs variables:						
Harm mother	1.135***	1.110**	1.164***			
	(0.0346)	(0.0482)	(0.0505)			
Harm father	1.080**	1.150**	1.016			
	(0,0370)	(0,0564)	(0,0495)			
Harm other	1.088*	1.108	1.076			
	(0.0511)	(0.0730)	(0.0719)			
Relationship mother	1.267***	1.317***	1.102			
	(0.0433)	(0.0546)	(0.0728)			
Relationship father	1.202***	1.202***	1.227***			
	(0.0370)	(0.0507)	(0.0551)			
ACE index				1.003***	1.005***	1.002***
				(0.0094)	(0.0008)	(0.0007)
Female	0.392***			0.391***		
	(0.0094)			(0.0094)		
Baby Boomers	1.647***	2.369***	1.131***	1.755***	2.796***	1.168***
	(0.043)	(0.091)	(0.043)	(0.0682)	(0.1661)	(0.0646)
X Generation	1.620***	2.189***	0.952	1.640***	2.484***	0.921
	(0.137)	(0.206)	(0.212)	(0.2102)	(0.3534)	(0.3319)
Baby Boomers*ACE index				1.000	0.998*	1.001
				(0.0006)	(0.0009)	(0.0009)
X Generation*ACE index				1.004**	1.003	1.004
				(0.0021)	(0.0024)	(0.0058)
More than 100 books	1.212***	1.237***	1.170***	1.686***	1.884***	1.684***
	(0.042)	(0.057)	(0.062)	(0.1095)	(0.1702)	(0.1652)
More than 100 books*Baby Boomers				0.655***	0.609***	0.603***
				(0.0477)	(0.0609)	(0.0665)
More than 100 books*X Generation				0.401***	0.321***	0.529

				(0.0801)	(0.0720)	(0.2685)
Education controls	yes	yes	yes	yes	yes	yes
SES controls	yes	yes	yes	yes	yes	yes
Country dummies	yes	yes	yes	yes	yes	yes
N obs.	31341	17757	13584	31341	17757	13584

Notes: * p<0.1, ** p<0.05, *** p<0.01. All the reported coefficients are odds ratio. Models in Panel A include as control variables educational level of respondents and their parents, SES variables when respondents were 10 years old (if father was unemployed, household size, number of rooms in the house, more than 100 books in the house), generation and country dummies. Models in Panel B include as control variables educational level of respondents and their parents, SES variables when respondents were 10 years old (if father was unemployed, household size, number of rooms in the house, more than 100 books in the house), generation and country dummies plus interaction terms between (i) generation and ACE index; (ii) more than 100 book and ACE index.

Table 2 shows the results for the number of years a respondent reports to have been smoking or to have smoked in the past. Panel A shows the coefficients for each ACE variable separately, while in Panel B we consider the ACE index instead of single variables, along with the set of interaction terms as in Table 1. Again, we find a significant and positive relationship between adverse childhood conditions and the total years of smoking. Worth observing that having experienced physical harm from father (Panel A) has a positive and significant impact on the number of smoking years in all specifications, the effect being larger for women. Interestingly, exposure to physical harm from mother, instead, is positively and significantly related to the intensity of the smoking behavior for the female subsample, but it is not a significant predictor for the total years of smoking of males.

If we look at Panel B, our results confirm a positive and significant correlation between the ACE index and the number of years respondents report to having been smoking or having smoked in the past.

Table 2: OLS, Dependent Variable: Years of Smoking

	Panel A			Panel B		
	All	Female	Male	All	Female	Male
ACEs variables:						
Harm mother	0,8508**	1,4535***	0,3757			
	(0,3523)	(0,4131)	(0,5819)			
Harm father	1,2815***	1,6372**	1,1233**			
	(0,3671)	(0,582)	(0,4013)			
Harm other	0,24	0,7834	-0,1435			
	(0,3283)	(0,689)	(0,4689)			
Relationship mother	0,6093	0,7971	0,0135			
	(0,5833)	(0,5846)	(0,7724)			
Relationship father	0,3176	0,8546	-0,1387			
	(0,3343)	(0,6632)	(0,3716)			
ACE index				0.0331***	0.0489***	0.0275**
				(0.0084)	(0.0133)	(0.0100)
Female	-3.151***			-3.285***		
	(0.5912)			(0.5457)		
Baby Boomers	1.9564***	0.9519	2.7346***	2.8000***	2.6650**	3.4373***
	(0.6673)	(0.9011)	(0.8965)	(0.7720)	(1,2084)	(1,0712)

X Generation	-0.4135	-2.0591*	0.7273	0.7219	0.0269	27.528
	(1.0067)	(1.1449)	(2.0786)	(1.2361)	(1.5169)	(3.1220)
Baby Boomers*ACE index				-0.0168*	-0.0259*	-0.0181*
				(0.0082)	(0.0142)	(0.0103)
X Generation*ACE index				-0.0118	-0.0227	-0.0404
				(0.0113)	(0.0164)	(0.0363)
More than 100 books	0.5340	0.5856	0.6198	1.4121*	3.0831**	0.4509
	(0.3801)	(0.4617)	(0.5211)	(0.7530)	(1.0858)	(1.2563)
More than 100 books*Baby Boomers				-1,0955	-2.9279**	0.1815
				(0.7567)	(1.2547)	(1.4188)
More than 100 books*X Generation				-2.8419*	-4.8472**	-0.4458
				1,5395	(1.6986)	(3.6322)
Age and Education controls	yes	yes	yes	yes	yes	yes
SES controls	yes	yes	yes	yes	yes	yes
Country dummies	yes	yes	yes	yes	yes	yes
N obs.	13212	5867	7345	13054	5806	7248

*Notes: * p<0.1, ** p<0.05, *** p<0.01. Models in Panel A include as control variables respondents' age, educational level of respondents and their parents, SES variables when respondents were 10 years old (if father was unemployed, household size, number of rooms in the house, more than 100 books in the house), generation and country dummies. Models in Panel B include as control variables respondents' age, educational level of respondents and their parents, SES variables when respondents were 10 years old (if father was unemployed, household size, number of rooms in the house, more than 100 books in the house), generation and country dummies plus interaction terms between (i) generation and ACE index; (ii) more than 100 book and ACE index.*

4.2 Unemployment

Tables 3 and 4 summarize the regression results concerning the impact of ACEs on the number of unemployment and out of the labor force spells respectively, along individual working careers. We estimate two models for each outcome: on the one hand we estimate the overall effect of early life adversities using the aggregate ACE index, on the other hand, in order to get additional insight, we evaluate the impact of each ACEs separately. We find that exposure to adverse circumstances during childhood and adolescence is, in general, significantly associated with more unemployment and out of the labor force spells. These results are robust to the inclusion of controls for SES, country and year of birth fixed effects, childhood health status, current age and education of respondents and their parents.

The ACE index is a significant predictor of both outcomes in five out of six specifications with a stronger impact on men. If we focus on single ACEs, we find that a poor relationship with parents has a strong and significant positive impact on the number of unemployment spells with some differences among parents and genders. The relationship with the mother has a larger effect on the number of spells of unemployment than the relationship with the father, for both men and women. On the other hand the effects are more significant for males. Having experienced physical harm from parents or from other persons outside the household is generally not significantly different from zero.

Interestingly, having experienced a poor relationship with the mother is positively and significantly associated with the number of spells an individual reports to be out of the labor force for females, but not for males. On the other hand, a negative emotional relationship with the father appears as a strong predictor for experiencing a higher number of spells out of the labor force for the male subsample.

Table 3: Total Unemployment spells, Negative Binomial Model.

	Unemployment spells					
	All	Female	Male	All	Female	Male
ACE Variables:						
Harm mother	-0.0015	-0.0081	-0.0045			
	(0.0123)	(0.0189)	(0.0173)			
Harm father	-0.0121	0.0203	-0.0398*			
	(0.0188)	(0.0189)	(0.0240)			
Harm others	0.0185	0.0186	0.0158			
	(0.0250)	(0.0312)	(0.0316)			
Relationship Mother	0.0777***	0.0771*	0.0719***			
	(0.0256)	(0.0454)	(0.0277)			
Relationship Father	0.0491***	0.0422**	0.0581***			
	(0.0145)	(0.0184)	(0.0209)			
ACE index				0.0010***	0.0007***	0.0010***
				(0.0001)	(0.0002)	(0.0002)
Female	0.1125***			0.1155***		
	(0.0366)			(0.0365)		
Age and Education controls	yes	yes	yes	yes	yes	yes
SES controls	yes	yes	yes	yes	yes	yes
Country dummies	yes	yes	yes	yes	yes	yes
Yr Birth dummies	yes	yes	yes	yes	yes	yes
N obs	8765	3451	5314	8765	3451	5314

Notes: * p<0.1, ** p<0.05, *** p<0.01. Models in Panel A and B include as control variables respondents' age, educational level of respondents and their parents, SES variables when respondents were 10 years old (if father was unemployed, household size, number of rooms in the house, more than 100 books in the house), years of birth and country dummies.

Table 4: Total Out of the labor force spells, Negative Binomial Model.

	Out of the labour force spells					
	All	Female	Male	All	Female	Male
ACE Variables:						
Harm mother	0.0324	-0.1246	0.0442			
	(0.0631)	(0.2259)	(0.0686)			
Harm father	-0.051	0.0375	-0.0556			
	(0.0626)	(0.3043)	(0.0633)			
Harm others	0.0101	0.3301	-0.0157			
	(0.1045)	(0.3657)	(0.0895)			
Relationship Mother	0.0386	0.9070**	-0.007			
	(0.1049)	(0.3732)	(0.1060)			
Relationship Father	0.1735***	-0.0803	0.1787**			
	(0.0625)	(0.3155)	(0.0710)			

	All	Female	Male	All	Female	Male
ACE index				0.0024***	0.0006	0.0025***
				(0.0007)	(0.0022)	(0.0007)
Female	2.377***			2.395***		
	(0.0625)			(0.1923)		
Age and Education controls	yes	yes	yes	yes	yes	yes
SES controls	yes	yes	yes	yes	yes	yes
Country dummies	yes	yes	yes	yes	yes	yes
Yr Birth dummies	yes	yes	yes	yes	yes	yes
N obs	8765	3451	5314	8765	3451	5314

Notes: * p<0.1, ** p<0.05, *** p<0.01. Models in Panel A and B include as control variables respondents' age, educational level of respondents and their parents, SES variables when respondents were 10 years old (if father was unemployed, household size, number of rooms in the house, more than 100 books in the house), years of birth and country dummies.

4.3 Family Dissolution

Results in Table 5 report the coefficients (odds ratio) for being divorced or separated in adulthood. As in the case of unemployment, we specify two distinct models for the outcome of interest, including the overall index or each ACE variables separately.

In line with previous findings, being exposed to adverse circumstances in childhood and adolescence is significantly correlated with the probability of experiencing divorce or separation later in life. Interestingly, this effect seems more pronounced for the female subsample with respect to the male ones. If we focus on single ACE variables, exposure to physical harm by persons outside the family and having experienced a poor relationship with mother are strong predictor of family dissolution for women, but not for men. On the other hand, a low-quality relationship with father significantly affect the probability of divorce or separation for both male and female subsamples.

Table 5: Logit, Odds Ratio. Dependent Variable: Being Divorced/Separated in adulthood.

	Divorced/Separated					
	All	Female	Male	All	Female	Male
ACE Variables:						
Harm mother	1.051	1.017	1.085			
	(0.057)	(0.072)	(0.092)			
Harm father	1.163***	1.137	1.201**			
	(0.066)	(0.090)	(0.098)			
Harm others	1.359***	1.482***	1.190			
	(0.097)	(0.140)	(0.131)			
Relationship Mother	1.460***	1.610***	1.168			
	(0.088)	(0.117)	(0.128)			
Relationship Father	1.302***	1.256***	1.388***			
	(0.071)	(0.089)	(0.119)			
ACE index				1.005***	1.006***	1.004***
				(0.001)	(0.001)	(0.001)
Female	1.314***			1.311***		

	(0.0523)			(0.0519)		
Education controls	yes	yes	yes	yes	yes	yes
SES controls	yes	yes	yes	yes	yes	yes
Country dummies	yes	yes	yes	yes	yes	yes
Yr Birth dummies	yes	yes	yes	yes	yes	yes
N obs	31129	17553	13393	31129	17553	13393

Notes: * p<0.1, ** p<0.05, *** p<0.01. Models in Panel A and B include as control variables educational level of respondents and their parents, SES variables when respondents were 10 years old (if father was unemployed, household size, number of rooms in the house, more than 100 books in the house), years of birth and country dummies.

5. Conclusion

The importance of early life conditions in determining individuals' future health and economic status is well documented in the literature. In this paper, we specifically focus on whether exposure to adverse experiences as physical abuse and emotional neglect during childhood may affect a subset of adult outcomes, namely smoking behavior, unemployment and family disruption, using recent European data from SHARE.

Our results confirm the negative long-term effects of exposure to ACEs on risk behaviours such as smoking, as well as on SES outcomes like unemployment experiences and family dissolution.

However, this study presents some limitations. Firstly, ACEs were retrospectively recalled in adulthood and may have been subject to recall bias and "coloring". Moreover, at this stage we do not consider other potential confounders, such as adult adverse events, which may affect outcomes later in life.

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