Social Determinants of Depression

in Later Life

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1. General Introduction

Motivation

In the face of aging societies changes in health of the older population gain increasing importance. Although declines in physical health are very obvious in older age, the role of psychological and mental diseases must not be neglected. Depression, a very frequent mental disease in older age, deserves closer attention.

According to the World Health Organization 151 million people worldwide suffer from depression and thus depression is a major cause for morbidity (Funk et al., 2010). Although there is a wide variation in lifetime prevalence, studies suggest that about 8 to 12 percent of the population in most countries will experience an episode of depression at least once in life (Möller et al., 1995). A meta-analysis by Luppa and coworkers in 2012 (Luppa et al., 2012) on the prevalence of depression in latest life (75 or older), based on studies published from 1999 onwards, estimated that about 17 percent of the older population suffer from a depressive disorder.

Depression is a costly disease. Direct costs cover outpatient care, hospitalization, and drug costs, but also indirect costs due to morbidity and mortality (Sobocki et al., 2006). Sobocki and colleagues conducted a study in 2006 (Sobocki et al., 2006) and estimated that the costs for depression correspond to 1 percent of the total economy of Europe (GDP), and thus depression has a severe economic impact. Luppa and colleagues (Luppa et al., 2013) suggest that depression in old age is associated with an increase in unexplained physical symptoms (headaches, gastrointestinal problems), which add to an increase in health care use. Thus, Luppa and colleagues estimate in their 4.5 five years follow-up study, based on 305 participants ages 75 or older, that "mean annual direct costs of individuals with depressive symptomatology exceeded the direct costs of non-depressed individuals by almost one third at baseline and follow-up" (Luppa et al., 2013, 299).

Research so far provides clear evidence that the occurrence of depressive symptoms is not only caused by biological or psychological factors, but is also influenced by a wide array of social risk factors. So far, it is not sufficiently understood, which role the social context plays in explaining social gradients in

depression in individuals as well as in explaining differences in prevalence between countries or regions in cross-national studies. Not everybody faces the same risk of experiencing depression: studies show a statistical association between people's position within the social structure and the prevalence of depressive symptoms (Berkman & Kawachi, 2000; Horwitz & Scheid, 1999). Depression is more prevalent among women and among older people (Mirowsky & Ross, 1992, 2003; Ross & Mirowsky, 2006). Furthermore, marital status, employment status, educational attainment, economic position in general, as well as lifestyle factors and geographical regions are all associated with different risks for depression (e.g. Mirowsky & Ross, 2003; Ploubidis & Grundy, 2009). These research results suggest the existence of a social etiology in depressive symptoms (e.g. Aneshensel, 2005). The aim of this dissertation thesis is to add to the understanding of social factors and social causes of depression in later life.

The remainder of this introductory chapter structured as follows: First, depression as a disease will be introduced and its biological, psychological, and social causes will be presented. Next, theoretical approaches commonly used in the social sciences in order to explain the existence of a social gradient in depression will be introduced. Special emphasis will be put on the role of critical life events and the life course perspective. Finally, the chapter concludes with an introduction of the research questions and a short summary of the results.

What is depression?

Depression is an affective disorder, which is characterized by episodes of changes in the psychological and/or physical well-being, which last for more than two weeks. Persons suffering from depression report a wide array of symptoms. These symptoms can be either of affective nature (such as depressed mood, feelings of guilt, irritability, suicidality, tearfulness) or motivational nature (such as loss of interest or lacking enjoyment in otherwise enjoyable activities). A depressive disorder is also associated with symptoms that seem to be rather physical and unspecific (such as diminution in appetite or sleeping problems), which makes it sometimes difficult to identify them as being caused by a depression.

About two thirds of depressive disorders have a unipolar course of disease (i.e. only depressive phases); about 30 percent of depressive disorders are bipolar

(i.e. depressive and manic phases). Only about 5 percent of diagnosed depressions have a course of disease that is manic only (Möller et al., 1995).

Compared to men (and independent of cultural context) women are more than twice as likely to suffer from a depressive disorder. The average age in which depression occurs for the first time ranges between 40 and 45 years for unipolar depression and between 30 and 35 years for bipolar depression. The prevalence for late-life depression (i.e. depression among persons aged 65 and older) is estimated with 10 percent (Möller et al., 1995). Other studies estimate the prevalence of depression in the population aged 75 and older with 17 percent (Luppa et al., 2012). A study by Dewey and Prince (2005) showed that the prevalence of depression varies not only by gender and age, but also across European countries: "In northern European countries the prevalence in men increases from around 10-15% at age 50 to 20-25% at age 75, and in women from 20-25% at age 50 to 35-40% by age 70. In southern European countries the prevalence in men increases from 10-20% at age 50 to 30-40% by age 75, and in women from 30-40% at age 50 to 50-70% by age 75" (Dewey & Prince, 2005, 110).

Earlier studies from the 1970s estimated that about 10 to 15 percent of depressed persons commit suicide (Guze & Robins, 1970; Möller et al., 1995). Newer studies reveal that this number is overestimated; instead, the suicide rate among persons suffering from a major depression is estimated with about 3 to 9 percent (Bostwick & Pankratz, 2000). It is remarkable that about 25 percent of depressed persons do not consult a general practitioner with their symptoms; in about 50 percent of the cases the depression is not diagnosed as such by the GP (Möller et al., 1995).

Traditionally, three different forms of depression were commonly distinguished: the endogen depression (caused by changes in the cerebral metabolisms or genetic disposition), a neurotic or reactive depression (caused by reactions and mal-adaptions to long lasting strains or critical life events), and the somatogenic depression (caused by physical disorders). Nowadays, this threefold distinction is considered as no longer valid. Instead, the multifactorial "biopsychosocial" approach assumes that a depressive disorder is usually caused by biological, psychological, and social factors altogether (Santrock, 2007). Blazer and Hybels argue, that the biopsychosocial model is "especially applicable to the elderly because it reminds us that the origins of late-life depression are multiple and range across all three domains. Even so, the model can be misleading given the tight

connections between the domains. For example, psychological dimensions have biological mechanisms and biological models imply input from the environment" (Blazer & Hybels, 2005). In line with the biopsychosocial model is the stress-diathesis approach which suggests that a depressive disorder becomes prevalent if an existing vulnerability (=diathesis) to depression becomes activated by adverse life circumstances (=stress) (Patten, 2013; Scher et al., 2005).

Biological causes

Scientific studies have found that patients suffering from depression show altered biochemical processes in the brain and changes in the endocrine system (Möller et al., 1995). For a long time researchers suspected depression to be associated with a reduction in the neurotransmitters norepinephrine resp. serotonin. Neurotransmitters are chemical substances that are needed in order to transport nerve signals from one neuron to another neuron across the synaptic cleft. Studies showed that depressive patients showed lower levels in the norepinephrine- and serotonin metabolites MHPG and 5-HIES compared to non-depressive persons. Today, instead of attributing depression to a reduction of single neurotransmitters, researchers suspect that a deficiency and dysbalance between several neurotransmitters is responsible for depression (Nutt, 2008). Neurotransmitters found to be associated with depression are serotonin (regulates sleep, mood, and appetite, also inhibits pain), norepinephrine (is associated with motivation and reward), and dopamine (regulates motoric control and is also associated with motivation and controls how persons perceive reality). Further neurotransmitters, which play a role in depressive disorders are acetylcholine (is involved in learning and recall) and Gamma-aminobutyric acid (related to anxiety) ("What causes Depression?, 2013).

Other theories suggest that depression could be partly caused by a mal-adaption to chronic stress (Dickerson & Kemeny, 2004), which manifests in changes in the endocrine system. Individuals with a current depression are found to exhibit an overreaction of the hypothalamic-pituitary-adrenal (HPA) function (Morris et al., 2012), which results in higher cortisol levels in blood and urine. The cortisol levels are chronically elevated independent of the existence of a stressor (Schuhmacher, 2011). A meta-analysis by Burke, Davis, Otte, & Mohr (2005) revealed that

depressed persons reacted to a stressor with comparable cortisol levels compared to non-depressed persons, but needed significantly more time to recover from the stress reaction.

Still other studies found differences in the brain structures between depressed patients and non-depressed persons: MRI-scans showed a decrease in the mass of the hippocampal volume and other regions in the brain such as the orbitofrontal cortex, putamen, and thalamus (Sexton et al., 2013); however, it is not clear whether this reduction is a cause for or a consequence of a major depressive disorder (Videbech & Ravnkilde, 2004).

Other biological origins of depression especially in later life include vascular diseases, Alzheimer's disease, and comorbidity with myocardial diseases, diabetes, hip fracture, stroke, or disability in daily activities (for an overview see Blazer & Hybels, 2005).

Genetic causes

Family-, twin-, and adoption studies show the existence of a genetic disposition for depression (e.g. Sullivan et al., 2000). Lau and Eley (2010) present an overview over research based on the genetics of depression, according to which about 30-40% of the variance in adult depression can be attributed to genetic influences. Many studies, especially twin studies, were able to show that the likelihood of developing a depressive disorder following critical life events or chronic stressors was predicted by genetic factors (see Lau & Eley (2010) for an overview). A study that investigated the interaction between stressful life events and a specific genetic polymorphism in the serotonin transporter gene (5HTT, a transporter gene which is responsible for the release of serotonin under parasympathetic excitation) showed that a depressive reaction to high stressors was significantly stronger among individuals with higher methylation levels in the 5HTT gene (Olsson et al., 2010). Caspi and colleagues (Caspi et al., 2003) also found that a depressive reaction to a stressful life event was significantly stronger among persons who carried one or two copies of the short form of the 5HTT promoter allele.

Even though there is a large amount of evidence that depression is associated with social factors, it is still not entirely clear, how the social environment affects

physiological and biochemical processes which in the end lead to depression. Lau and Eley (2010) suggest that the debate "nature *versus* nuture" should be substituted by the discussion on "nature *and* nuture". Toyokawa and coworkers come to the same conclusion in their overview over the literature and stress that "[...]twin studies suggest a critical effect of genes on psychiatric disorders; however, they also indicate that environmental factors underlie the development of psychopathological phenotypes" (Toyokawa et al., 2012, 68).

Lau and Eley (2010) argue that complicated correlations between environmental factors and genetic dispositions, such as gene-environment correlation (i.e. genetic factors influence the exposure to a certain social environment), gene-environment interaction (i.e genetic factors influence the response to a social environment or the social environment influences a genetic risk), and epigenetics (i.e. social environment modifies gene expression) should be taken into account:

Gene-environment correlation: The concept of gene-environment correlation states, that "[...]genes influence human interactions with the social environment by enhancing exposure toward certain environmental experiences" (Lau & Eley, 2010, 314). Correlations between genes and the environment occur, when the number of individuals, which carry a certain genotype, is not randomly distributed across society. In the concept of gene-environment correlation genes do not influence the social environment (i.e. individuals who carry a certain genotype do not "shape" their environment). Instead, the genetic vulnerability to depression "is expressed through exposure to high-risk environments" (Lau & Eley, 2010, 322). Gene-environment correlation helps to explain why some social strata exhibit higher prevalence of depression than others, but it does not help identifying a causal effect of social environment on depression. Instead it suggests a social selection rather than a social causation.

Gene-environment interaction: Gene-environment interaction occurs when the response to the social environment or to critical life events is influenced by genetic factors. Many studies, especially twin studies, were able to show that the likelihood of developing a depressive disorder following critical life events or chronic stressors was predicted by genetic factors (for an overview see Lau & Eley, 2010). A study that investigated the interaction between stressful life events and a specific genetic polymorphism in the serotonin transporter gene (5HTTLPR) showed that a depressive reaction to a stressful life event was significantly stronger

among persons who carried one or two copies of the short form of the above mentioned allele (Caspi et al., 2003). However, the results are being discussed controversially since other studies were not able to replicate the results (e.g. Chipman et al., 2007).

Epigenetics: Epigenetics is research on how the social environment modifies gene expression and thus offers a fruitful approach for how social environment gets translated into psychopathological outcomes (Toyokawa et al., 2012). To be precise, epigenetics refers to "[...]the heritable, but modifiable, regulation of genetic functions that are mediated though non-DNA-encoded mechanisms, in particular DNA methylation and histone modification" (Toyokawa et al., 2012, 68). Although epigenetic studies focus mainly on other diseases such as cancer, a growing body of literature suggests that epigenetic processes also influence psychological disorders.

Psychological causes

Several psychological factors are discussed as possible causes for depression. Among them are personality traits, the cognitive model of depression, and self-efficacy.

Personality traits: In their overview over psychological origins of depression, Blazer and Hybels (2005) cite a study by Morse and Lynch (Morse & Lynch, 2004), which found that older patients, who are suffering from a personality disorder, are four times more likely to experience depression compared to those without a personality disorder. Morse and Lynch (2004) found that personality disorder traits were associated with the psychological correlates of depression, such as hopelessness or ambivalence regarding emotional expression. Other personality traits associated with depression are neatness, accurateness, primness, and self-sacrifice (Möller et al., 1995).

Cognitive model of depression: The cognitive model of depression was developed by Aaron T. Beck (Beck, 1987). Beck assumes that maladaptive cognitions are the central problem causing a depressive disorder. Persons perceive themselves, their environment, and the future in a very negative manner (the so-called cognitive triad). The negative thoughts and believes then influence behavior and emotions. The cognitive model of depression is based on three principles: firstly, the cognitive

triad; secondly, recurrent patterns or schemas of depressive thinking and believes; thirdly, cognitive errors, which lead to distorted information processing.

Self-efficacy: The concept of self-efficacy was developed by Albert Bandura (Bandura, 1997) and refers to the expectation of a person to be able or not able to perform actions and reach goals due to own competences (or the lack thereof). Concepts such as self-efficacy, mastery, or locus of control have been used to describe an association between depressive symptoms and personal attribution style. Depressed persons have negative beliefs about themselves and are convinced that everything that happens to them is out of their own control and that they are unable to influence outcomes. As Blazer and Hybels (2005) show in their overview over the literature, several studies confirmed theses associations: Beekman and coworkers (Beekman et al., 2001) showed that depression was predicted by external locus of control. Another study by Jang and colleagues (Jang et al., 2002) suggests that higher levels of mastery are associated with a decrease in depressive symptoms among older adults. Another study by Holahan and Holahan (Holahan & Holahan, 1987) confirmed that self-efficacy has a direct as well as an indirect (via its effect of social support) impact on depression among older adults.

Social causes

Many renowned sociologists dedicated their work to the understanding of the social disparities in mental health. Among them are John Mirowsky and Catherine Ross. In their seminal 2003 book "Social Causes of Psychological distress"[1] (Mirowsky & Ross, 2003), which refers to the work of other influential sociologist in the field of mental health disparities (such as Ronald Kessler, Leonard Pearlin, Peggy Thoits, or Blair Wheaton), they introduce and discuss six basic social patterns of distress and depression, which have been discovered and confirmed in many (U.S.-based) studies and by many social scientists over the last 40 years. The basic social factors that are associated with depression are socioeconomic status, marriage, children, gender, age, and undesirable life events.

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[1] "Social Causes of Psychological Distress" is considered one of the most influential books in the sociology of mental health. According to Google Scholar, the book has been cited more than 1,100 times in many different disciplines, such as sociology, psychology, or public health (Google Scholar, 2013).

Socio-economic status and education: The socio-economic status signifies a person's status within society relative to others regarding the distribution of resources such as education, employment, occupation, income, or wealth. Education is the key determinant for a person's socio-economic status and their placement in the social stratification system. Higher education increases the chances to get a job; it is associated with higher job quality and higher income, and studies have shown that education has a very strong association with many health outcomes, physical as well as mental health (Ross & Mirowsky, 2006). Higher education is associated with lower levels of depressive symptoms, even when controlling for a wide array of other variables (Kok et al., 2012; Ladin, 2008). Ross and Mirowsky argue that education is particularly beneficial for the (mental) health of otherwise (socio-economically) disadvantaged groups (Ross & Mirowsky, 2006, 2011).

Being employed is also associated with better mental health outcomes. Several studies have shown that full-time employment is connected to higher psychological well-being compared to part-time employment (Reynolds & Ross, 1998; Ross & VanWilligen, 1997). Higher economic and financial prosperity are also associated with psychological well-being. Financial hardship is a constant stressor since it hampers people in their everyday life (e.g. paying their rent and bills, buying food and clothes) and thus leads to a reduction in good mental health (Mirowsky & Ross, 2001).

Marriage: Another pattern, which has been confirmed throughout the past decades, is that married persons report less psychological distress compared to non-married persons (e.g. Kessler & Essex, 1982). Among the non-married widowed and divorced/separated persons report the highest numbers of depressive symptoms, followed by those who have never been married or who cohabitate (Mirowsky & Ross, 2003). Some researchers argue that the strong association between marriage and psychological well-being is partly due to a selection effect since the (psychologically) healthy are more likely to find a spouse (Booth & Amato, 1991; Horwitz & White, 1991).

A long tradition in research argues that marriage is beneficial to men and to women, but the protective effect is stronger for men (Waite, 1995). Married men are more likely to receive instrumental support (e.g. housework tasks) as well as emotional support (also from sources outside the household) compared to their non-married counterpart (Lee et al., 1998; Umberson et al., 1992). The death of one's spouse is one of the most drastic events in life. Many studies confirm that

especially older widowed persons report less well-being and more symptoms of depression than do their married counterparts (Lee et al., 1998; Umberson et al., 1992; Williams & Umberson, 2004).

Children: In their overview over the six established social patterns in psychological distress, Ross and Mirowsky (2003) argue that although marriage is beneficial for mental health, raising children is not. Although having children is considered as being joyful and it is also considered as a social norm, studies show that having children in the household does not improve psychological well-being; sometimes it is even associated with worse mental health outcomes. Researchers argue that this is the case since "…the presence of children sharply increases the risk of economic hardship and strains in marital relationships, eroding the very resources needed to moderate the distress associated with raising them" (Mirowsky & Ross, 2003, 92). Furthermore, studies showed that persons living in households with children aged 15 years or younger, report more psychosocial stress - due to a higher amount of housework - compared to persons without children (Wolf, 2006). A study by Evenson and coworkers (2005) showed that parents do not have better mental health outcomes than childless persons; some types of parenthood (e.g. minor children at home, adult children at home, nonresidential adult stepchildren) are associated with more symptoms of depression. However, a study by Hansen and colleagues (2009) found that parenthood is not associated with an increase nor decrease in affective well-being. Hank and Wagner (2012) found only minor differences between childless and parents with children regarding depression and assume a non-linear association between the number of children and the number of depressive symptoms. Huijts and colleagues (2013) conjecture that the association between childlessness and depressive symptoms varies across countries within the European context and depends on social norms.

Gender: A very robust find is that women are more likely to suffer from depression than men - independent of cultural background (Aneshensel et al., 1981; Möller et al., 1995). This could well have biological reasons, but there are also social patterns that add to the explanation why women report more psychological distress than men. Ross and Mirowsky (2003) argue that women – especially those living in the traditional role model of a male breadwinner – are economically dependent since they either do not work at all or are only part-time employed. They are mainly responsible for the household chores, and often feel that they do not receive the appreciation they deserve for their work. Middle-aged women, who work full-time

or part-time, shoulder the double burden of paid work and household responsibilities. The family work (i.e. caring for children or parents) is also considered as emotionally demanding. A study by Wolf (2006) revealed that in case children aged 15 or younger are present in the household, the psychosocial stress resulting from raising children mainly affects women, since they are responsible for managing the elevated amount of housework. However, as children grow older and leave the household, the amount of housework and thus the psychosocial burden resulting from it, decreases (Wolf, 2006).

Especially in older cohorts women are lower educated and thus lack the very resource, which would help them to cope with distressing situations.

Some researchers argue that women are not more distressed than men. The response-bias view assumes that women are more aware of their emotions and are more willing to talk about them. Thus, women are more likely to *report* psychological distress. The gendered-response view assumes that women react to stress different than men. Whereas women react to stressors in their lives with anxieties and depression, men are more likely to react with anger or agitation. Thus, we constantly find a gender-gap in depression (Mirowsky & Ross, 2003).

Age: The relationship between age and depression is not linear. Instead, it seems to be U-shaped, with higher levels of depression at the beginning of adulthood, a steep decline with the lowest level in midlife, and an increase in later life (Clarke et al., 2011; Miech & Shanahan, 2000; Mirowsky, 1996; Mirowsky & Ross, 1992)*. Mirowsky and Ross (Mirowsky, 1996; Mirowsky & Ross ,1992) consider age as a change in physiological and psychological processes, which in turn affect mental well-being. According to Mirowsky and Ross (Mirowsky, 1996; Mirowsky & Ross, 1992) age can be regarded in terms of maturity, in terms of decline, as a stage, as survival, and as a historical trend. As people age they become "experienced, accomplished, and seasoned" (Mirowsky & Ross, 1992, 188). This process of psychological *maturity* inclines a decrease in depressive symptoms with age. Age as a *decline* on the other hand assumes that the levels of depression increase with age since important cognitive and physiological functions become worse with age. Age as a *stage* emphasizes the fact, that aging – from childhood to old age – implies a sequences of role entries and roles exits, which are all associated with changes in …"freedoms, prerogatives, privileges, options, opportunities, scope, and resources" (Mirowsky & Ross, 1992, 189), which in turn impact psychological well-being. Age as *survival* suggests, that there is a social selection, since depression

reduces survival and thus individuals that reach old have must have personality or other traits, which provide them with selective advantages regarding depression. Age as a *historical trend* assumes that the age gradient in depression is partly due to cohort membership, which in turn is associated with major cultural and societal trend. Educational attainment is such a trend. The number of persons with higher education increased over time (Mirowsky & Ross, 1992). Thus, younger generations are better educated that their predecessors. Since education in strongly associated with psychological health, is it not the aging process per se, but rather the differences educational attainment, which cause the age gradient in depression.

Undesirable life changes: Another constant pattern in research is that undesirable life changes are associated with a decrease in mental well-being. Whereas early research assumed that all life changes (either positive or negative) induced stress and therefore negatively influenced psychological well-being, later research argued that only undesirable life changes (i.e. life changes which are associated with a loss of resources which advance psychological well-being) cause increases in depression (Mirowsky & Ross, 2003). Since the influence of critical life events on depression received a tremendous amount of attention by researchers and, this perspective will be discussed in greater detail later in this chapter.

These six social patterns of depression described by John Mirowsky and Catherine Ross are well-established and very robust. However, they are not set in stone forever: since trends in society are under constant change, the findings described above might not be valid for future generations. As Mirowsky and Ross state: "The reasons why social differences in distress exist are also reasons why the differences might disappear" (Mirowsky & Ross, 2003, 76).

The identification of social differences in depression is one major step. The next step is to explain why this social gradient in depression exists. The next section of the chapter will introduce and discuss several theoretical approaches, which are used in the explanation of a social etiology of depression. Special emphasize will be put on the life course perspective and the impact of critical life events.

Aging and Depression - Theoretical Approaches

For a long time, researchers tried to tackle the social patterns of depression. Durkheim's classical work on differences in suicide rates between Catholics and Protestants, which he attributed to higher levels of social control among Catholics (Durkheim, 1983), laid the basis for the developments in sociological analyses of mental health. Several theoretical approaches have been applied to explain why there are social gradients in depression and why some people are more likely to suffer from depressive symptoms than others. Special attention has been paid to question why depression is so prevalent in later stages of life.

Clarke and coworkers (Clarke et al., 2011) developed a framework of social structuring of mental health over the adult life course and argue that it is not aging per se which induces an increase in depression. "Rather, the social structure of the life course, as a system of age-graded social statuses, has mental health consequences as persons enter and exit meaningful social roles" (Clarke et al., 2011, 1289). The social structure is defined by social status and roles. This follows the work of Ralph Linton (Linton, 1936), who states that the social role is a set of behaviors connected to social status. Social status in turn is the position within the cultural pattern, which is connected to a set of rights and duties.

A people age, they go through different role transitions – from childhood to old-age. Role transitions throughout the life course are partly individual choices, but they are always structured by rules, linkages, and mechanisms within the social structure (Riley, 1987). For instance, the transition from employment to retirement is institutionalized in many social systems with a legal retirement age. Role transitions, such as marriage, widowhood, job loss, or retirement, can be considered as critical life events, since they impose a drastic change in life (Holmes & Rahe, 1967).

Social positions or social status[2] are associated with different material (such as income) or immaterial (such as prestige or sense of control) resources, which have an impact on health (Ross & Wu, 1996; Ross & Wu, 1995). These resources can cumulate throughout the life course, as studies show (Maddox & Clark, 1992; Maddox & Douglass, 1974). As people enter and exit social roles and social positions,

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[2]Although the literature often distinguishes between "social status" and "social position" Ralph Linton (1936) and also Talcott Parsons (Parsons, 1951) use the terms interchangeably.

they also gain or lose access to the resources that are connected to the social position. Whereas role entries in midlife are associated with access to resources, which are beneficial to (mental) health, role exits, which appear in later life, are associated with a decline in such resources. Typical examples are employment and marriage. The entry to the employment role goes along with an increase in financial means, whereas the exit from the role – namely retirement – typically leads to decrease in financial resources. Marriage – a typical role transition in early midlife – goes along with an increase in social support and affection. Widowhood – a typical status transition in later life – then leads to a decrease in social support and affection. Financial resources as well as social support and affection are positively associated with psychological well-being (e.g. Cairney et al., 2003; Chen et al., 2009; Mirowsky & Ross, 2001).

The approach of Clarke and colleagues (Clarke et al., 2011) of a social structuring of mental health over the life course is also in line with other theoretical concepts, which are used to explain social gradients in mental well-being, such as the resource substitution theory of education and health by John Mirowsky and Catherine Ross (Ross & Mirowsky, 2006, 2010, 2011) or the theory of social production functions (SPF) by Siegwart Lindenberg (Lindenberg, 1989, 1990, 1991) and its application to health and well-being (Meertens, 2004; Nieboer et al., 1998; Steverink et al., 2001).

Lindenberg (1989, 1990, 1991) created the theory of social production functions (SPF), which is based on the assumption that people are rational and goal directed. The production of psychological well-being can be considered as a universal goal that all people aspire. Psychological well-being is determined by physical well-being on the one hand and social well-being on the other. Both, physical and social well-being, are universal needs. Their realization is dependent on the fulfillment of instrumental goals such as *comfort* and *stimulation* (in order to produce physical well-being) and *affection, behavioral confirmation*, and *status* (in order to produce social well-being). *Comfort* stands for the absence of physiological strains such as thirst, hunger or pain. With *stimulation*, Lindenberg refers to "activities that produce arousal, including mental and sensory stimulation and physical effort" (Nieboer et al., 1998, 116). *Affect* describes the emotional input one gets from a significant other in caring relationship such as friendship or partnership. *Behavioral confirmation* refers to the feedback one gets from relevant others following the compliance of norms. *Status* refers to the social approval one gets for

having control over scarce resources. In order to produce instrumental goals, people have to utilize different social, economic or cultural resources. If resources are lacking and cannot be substituted, people are hampered in the production of well-being, which in turn might induce suffering from depressive symptoms. Thus, the social production function theory offers a fruitful theoretical approach for explaining how socio-demographic differences affect the likelihood of suffering from depressive symptoms from a sociological point of view. As an example, making the role transition to marriage leads to gaining access to resources that can produce all instrumental goals, which in turn are necessary in order to produce well-being, whereas the role exit through widowhood leads to a loss of those resources. Thus, losing one's spouse will have severe consequences in the production of well-being.

Ross and Mirowsky (Ross & Mirowsky, 2006, 2010, 2011) developed the resource substitution theory of education and health, which states that education is more beneficial to the (mental) health of groups that are otherwise disadvantaged, i.e. that do not have access to many other health advancing resources. Education provides access to a wide array of health advancing resources, such as higher incomes, higher prestige, or better jobs, which are all associated with better (mental) health outcomes (Back & Lee, 2011; Berchick et al., 2012). Education is one key determinant of the placement in the social stratification system and for social positions and social roles. According to Ross & Mirowsky (2011) education is also a resource in itself. It stands for learned effectiveness and personal control. From the viewpoint of the theory of learned effectiveness education indicates resourcefulness. Thus, education produces a feeling of control over own life outcomes (Mirowsky & Ross, 1998, 2003). In line with the SPF theory, the resource substitution theory assumes that resources can be substituted. Thus, the absence of one resource is less harmful if other resources can substitute the lacking resource. Individuals who have access to many different resources, which are beneficial for health, are not as dependent on specific single resources, since they have alternative resources at disposal, which can substitute the lacking resource. But individuals with only very limited access to health advancing resources are more dependent on the specific single resources they do have access to.

Not only objective differences in social position are associated with depressive symptoms. Research based on stress theory (Pearlin et al., 1981) acknowledges the importance of subjective perceptions of social positions. Psychological traits as mastery, locus of control, or self-efficacy act as mediators and

moderators in the association between social position and depression (Mirowsky & Ross, 2003).

Since the theoretical framework suggested by Clarke and colleagues (Clarke et al., 2011) emphasizes the role of critical life events, which mark the intro into or exit from roles, and the role of the life course perspective, which marks the timing for role transitions, both concepts and their relevance for late life depression are discussed in greater detail in the next two sections of this chapter.

Critical Life Events and Depression

Research on critical life events and depression distinguishes several types of events. Under critical life events, one understands events throughout the life course, which elevate the risk for depression in later life (such as parental divorce) as well as events that are assumed to have a direct and immediate effect on current depression (such as widowhood). Brown and Harris (1978) found that most events lead to depression quite quickly, with a first onset of depression within the first three weeks. Kendler and coworkers (Kendler et al., 1998) found that for the majority of critical life events depression occurs within the first month after the event. However, in his 1997 paper, Ronald Kessler (1997) presents a number of studies which find evidence for long-term effects of previous stressors on current depression. These studies are able to show that adults with current depression report more childhood adversities such a parental divorces. Events that directly impact depression (such as unemployment, retirement, widowhood) also elevate the risk for later depression.

Over the years, researchers developed several instruments in order to rate life events. A very prominent example of such a rating scale is the "Social Readjustment Rating Scale" (SRRS) by Holmes and Rahe (1967), which is based on the "Schedule of Recent Experiences" by Hawkins, Davies, and Holmes (1957). The SRRS contains a list of 43 life change events, which are sorted by their life-change value (ranging from 100 for "death of a spouse" to 11 for "minor violations of the law"). The SRRS contains negative life events (such as widowhood) as well as positive life events (such as marriage). The assumption of the scale is that the stress resulting from the events depends more on the amount of change associated with the event rather than the negativity/positivity of the event. Whether such a scale is

effective and useful has been long debated (e.g. Turner & Wheaton, 1995). In the meanwhile, many other scales have been introduced (e.g. "Daily Hassles Scale" by Lazarus and Folkman (1989), the "Life Events and Difficulties Schedule (LEDS)" by Brown and Harris (1978), or the "Standardized Event Rating System (SERATE) by Dohrenwend, Raphael, Schartz, Stueve, and Skodol (1993)).

In their overview over the literature, Wichers and colleagues (Wichers et al., 2012) conjecture that the relationship between negative life events and depression is very complex. Basically, there are two different theoretical models to explain the association between life events and depression:

a) The causation model assumes a causal effect of negative life events (such as bereavement, job loss, or loss of self-esteem) on depression.

b) The stress generation model assumes that individuals "[…] with a history of depression are more likely to expose themselves to negative life events compared to individuals without a history of depression" (Wichers et al., 2012, 1801).

As Brown and Rosellini (2011) show there is evidence that supports both models.

The literature distinguishes further types of life events: *Dependent life events* are events that the individual could have contributed to, such as separation or divorce. *Independent life* events are events that are not under control of the individual, such as the death of a significant other or a natural disaster (Kessler, 1997). A study by Kercher and colleagues (Kercher et al., 2009), which applied path analysis, showed that depressive symptoms predicted dependent life events (stress generation model), but also that dependent life events are mediators in the effect of neuroticism on later depressive symptoms. Other studies were able to confirm the causation model, with independent life events predicting the onset of future depression (Kendler et al., 1999; Silberg et al., 2001). Kendler and colleagues (Kendler et al., 1999) also found that dependent events are more predictive for depression than independent events

A shared causal influence on both depression and life events is also possible. Studies suggest that neuroticism (Kendler et al., 2003; Kendler et al., 1993; Van Os & Jones, 1999) or socio-economic status (Brady & Matthews, 2002; Wang et al., 2010) might act as third factors.

There is also a discussion about shared genetic dispositions. Researchers argue that genetic dispositions exist, which elevate both the risk for depression and the risk for exposure to negative life events, but so far the evidence is mixed (see

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Wichers et al., 2012 for an overview). On the other hand, it is possible that genetic disposition increases the likelihood to experience negative life events (see Kendler et al., 1999; Lau & Eley, 2010), the so-called gene-environment correlation.

The literature also distinguishes between *random stressors* and *systematic stressors* in order to understand the social etiology of depressive symptoms (Pearlin et al., 1981; Thoits, 1983). Random stressors occur to all social groups with the same likelihood; they are not related to social position. Thus, they only help to predict overall risk of suffering from depressive episodes, but they do not help to explain, why some social groups are more likely to suffer from depression compared to other social groups. The occurrence of systematic stressors on the other hand is strongly associated with an individuals' social position and thus they can add to the understanding of a social gradient in depression

Not all life-changing events do lead to elevated risks for depression. The literature distinguishes *undesirable* (i.e. negative, such as job loss, widowhood) from *desirable* (i.e. positive, such as job promotion, marriage) life events. Studies show that the association between life events and depressive symptoms is much stronger for negative, undesirable life events, since these events lead to increased feelings of powerlessness and helplessness and thus induce depressive symptoms (Brown & Harris, 1978; Mirowsky & Ross, 2003; Ross & Mirowsky, 1989).

Not everybody develops a depression after a critical life event. The congruence model assumes - in line with the stress diathesis theory (see above) – that the onset of depression after a stressful life event is more likely for persons with a match "between an individual's personality styles or schemas and the occurrence of a stressor whose content is relevant to the personality style.[...] Thus, a person with high sociotropic values would be more likely than someone without such beliefs to interpret an interpersonal loss experience as highly significant and reflecting personal shortcomings, potentially triggering depression." (Hammen, 2005, 287).

Hammen (2005) distinguishes four different types of moderators and mediators in the association between critical life events and depression, which add to the explanation why individuals do not have the same likelihood of suffering from depression after being exposed to a critical life event:

1) Biological mediators and moderators: Many studies find associations between depression and abnormalities in the hypothalamic pituitary adrenal (HPA) axis (e.g. Plotsky et al., 1998). Studies suggest that critical life events and traumatic

stressors do not only trigger emotions that are related to depression, but might also lead to prolonged cortisol hypersecretion (Lee et al., 2002). Other studies suggest, that critical life events in childhood and early life could lead to changes and abnormalities in the HPA axis, which make individuals more sensitive to stressors in later life (e.g. Ladd et al., 2000).

The sensitivity to stressors may also depend on genetic dispositions and may thus be heritable (Kendler et al., 1995). In 2003, Caspi and coworkers (Caspi et al., 2003) found evidence that the short allele of the 5-HTTLPR (serotonin transporter) gene moderated the likelihood of reacting to severe stressors with the onset of depression. Individuals carrying the short allele were more likely to react to traumatic stress with depressive symptoms.

2) Developmental moderators and mediators: Stress and traumatic events in childhood and adolescence might influence how individuals react to stressors in adulthood. One effect could be that stress in childhood is associated with stress in adulthood. For instance, Bifulco and colleagues (Bifulco et al., 2000) found that women who experienced abuse in childhood reported more severe stress in adulthood. One the other hand, the "sensitization" effect assumes that individuals who experienced severe stress in childhood react more sensitive to stressors in adulthood and thus have a higher likelihood of developing depression compared to individuals, who experience the same stressors in adulthood, but who reported no adverse childhood events (Hammen, 2005, see also below)

3) Psychological moderators and mediators: Psychological characteristics, such as dysfunctional attitudes or negative attribution styles might act as moderators and mediators in the association between critical life events and depression (e.g. Lewinsohn et al., 2001). Several studies (Kendler et al., 2003; Kendler et al., 2004; Poulton & Andrews, 1992; Van Os & Jones, 1999) were able to show that neuroticism moderates the reaction to stressful life events.

4) Socio-demographic moderators and mediators: In her overview over the literature on socio-demographic moderators and mediators, Hammen (2005) focuses on the role of gender, since women are more likely than men to suffer from depression. The literature distinguishes specific stressors (such as sexual assault), chronic stressors, and episodic stressors. Studies suggest that women are more likely to experience specific stressors (e.g. Weiss et al., 1999; Whiffen & Clark, 1997). Women are also more prone compared to men to experience chronic stressors such as poverty, single parenting, or care-giving (e.g. Brown & Moran, 1997; Maciejewski

et al., 2001). However, the results regarding episodic stressors are mixed: while some studies find no gender differences (Kendler et al., 2001b; Maciejewski et al., 2001), others found more episodic stressors for women (McGonagle & Kessler, 1990).

Recently, researchers began to distinguish between first-onset and recurrent episodes of depression (Kendler et al., 2000) following critical life events. Early hypotheses by Kraepelin (Kraepelin, 1921) assume that psychosocial factors, such as critical life events, play a greater role in first-onsets of depression compared to subsequent episodes. Post and colleagues (e.g. Post, 1992) hypothesize that due to neurobiological changes that occur after being exposed to social stressors, individuals become "kindled" or sensitized and thus recurrent episodes of depression become more and more independent from exposure to social stressors. However, there is also the possibility that those who experience recurrent episodes of depression might have been more sensitive from the beginning. Thus, Kendler and colleagues (Kendler et al., 2000) applied a within-person comparison over time in order to examine the role of social stressors in recurrent episodes of depression, and their analyses confirmed the kindling effect. But still, it is unclear whether psychological or biological factors mediate the kindling effect in the association between social stressors and depression.

Further studies, which examined the role of genetic risk (Kendler et al., 2001a), suggest that the kindling effect is particularly strong in the genetic low-risk group, whereas the genetic high-risk group appears to be "prekindled" (i.e. the association between experiencing stressful life events and depression was weaker).

Life Course Perspective and Depression

Many studies have focused on the association between socio-economic status and depression (e.g. Mirowsky & Ross, 1986, 2003; Mirowsky et al., 2000; Ross & Mirowsky, 1989). Education serves as a key determinant to the placement in the social stratification system; it is considered as a key component of socio-economics status (Miech & Shanahan, 2000; Ross & Mirowsky, 2006). Therefore, education became an important determinant in studying how socio-economic status and depression are related. Educational attainment takes place in an early phase of life, namely childhood and adolescence. However, education is associated with

(mental) health outcomes even in later life or old age (e.g. Back & Lee, 2011; Kok et al., 2012; Mirowsky & Ross, 2008). In order to explain how something that takes place early in life (such as education) has an impact on outcomes in later life (such as health) one has to take developments throughout life course into account.

The stress paradigm (Pearlin, 1989; Pearlin et al., 1981) is helpful to shed light on the relationship between socio-economic status and health, since it allows insight into socially based stressors, which serve as mediators in the association between education and health in general. The stress paradigm has been extended by the inclusion of moderators – such as social support of control beliefs – since these moderators help to distinguish if and why certain stressors do or do not have an impact on psychological functioning and well-being and thus help to better understand the association between education and mental health. Miech and Shanahan (2000) examined the "traditional" use of the stress paradigm, which assumes an ageless individual (i.e. an individual reacts to stressors in an identical way independent of age, see Pearlin, 1989; Thoits, 1995) from the life course perspective, assuming that social stressors, such as stressful events or social roles, are age-graded in their consequences for health. Lower educated persons are disadvantaged since they own fewer resources, which might help them to cope with social stressors, such as skills or training. Following the theory of cumulative advantage, this gap in coping resources does not remain static throughout the life course and thus the education gap in depression either diverges or converges with age.

The theory of cumulative advantage was initially developed to study divergence in age regarding income, careers, or labor market behavior (Crystal & Shea, 1990; Dannefer, 1988; Kerckoff, 1993; Merton, 1968). In the past decades the cumulative advantage theory has been extended to study diverging health outcomes (Goosby, 2013; Ross & Wu, 1996). The theory assumes that the positive effect of education on health increases with age, which results in more health inequality among older people compared to younger ones (Ross & Wu, 1996). Better education increases the number of resources at disposal that are beneficial for health and which are cumulative with age. These resources can be of different nature: they can be economic (such as income), or social psychological (such as a sense of personal control), or life style resources (such as exercising or non-smoking), which all have an impact on health (Ross & Wu, 1996; Ross & Wu, 1995). As studies show, all of these resources, which are associated with education, cumulate throughout the life

course (Maddox & Clark, 1992; Maddox & Douglass, 1974). Ross and Wu (1996) demonstrate this with the example of exercising: at younger age most people are healthy and thus differences in a resource such as physical activity does not make large differences (House et al., 1990). However, as people age differences become apparent since those who do not exercise become less fit, more overweight and have more joint problems compared to those who are physically active on a regular basis. These health problems make exercising more difficult and more painful and thus interfere with physical activity. The result is that the ones who do not exercise become even unhealthier. Thus health differences in sedentary individuals and physically active individuals become larger and larger as individuals age.

However, one could also assume that the gap in depression converges with age since lower educated persons have a higher exposure to stressors and thus develop a kind of immunity. Another possibility could be that education-related stressors become less frequent with age. Selection might also play a role: those who are most vulnerable are more likely to die earlier and thus in older age only the healthy ones remain. However, empirical evidence so far supports the divergence hypothesis (Ferraro & Shippee, 2009; Hatch, 2005; Mirowsky & Ross, 2008).[3]

Although much research focused on the association between education and health, the life course approach goes much further than just examining how education influences health in later life. "Cumulative adversity and advantage implies that well-being is not simply a consequence of an isolated circumstance but the result of circumstances that evolve over time" (Hatch, 2005, 131).

The theory of cumulative inequality (Ferraro & Shippee, 2009; Goosby, 2013) extends the theory of cumulative advantage (which has a strong emphasis on the role of education) by combining the theory of cumulative advantage with a life course perspective, that integrates "...the intergenerational transmission of inequalities into life course aging and health processes (Goosby, 2013, 2).

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[3] Education may lead to diverging health outcomes with age "...through the influence of factors specific to later stages of the life course. This approach highlights the immediate consequences of social roles and adversities that become increasingly prevalent at later stages of the life course, rather than long-term consequences of factors present at earlier ages" (Miech & Shanahan, 2000, 164). These are events such as widowhood or (involuntary) withdrawal from the labor market, which can be classified as critical or stressful life events, but Miech and Shanahan argue that these events are more likely to hamper the psychological health of low educated persons and thus increase the diverging age gap in depression, partly because in later life is associated with decrease in coping resources such as social support and control beliefs.

Adverse childhood circumstances impact health outcomes in adult life. Physical health as well as psychological well-being and cognitive health in *later life* are affected by family background and socio-economic status of parents during *childhood*. Family background in childhood is found to have an impact on physical health in adulthood (Bowen & Gonzalez, 2010; Brandt et al., 2012; O'Rand & Hamil-Luker, 2005; van den Berg et al., 2009). One possible pathway could be childhood health since children of parents with a low socio-economic status have worse health status compared to children coming from a financially well-off background (e.g. Bauldry et al., 2012; Case et al., 2002; Currie et al., 2007; Reinhold & Jürges, 2012). Childhood health in turn strongly predicts health in adulthood and later life (Blackwell et al., 2001; Case et al., 2005; Haas, 2007, 2008). Even when controlling for adult social class, social class in childhood is still predictive of health outcomes such as cardiovascular diseases (Mirowsky et al., 2000).

There are several pathways how early socio-economic conditions (i.e. the socio-economic status of the parents) affect health in later life. This could start before even being born. Stress of the mother during pregnancy – while being in the womb – is also associated with depression in later life since both, maternal prenatal stress and higher maternal blood pressure, are associated with lower birth weight. Costello and coworkers (Costello et al., 2007) published results that showed that adolescent females with low birth weight are more likely to develop depression when faced with adversity compared to adolescent females with normal birth weight. However, other studies did not find an association between low birth weight and depression (Colman & Ataullahjan, 2010; Inskip et al., 2008; Osler et al., 2005)

As Goosby (2013) illustrates mothers with a low SES background are more likely to suffer from depression or other psychological distresses (Gilman et al., 2002; Kahn et al., 2000), which has an effect on the way they bring up, nurture, and supervise their offspring (Downey & Coyne, 1990; Elder & Shanahan, 2007; Ensminger et al., 2003). This results in developmental challenges and disadvantages for the children, which in turn affects their health and educational outcomes.

Children's educational outcomes are heavily influenced by the socio-economic status of their parents as the literature on intergenerational mobility suggests (e.g. Carvalho, 2012; Jerrim & Micklewright, 2009). As Case (2005) shows children from socially disadvantaged family backgrounds are hampered in their educational attainment since they are more likely to suffer from adverse health (see above). But since educational attainment is a key resource in the production of

health, these children will also show worse health outcomes in later life. Several studies suggest that the association between educational attainment and negative health outcomes is partly mediated though health behavior and lower socio-economic resources (Gall et al., 2010; Ross & Mirowsky, 2006, 2010, 2011).

Critical life events that occur in childhood are associated with adverse mental health outcomes in adult life and later life, such as parental loss or parental divorce. Parental divorce is associated with elevated risk for depression not only in adolescence but also in adult life (Aseltine, 1996; Ross & Mirowsky, 1999). Colman and Ataullahjan (2010) also cite studies that associated depression in adult life with abuse in childhood and inter-parental violence.

Research Questions

This dissertation thesis adds to the understanding of the social etiology of depression in later life from a theory based, empirical perspective. By means of three different research questions, the essays of this dissertation shed light on the social causes of depression from different angles: the associations between widowhood and depression as well as retirement and depression are used as examples for the impact of critical life events on mental health in later life. A third research question investigates on the life course perspective on depression in later life by examining the relationship between family background in childhood, personal educational attainment, and depressive symptoms. Critical life events and the life course perspective serve as frameworks within which the importance of social roles and resources as well as subjective perceptions of objective situations is examined.

The common database used in the empirical analyses is the "Survey of Health, Ageing, and Retirement in Europe" (SHARE), a longitudinal survey that combines extensive cross-national information on the socio-economic status, health and family relationships of Europe's elderly population (for an overview see Börsch-Supan et al., 2008; Börsch-Supan & Jürges, 2005; Malter & Börsch-Supan, 2013; Schroeder, 2011).

The following section introduces the three research questions and briefly summarizes the results.

1. Widowhood and Depression among Older Europeans – The Role of Gender, Caregiving, Marital Quality, and Regional Context

This chapter uses a longitudinal approach to add to the understanding of the relationship between widowhood and depressive symptoms. Widowhood is a critical life event and from the viewpoint of the social production function theory it is associated with an abrupt loss of many resources which are beneficial to production of psychological well-being. But the dimension of loss is not equal for all individuals. Individual perceptions of objective situations might act as moderators in the association between widowhood and depressive symptoms. Thus, this chapter focuses on the role of possible moderators, such as gender, caregiving, marital quality, and cultural context, and contributes to the research of widowhood and mental health by answering three questions: 1) Do men and women differ in the psychological consequences of widowhood? 2) What role do marital quality and caregiving play in the effect of widowhood on depression? 3) To what extent does widowhood increase levels of depression in the European context and are there differences in the association between widowhood and depression across Europe?

The results of the study suggest that widowhood is a critical life event, which has negative consequences for mental health. The analyses show that the negative experience of widowhood affects the levels of depression of men and women to a comparable extent. Widowed caregivers report a smaller increase in the number of symptoms of depression than non-caregivers, following a relief model. Although higher marital quality is usually associated with better mental health outcomes, widowed persons who experienced high marital quality show a larger increase in the number of depressive symptoms after the death of their spouse compared to widowed respondents who report lower marital quality. Furthermore, widowhood is associated with a smaller increase in the number of depressive symptoms in Northern Europe and Western Europe compared to Southern Europe.

2. The Association between Retirement and depression and the Moderating Role of Quality of Work

Retirement is a critical life event, and it signifies the exit from the job role. Research streams within sociology, gerontology, and psychology are trying to answer the question whether and how retirement is linked to mental health. So far,

the results are contradictory. Some studies find evidence, that retirement is related to an increase in mental health, while other studies show that retirees report worse mental health outcomes compared to employees. Whether the life changing event of entering retirement is experienced as a relief or a burden heavily depends on how the individual experiences the work role, e.g. whether the job role is experienced as pleasant or as straining. This chapter investigates whether quality characteristics of the last job (such as high efforts, low rewards, low control) moderate the association between retirement and mental well-being from a longitudinal perspective (i.e. observing respondents before and after the critical life event of retirement), by answering three questions: 1) Is going into retirement associated with a change in the number of depressive symptoms? 2) Is quality of work associated with depressive symptoms? 3) Does quality of work moderate the association between retirement and mental well-being?

The multivariate analyses show that retirement per se does not have an impact on mental well-being. Quality of work is significantly related to mental well-being, since an increase in job strain is followed by an increase in the number of depressive symptoms. Furthermore, the results of this study support the assumption that retiring from a stressful work environment, which elevates the number of depressive symptoms while still being employed, is associated with a relief reaction and thus with an increase in mental health after quitting the active labor force, whereas retiring from an empowering occupation leads to feelings of (role) loss and thus has negative effects on mental well-being

Although entering retirement can be considered as a life changing event from an objective point of view, is depends on the subjective perception of the circumstances whether the life change is experienced as positive or negative for mental well-being.

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

This chapter focuses on the life course perspective on mental health in later life and elaborates the role of education as a moderator and a mediator in the association between family background during childhood and psychological well-being in later life by applying the resource substitution theory developed by Mirowsky and Ross. Education can be viewed as a mediator, since the socio-

economic status of parents is one of the main determinants for educational attainment of children. Own educational attainment in turn determines health outcomes in adulthood and later life (through own socio-economic status and health behavior).

But as the resource substitution theory of education and health hypothesizes education is also a moderator in the association between parental socio-economic status and mental health in later life, since education is supposed to have a stronger impact on the psychological well-being of persons with disadvantaged family origins.

The literature so far suggests that a) the impact of family background on health diminishes with age, and b) the educational gap on health increases with age (following the cumulative advantage theory). Thus, this chapter investigates whether the interaction between family background and personal education on psychological well-being increases or diminishes with age.

The results of the empirical analyses show that individuals from a well-off family background report better psychological well-being in later life compared to individuals from a less prosperous family background, but this association is partly mediated by education. Higher levels of education are associated with lower numbers of depressive symptoms: the more years of education one accomplishes, the weaker the impact of family background on mental well-being becomes. But a low family background and low personal education amplify each other: individuals with a low parental SES lack exactly the resource they need in order to overcome the negative consequences their non-prosperous background, since are less likely to attain higher educational levels.

Confirming the cumulative advantage and the cumulative inequality theory, the differences in psychological well-being between higher educated and lower educated individuals become larger with age. The gap between individuals with a well-off family background and from a poor family background regarding the number of depressive symptoms also increases with age.

Conclusions and Perspectives

Depression is a disease, which is very prevalent, particularly in old-age. The onset of depression is caused by many different factors: biological, genetic,

psychological, and social factors. Research has shown that there is a social gradient in depression; some social strata are at higher risk of suffering from depressive symptoms than others. What causes this social gradient in mental health in later life?

Critical life events and the life course perspective play an important role in finding an answer to this question. One the one hand, some important life transitions, which are suspected to be associated with deterioration in mental health, are very common in later life, such as widowhood or retirement. On the other hand, from the viewpoint of the life course perspective, suffering from depression in later life can be associated with events and circumstances that took place years and even decades before the onset of the disease and that have long-lasting consequences for the further life course, such as the socio-economic family background during childhood or educational attainment.

Do all critical life events or life transitions induce changes in psychological well-being? The answer is no. Although all critical life events, either positive or negative, are associated with changes in life, not all of them elevate the number of depressive symptoms. The analyses on retirement and depression show that retirement as such does not lead to changes in the levels of mental well-being. On the other hand, the analyses show that widowhood is a negative and devastating event in life and widowed persons report more depressive symptoms than married persons even when holding constant a wide array of confounding factors.

If and/or to which extent a critical life event has consequences for psychological well-being depends on the circumstances under which the event takes place. Widowhood is even more devastating if the marriage was happy, but it is a bit less devastating for the surviving spouse in case the surviving spouse was a caregiver to the deceased spouse in the time prior to death, following a relief model. Retiring from a stressful and straining job is associated with an increase in mental well-being, whereas retiring from a job, which was considered as rewarding, is associated with lower levels of mental well-being.

In order to understand social disparities in mental health in later life, it is also necessary to take a life course perspective. In line with the theories of cumulative advantage and cumulative inequality, social disparities during childhood such as the socio-economic status of the parents and educational attainment are associated with differences in mental health in later life. These disparities in mental health between those who are well-educated and those who are not that educated become larger

with age. The same holds for differences in mental health between those who had a prosperous family background during childhood compared to those whose parents had a low socio-economic status. The good news is that educational attainment helps to overcome disadvantages that stem from a non-prosperous parental background. But on the downside, low family background and low personal education amplify each other.

Since depression is such a prevalent disease in later life, gaining deeper insights into the social etiology of depression will help inform policy makers in order to improve the quality of life of the older population. There are numerous perspectives for future research. For instance, the prevalence rates of depression differ between countries and regions. Until now it is not well understood how the cultural context influences psychological well-being. The impact of country-specific social norms, social institutions, and social policies deserves closer attention. Cross-national datasets, such as the SHARE survey, that capture Europe's cultural diversities as a "natural laboratory", will help to understand the role of the cultural context in explaining the social gradient in depression in later life.

Furthermore, research on the social origins of depression applies several different theoretical frameworks: some of them emphasis the role of socio-economic resources, other stress the role of psychological resources. Still others focus on the role of critical life events, while others apply the life course perspective. More efforts should be taken in order to arrive at an integrated theoretical framework. Moreover, the biological perspective must not be neglected. Since depression is a multi-causal disease, as the biopsychosocial model suggests, more interdisciplinary research will be fruitful in gaining deeper understanding of the social gradient in depression in later life.

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2. Widowhood and Depression among Older Europeans – The Role of Gender, Caregiving, Marital Quality, and Regional Context[4]

Abstract

Objectives: This study investigates the role of gender, caregiving and marital quality in the correlation between widowhood and depression among older people within a European context by applying the theory of Social Production Functions as a theoretical framework.

Method: Fixed-effects linear regression models are estimated using the first two waves (2004, 2006) of "The Survey of Health, Ageing and Retirement in Europe" (SHARE). A subsample of 7,844 respondents aged 50 plus in 11 countries, who were married at baseline and are either continuously married or widowed at follow-up is analyzed.

Results: Respondents who experienced widowhood between the two waves report significantly more depressive symptoms than those continuously married, with respondents living in Denmark and Sweden reporting a lower increase in depressive symptoms than those living in Greece, Spain or Italy. There is no statistically significant interaction between gender and widowhood. Widowed persons who report higher marital quality at baseline show a larger increase in the number of symptoms of depression than those with low marital quality; widowed persons who report being a caregiver for their partner at baseline report smaller increase in the symptoms of depression compared to widowed non-caregivers.

Discussion: The results support the results of previous studies using longitudinal data. Furthermore, the effect of widowhood varies among the 11 countries in the subsample, although only a small amount of the variation in the increase of depressive symptoms after becoming widowed can be explained by such contextual factors.

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Introduction

The death of one's spouse is one of the most devastating events in life. Previous research shows that becoming widowed is one of those life events which are most associated with negative stress (Dohrenwend et al., 1978; Holmes & Rahe, 1967). Many studies confirm that older widowed persons in particular report less well-being and more symptoms of depression than do their married counterparts (Lee et al., 1998; Umberson et al., 1992; Williams & Umberson, 2004).

Previous research paid special attention to the question of whether widowhood has different effects on the onset of depression depending on gender (Lee & DeMaris, 2007). The question of whether men or women suffer more from depression after becoming widowed has still not been answered clearly. There are many studies which find indications that depressive symptoms are more pronounced for men (Carr, 2004a; Williams, 2003), whereas other studies show that women suffer more from depressive symptoms after becoming widowed (Chou & Chi, 2000; Lichtenstein et al., 1996). However, other studies conclude that there are no gender differences in mental health after becoming widowed (Umberson et al., 1992).

Lee and DeMaris (2007) conjecture in their overview of the existing literature that the discrepancies in the results can be partly explained by the fact that some analyses have been conducted with cross-sectional data while others have been carried out using longitudinal data. Cross-sectional data present the opportunity for collecting a broader range of elapsed time since widowhood whilst longitudinal designs may censor time by design. On the other hand longitudinal data provides a fuller opportunity to analyze both the antecedents and consequences of widowhood whereas cross-sectional data may be hindered by recall bias.

The negative effect of becoming widowed is particularly strong during the first years after the event (Harlow et al., 1991; Mendes de Leon et al., 1994). The course of the psychological strain after becoming widowed follows a crisis model: immediately after becoming widowed the effects are strongest, but they diminish with time due to coping processes. While some studies show that the levels of depression fall back to the level before the death of the partner after some years (Harlow et al., 1991; Mendes de Leon et al., 1994), other studies find evidence that the level of depression diminishes with time but remains on an elevated level

compared to the time before widowhood (Lee et al., 2001; Lee et al., 1998; Sonnenberg et al., 2000). As women *on average* report a longer duration of widowhood, women *on average* are in an advanced state of the crisis model in which the negative effects have lost their strength or have even vanished.

In addition, sample composition can have a significant effect on the results. Mortality rates are higher among widowed men as compared to widowed women (Lusyne et al., 2001). Additionally, mortality rates are higher among depressive persons (Mastekaasa, 1994). This selection bias cannot be controlled in cross-sectional studies and thus might lead to underestimating the levels of depression in men following widowhood. On the other hand, men are more likely to remarry after becoming widowed (Carr, 2004b) and thus take themselves out of the widowed population. However, remarriage is a rather rare event among the older population.

There is a wide variation in the extent of psychological consequences of widowhood, which depends – amongst other things – on marital quality. People who rate their marriage positively experience higher levels of psychological distress upon becoming widowed (Carr & Boerner, 2009; Carr et al., 2000).

Whether the surviving partner has provided care for the deceased one is also an important factor in the analysis of the mental health consequences of widowhood. Keene and Prokos (Keene & Prokos, 2008; Prokos & Keene, 2005) argue that while caregiving enhances levels of depression prior to widowhood, former caregivers experience widowhood as a less negative event, since it is the end to a chronically stressful care situation. Furthermore, providing care might prepare the caregiver for the coming the death of the spouse and allows "to say goodbye and (or) begin the grieving process before the death" (Keene & Prokos, 2008, 566). All this might lead to lower levels of psychological distress after becoming widowed for caregivers compared to non-caregivers.

However, it is not only individual characteristics which may account for differences in depression. As Ploubidis and Grundy (2009) show, depression rates vary considerably across Europe. "One possible factor underlying the observed country level variation might be the availability of state-provided supports and services, as these may be particularly important for mental health because the availability of state-provided safety nets may enhance feelings of security and reduce anxiety" (Ploubidis & Grundy, 2009, 674). There are influencing factors on the societal level which add to the differences in the number of depressive symptoms after widowhood among European regions or countries. One could

assume, for example, that the magnitude of the effect of widowhood on depression varies with different patterns of domestic labor division (Hank & Jürges, 2007) as well as with the extent of economic independence of women within a society (Klement & Rudolph, 2004). One goal of this paper is to contribute to the existing knowledge of the negative effects of widowhood on mental health within a European context from a longitudinal perspective using the "Survey of Health, Ageing and Retirement in Europe" (SHARE). Although much research has been done in the field of mental health consequences of widowhood, little attention has been paid to differences in this effect between countries or regions.

As this indicative overview over the literature shows, widowhood and its effects on depression is a complex research field since there are many different aspects of widowhood, on the individual and societal level, which could possibly drive its associations with depressive symptoms or mental well-being in general. The aim of this paper is to add to the understanding of the complex relationship between widowhood and changes in depressive symptoms by applying a longitudinal approach using European data. More specifically, this paper contributes to the understanding of the association between widowhood and mental well-being by answering three specific questions: 1) Do men and women differ in the psychological consequences of widowhood? 2) What role do marital quality and caregiving play in the effect of widowhood on depression? 3) To what extent does widowhood increase levels of depression in the European context and are there differences in the association between widowhood and depression across Europe? The mechanisms that drive the deterioration in psychological well-being are considered under the social production functions theory by Lindenberg in the remainder of this study.

Theoretical Framework – The Theory of Social Production Functions

What are the mechanisms that drive the deterioration in mental well-being after becoming widowed from a sociological point of view? In his work on social production functions theory, Lindenberg (1989a, 1990, 1991) assumes that people are rational and goal directed. The universal goal all people strive for is the production of psychological or emotional well-being. One's level of psychological

well-being is determined by physical well-being on the one hand, and social well-being on the other. Physical and social well-being are universal needs and their realization is dependent on the fulfillment of instrumental goals such as comfort and stimulation in order to produce physical well-being – and affection, behavioral confirmation and status in order to produce social well-being. A lack of specific resources therefore hampers people in the production of well-being, which in turn might induce suffering from depressive symptoms. Thus, the social production functions theory offers a fruitful theoretical approach to explaining how socio-demographic differences affect the likelihood of suffering from depressive symptoms from a sociological point of view. Being married and living with a spouse is a powerful resource that can produce all instrumental goals, which in turn are necessary in order to produce well-being. Thus, losing one's spouse will have severe consequences in the production of well-being. But which aspects of marriage produce comfort, stimulation, affection, behavioral confirmation and status, and is there a gender difference in the production of the instrumental goals? A long tradition in research argues that marriage is more beneficial to men than to women. So far, the literature has shown that marriage offers a protective effect in terms of health, but this effect is stronger for men (e.g. Waite, 1995). The literature shows that men benefit from marriage by having a closer social connectedness (e.g. from sources outside the household since it is mainly wives who maintain the family's social networks) and by receiving more emotional support as well as instrumental support (e.g. housework tasks) from a marriage (Lee et al., 1998; Umberson et al., 1992). However, a meta-analysis by Manzoli et al. (2007) reveals that despite these relative advantages for men as conferred by marriage there is no difference between older men and women in the effect of marriage on mortality.

The Role of Gender

Marriage is an important resource for the production of *comfort*, *affection* and *stimulation* for both genders, but especially for men, widowhood has a stronger impact on the production of these three instrumental goals:

Considering a traditional role allocation in the household, household managing tasks that have formerly been carried out by women form a special and unusual situation and therefore a potential source of strain for men (Utz et al., 2004; Williams, 2003). For women, on the other hand, the death of the husband does not

result in drastic changes regarding household chores. Umberson and coworkers (1992) show that after becoming widowed the number of hours spent on household tasks decreases for women, but increases for men. Men, especially those from older cohorts, may be unprepared to take over those tasks producing *comfort* formerly carried out by their wives, which might lead to an increased feeling of strain for those men. Yet, Lopata (1973) argues that widowers may have greater economic resources, which enable them to purchase home-making services. In general, one can state that "[t]he more dependent the survivor, the higher the decrease in production capacity after the loss of the spouse and, as a consequence, the well-being of the respondent" (Nieboer et al., 1998a, 117)

Having a spouse means having a person with whom "all kinds of things could be done, discussed and shared" (Nieboer et al., 1998a, 119). Thus, marriage is beneficial in terms of *stimulation* for husbands and wives. However, since older women are typically socially more active than their husbands (Cornwell, 2011; McLaughlin et al., 2010), it is easier for them to (partly) substitute the lost source for stimulation from within the marriage with resources for stimulation from outside the household.

Since wives often maintain friendships and close ties with children or other relatives, losing one's spouse should result in a loss of *affection* from sources outside the household like friends, neighbors and relatives for the surviving husband during the first couple of months of widowhood. However, men are more likely to compensate for the loss of affection by seeking new partners. Given the shortage of men in older age, women are less likely to receive affection from a new partner (Carr, 2004b).

Regarding the production of *status* and *behavioral confirmation*, it is especially women who gain from marriage and are thus hampered in the production of psychological well-being in the case of becoming widowed:

The loss of the spouse results in the loss of the most important source of *behavioral confirmation* for the surviving partner. Behavioral confirmation refers to the feedback one gets from relevant other following the compliance of social norms (such as caring for older family members). Older women in particular derive high levels of behavioral confirmation from caring for their husbands. If their husbands die, an important source of behavioral confirmation is lost. Due to demographic patterns, women are less likely to remarry and thus less likely to find a new source for gaining behavioral confirmation.

Becoming widowed might come along with *status* loss for the surviving partner, since singles in general have a lower status in society than married people (Osterweis et al., 1984). Financial strains are generally a threat to psychological well-being. Persons reporting not being able to make ends meet show elevated levels of depressive symptoms (Mirowsky & Ross, 2001). Women typically gain more from a marriage in financial terms since, even if holding constant human capital and occupational characteristics, men still earn more money and thus contribute more to the household income than women (see also current studies from the gender wage gap literature (Dex et al., 2008; Konstantopoulos & Constant, 2008)). Therefore, the death of a spouse is potentially a greater financial problem for widowed women than for widowed men, which should result in elevated levels of depression in widows compared to widowers (Angel et al., 2003; Ha et al., 2006; Umberson et al., 1992).

In summary, marriage facilitates the production of instrumental goals for men *and* women, and therefore widowhood hampers men *and* women in the production of these goals. Whether it is women or men who gain more from marriage or who are hampered more severely by widowhood depends on the specific instrumental goal. Therefore, widowhood should be able to decrease psychological well-being for men and women to an equal extent. Only when focusing on the different aspects of widowhood one should be able to find gender differences.

The Role of Marital Quality

Marriage is a strong resource, perhaps one of the strongest resources, for producing *affection*, *stimulation* and *behavioral confirmation* – in cases where the marriage is characterized by a high-quality relationship. Having a spouse means having a person with whom "all kinds of things could be done, discussed and shared" (Nieboer et al., 1998a, 119). Therefore, the dissolution of an emotionally strong and high-quality tie should have an extremely negative impact on the production of social well-being in terms of affection, stimulation and behavioral confirmation from within the household. This assumption is supported by *attachment theory*, which states that if such a strong emotional tie is broken through death, severe psychological reactions are the result (Bowlby, 1980). Umberson and coworkers (2006) as well as Williams (2003) show that good marital quality is beneficial for the health of men and women. Carr and colleagues (Carr & Boerner,

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2009; Carr et al., 2000) show that persons who reported high marital quality and rated their marriage positively experienced higher levels of negative psychological consequences after the death of their spouses.

The Role of Caregiving

Providing care for one's partner or spouse is another important aspect of marriage which is becoming more and more important in later life. If a spouse needs extensive care due to ill health, the caregiving partner has to dedicate much of his or her own time and effort into care and therefore might be restricted in his or her activities aimed at producing personal well-being (Nieboer et al., 1998b). In accordance with the stress paradigm (Pearlin et al., 1981), this can result in elevated levels of psychological distress, especially if the caregiving activities exceed the caregiver's abilities and resources. The literature shows that it is mostly wives who provide care for their husbands (Allen, 1994; Dentinger & Clarkberg, 2002; Pinquart & Sorensen, 2006). Nieboer and coworkers (1998b) show that spouses who provide care for their partner in need feel significantly more hampered in their activities, for example in those which produce *stimulation*, which in turn significantly reduces the well-being of caregivers. While there is an elevated burden caring for loved ones while they are still alive, this burden disappears after becoming widowed. Although caregiving should enhance the levels of depressive symptoms while the care-receiving partner is still alive, long-term caregivers report lower levels of depression after the death of their spouses than non-caregivers and short-term caregivers, following a relief model (Keene & Prokos, 2008; Prokos & Keene, 2005). Caregiving is a chronically stressful situation for the caregiver. The death of the spouse also means the end of caregiver burden. Therefore, one might expect former caregivers to report somewhat lower levels of depression than non-caregivers after becoming widowed since the death of the spouse is not only a source of grievance but also a source of relief (as the caregiver burden does not exist anymore and the deceased spouse does not have to suffer anymore). One could also assume that for a caregiver the death of the spouse does not come unexpectedly and thus caregivers are able to "prepare" for this event, which in turn might result in less severe mental health consequences. On the other hand, persons caring for a spouse might derive a lot of *behavioral confirmation* from their spouses as well as from persons outside the household for their work, which has a positive impact on psychological well-being.

The Role of Cultural Contexts

One research goal of this paper is to find out whether differences exist between countries regarding the effect of widowhood on depression. According to Lindenberg (e.g. Lindenberg, 1989b), social production functions vary in different cultural contexts, social positions, groups or even time periods, since it is social rules that define the situation-specific efficiency of the social production functions. Therefore, the production of instrumental goals through interaction with a spouse might be of different efficiency and importance for men and women in different countries. This could be due to either differences in welfare state regimes and policies, and/or to differences in culturally determined gender roles. Although this study is able to identify regional differences, it is out of the scope of this paper to test which of the two mechanisms is driving these differences.

Kohli, Kühnemund, and Lüdicke (Kohli et al., 2005) classify European countries into three clusters: countries with a traditional family structure (the Southern European countries), countries with a less traditional family structure (Scandinavian countries) and "in-between" countries (Central Europe). A traditional family structure is defined by the dominance of the male-breadwinner model, low female labor force participation, and low gender equity in the family (Crompton, 1999). In countries with traditional family structures, women depend heavily on the income of their spouses for the production of *status*, which leads to a status loss in the case of widowhood. Especially in Southern European countries women have spent most of their lives outside the paid labor force and worked at home raising their children. Thus, a large proportion of widows rely on survivorship pension benefits as their main source of income. As survivorship pension benefits are always lower than the deceased spouse's old-age pension this results in a severe reduction in household income. However, a study by Ahn (2005) shows that the proportion of widows and widowers reporting to have more difficulties to make ends meet after becoming widowed is not significantly higher in Southern Europe compared to the rest of Europe.

As it is mainly wives who carry out household chores in countries with more traditional family structures, becoming widowed especially hampers widowers in the production of *comfort*. Thus, widowhood should be associated with more negative consequences for the surviving spouse in Southern Europe. However, Kohli and coworkers (Kohli et al., 2005) show that family ties (e.g. contact frequency with

children, co-residence with adult children) are stronger in Spain, Italy and Greece (compared, in particular, to the Scandinavian countries), and thus widows and widowers living in Southern Europe might find it easier to replace their resource for *affection* from within the family. Replacing resources for the production of *affection*, *stimulation* and *behavioral confirmation* from *outside* the family might be more likely in Scandinavian countries as active engagement in voluntary or charity activities and social connectedness among the 50-plus generation are higher in Northern Europe than in Southern Europe (Kohli et al., 2009). All in all widows and widowers from Northern European countries are not as dependent on their spouses and have easier access to resources from outside the household, which facilitates the coping process. Therefore, one could expect widowhood to have less negative consequences for widows and widowers living in Northern European countries.

Methods

Statistical Model and Modeling Strategy

A straightforward way to investigate the psychological consequences of losing one's spouse is to compare the mental health status of people before and after becoming widowed. This is only possible with panel data, where we observe the same individuals over time. The associations between social status or social roles and mental health might reflect social causation as well as social selection (Pearlin & Johnson, 1977). Although widowhood might seem a purely exogenous event at first sight, it might well be that depressive people in particular tend to marry persons that suffer from health problems (and thus have higher mortality risks). Therefore, research results will be biased if researchers do not control for pre-existing characteristics which influence both mental health and the likelihood of becoming widowed.

To test the effect of widowhood on depression fixed-effects regression analysis is applied in order to exploit the panel structure of the data. An error-component model

$$\text{(a)} \quad \gamma_{it} = \beta_1 x_{it} + \nu_i + \varepsilon_{it}$$

(where γ_{it} is the dependent variable with i = entity and t = time; x_{it} represents the independent variable with β_1 as the coefficient for the independent variable, ν_i is the person-specific error and ε_{it} is the idiosyncratic error) is averaged over time for each

i:

(b) $\overline{\gamma}_i = \beta_1\overline{x}_i + \nu_i + \overline{\epsilon}_i$ (between transformation).

Subtracting equation (b) from equation (a) results in

(c) $\gamma_{it} - \overline{\gamma}_i = \beta_1(x_{it} - \overline{x}_i) + \epsilon_{it} - \overline{\epsilon}_i$ (within transformation),

which eliminates the person-specific error term ν_i.

The fixed-effects estimator presents the dependent variable y and the independent variable x in the form of their deviations from the person-specific mean. Thus, the statistical model allows within-person comparisons to be made (comparing the same person before and after becoming widowed), instead of between-person comparisons (comparing persons who are currently married with *other* persons who are currently widowed). A fixed-effects linear regression model allows controlling for time-constant unmeasured characteristics of individuals that might bias the association between widowhood and depression or are linked with depression. However, self-selection due to unmeasured time-variant factors cannot be ruled out by fixed effects. A disadvantage of fixed-effects regression is that it does not allow for the inclusion of time-invariant variables (e.g. gender). Thus, the main effects of time-invariant characteristics like gender and country cannot be analyzed. However, it is possible to include interactions with time-varying variables (e.g. interacting gender and widowhood, and country and widowhood). Since the *main effects* of gender, marital quality, caregiving and region on depression are not subject to the research questions (only their interaction with widowhood is of interest), the advantages of the fixed-effects approach outweigh the disadvantages.

Data Source

The data for this study are drawn from waves 1 (collected in 2004) and 2 (collected in 2006) of the "Survey of Health, Ageing and Retirement in Europe" (SHARE; for an overview see Börsch-Supan and Jürges (2005)). SHARE is modeled closely on the U.S. "Health and Retirement Study" and it is the first data set to combine extensive cross-national information on the socio-economic status, health and family relationships of Europe's elderly population. SHARE contains information from more than 45,000 computer-assisted personal interviews (CAPI) with individuals aged 50 and older. Eleven countries contributed to both waves: Sweden, Denmark, Germany, the Netherlands, Belgium, France, Switzerland, Austria, Italy, Spain and Greece. Probability samples were drawn in each participating country. However, the institutional conditions with respect to sampling in the

participating countries are so different that a uniform sampling design for the entire project was infeasible. As a result, the sampling designs used vary from a simple random selection of households (in the Danish case, for example, from the country's central population register) to rather complicated multistage designs (as, for example, in Greece, where the telephone directory was used as a sampling frame). The weighted average household response rate in the face-to-face part of the survey is 62% (a thorough description of methodological issues is contained in Börsch-Supan and Jürges (2005)). The overall attrition rate in wave 2 is 28% (see Schröder, 2008).

The analytical sample consists of 7,844 persons. Wave 1 data – consisting of 31,115 observations – was reduced to those cases that were married at the time of the interview. Additionally, persons aged younger than 50 or of unknown age, and persons who showed inconsistencies between age and duration of marriage, were excluded from the sample. This reduced the wave 1 sample to 21,059 observations. Wave 2 data consisted of 34,415 observations. Of these, 915 observations had to be excluded due to age (younger than 50 years) or missing age information, or due to inconsistent information on widowhood. Since only persons who were either married or widowed in wave 2 remained in the sample, the number of observations was reduced to 28,940. The combined longitudinal dataset thus consisted of 49,999 observations in total. Only observations with valid information on all variables of interest were included in the analysis. Some of these variables were asked in a self-completion drop-off questionnaire in wave 1, which was only handed to a *random subsample* in wave 1. Thus, a large fraction of the SHARE sample had to be dropped. Comparing the observations which remain in the analytical sample to the original SHARE sample shows that the analytical sample has lower levels of depression, is younger, slightly healthier, is more likely to being able to make ends meet, and more likely to come from Northern Europe. However, there is no bias regarding gender, marital quality and caregiving. Finally, only cases with observations in both waves remained in the sample. The attrition of cases, which only participated in wave 1 but did not continue their participation in wave 2, is unfortunately not random. Those who left the study are older, more depressed, are more likely to be caregivers, and report higher marital quality than those who participated again in wave 2. Additionally, there are more likely to come from Western or Southern European countries. Of those 7,844 remaining cases (15,688 observations), 152 became widowed between wave 1 and 2 (see also figure 2.1).

Figure 2.1: analytical sample

Wave 1: 31,115 cases	Wave 2: 34,415 cases
→ drop cases not married at time of interview	→ drop cases not married or widowed at time of interview
→ drop cases with age < 50	→ drop cases with age < 50
→ drop cases with inconsistent information on age and marriage	→ cases cases with inconsistent information on age and widowhood
21,059 cases	28,940 cases

Both waves combined: 49,999 obs

→ drop all obs (7,324 obs) from countries with one wave only (Ireland, Israel, Poland, Czech Republic)
→ drop obs with missing values on the variables of interest (23,039 obs)
→ drop cases with less than two observations (3,783 obs)

15,688 obs
7,844 cases (152 widowed in wave 2)

Key Variables

The primary outcome variable in all analyses is respondents' state of mental well-being, measured by the number of depressive symptoms reported in the interview. This variable was operationalized using the EURO-D scale (Prince et al., 1999). The EURO-D scale has been developed for measuring the prevalence of depression among older people within a European context, but has many similarities with the widely used CES-D scale (Radloff, 1977). The EURO-D scale ranges from zero (no symptoms of depression existent) to 12 (12 symptoms of depression existent). The symptoms are depressed mood, pessimism, suicidality, excessive feelings of guilt, sleeping problems, loss of interest, irritability, diminution in appetite, fatigue, difficulties in concentrating on entertainment or reading, lack of enjoyment in recent activities, and tearfulness. Respondents answer "yes" or "no" to questions about the presence of the aforementioned symptoms. All the items refer to the presence of those symptoms within the last month. Cronbach's alpha for the EURO-D scale within SHARE is 0.79.

Widowhood, operationalized as a dummy variable for widowed (married is the reference category) is entered into the analyses as an explanatory variable. Since the fixed-effects regression model does not allow for time-invariant variables, a

variable for gender would be automatically dropped from the analyses. But as it is possible to include an interaction effect of a time-variant with a time-invariant variable, an interaction effect of both gender and widowhood is part of the analyses in order to investigate gender differences. The interaction effect shows the changes in depressive symptoms for widowed women.

Respondents are also asked whether they are caregivers to their own spouses. This variable is also operationalized as a dummy variable for caregivers in wave 1 (with non-caregivers as the reference category). Since the information as to whether someone was a caregiver *prior* to becoming widowed can also be considered as time-invariant given that so far observations are available for two waves only, the multivariate analyses contain an interaction effect between caregiving and becoming widowed. This interaction effect can be interpreted as the changes in depressive symptoms within widowed caregivers.

An additive index of two variables serves as an indicator for marital quality: satisfaction with reciprocity within the relationship, and conflicts with partner. The original variable ranges from 4 "strongly agree" to 0 "strongly disagree" (for reciprocity) and 0 "often" to 3 "never" for conflicts with partner. For the analyses, both variables are rescaled to have a mean of zero and a standard variation of one before adding them together. Positive values indicate marital quality above the mean, e.g. a value of 0.5 indicates that the value for this person is half a standard variation higher than the mean value. Since both marital quality variables were measured only in wave 1 this additive index enters the multivariate analyses in the form of an interaction effect between marital quality and widowhood. This interaction effect shows the change in depressive symptoms depending on marital quality.

The analyses contain geographical region dummy variables for Southern Europe (Italy, Greece, and Spain), Northern Europe (Sweden and Denmark) and Western Europe (all other countries). This classification follows Ehrlinghagen and Hank (2006) and Kohli and coworkers (Kohli et al., 2005) reflecting the North-South gradient within Europe regarding traditional family structure, patterns of domestic labor division, female labor force participation, and volunteering activities and social connectedness. All time-invariant region dummies are interacted with widowhood.

The existing literature considers as well confirmed the fact that age, education and chronic diseases are correlated with mental health. Prevalence of

depression rises with age, persons suffering from chronic diseases are more likely to also suffer from depression (co-morbidity), and persons with higher education are less likely to show symptoms of depression (Mirowsky & Ross, 2003). Thus, variables on age (in years), and the number of diagnosed physical chronic diseases (e.g. diabetes, osteoporosis, high blood pressure, cancer, Parkinson's disease) enter the analyses. In the age group considered here education can be considered as time-invariant and is therefore disregarded in the fixed-effects regression. Income adequacy is measured using a question on whether respondents are able to make ends meet with their household income (Litwin & Sapir, 2009). The original variable ranges from 1 representing "with great difficulty" to 4 representing "easily". The variable used in the analysis is dummy coded, with 0 indicating difficulties with the financial situation (therefore including the categories "with great difficulty" and "with some difficulty") and 1 indicating respondents' ability to make ends meet (including the categories "fairly easy" and easy").

The regression models will only contain time-variant variables. Time-invariant variables (gender, caregiving at baseline, marital quality at baseline, region dummies) are dropped from the models. Only their interaction-effects with widowhood are included. The regression coefficients of these interaction effects show how the "return" of these time-invariant variables changes for an individual when becoming widowed.

Results

Descriptive Findings

Table 2.1 shows some descriptive statistics. The applied dataset contains information from 7,844 respondents. Of those, 7,692 respondents are continuously married and 152 became widowed during the two waves – 103 women and 49 men. With regards to depressive symptoms, the four marital status/gender categories vary greatly. In general, continuously married men report the lowest number of depressive symptoms at baseline whereas women, who later become widowed, have the highest number of depressive symptoms. At follow-up, too, married men report the lowest number of depressive symptoms, widowed women the highest number.

Married women vs. widowed women

Widowed women and married women differ significantly regarding their number of depressive symptoms at follow-up, but not at baseline. Widowed women are older than their married counterparts. Furthermore, they more often report being a caregiver for their spouse, and they report a higher amount of chronic diseases at follow-up. Counter-intuitively, married and widowed women do not differ regarding their ability to make ends meet.

Married men vs. widowed men

Widowed men and married men differ significantly regarding their number of depressive symptoms at follow-up, but not at baseline. Widowed men are on average older than married men; they do not report more chronic diseases. Neither do widowed and married men differ in their reports on marital quality, or financial hardship. On average, widowed men were caregivers for their spouses more often than were their married counterparts.

Widowed women vs. widowed men

Widowed women do not differ significantly from widowed men in most respects.

Table 2.1: means (*standard deviations*) of the sample for all variables by gender and marital status (source: SHARE release 2.5)

	All	Women		Men	
		continuously married	*married at baseline, widowed at follow-up*	*continuously married*	*married at baseline, widowed at follow-up*
	(n=7,844)	*(n= 3,722)*	*(n=103)*	*(n=3,970)*	*(n=49)*
Individual Indicators					
EURO-D (baseline)	1.95 *(1.99)*	2.38 *(2.16)*	2.80 *(2.45)*	1.53 *(1.71)*	2.00 *(2.14)*
EURO-D (follow-up)	1.95 *(2.07)*	2.29 *(2.16)* [a]	3.88 *(2.51)*	1.57 *(1.85)* [b]	3.04 *(2.78)*
Age (baseline)	62.86 *(8.52)*	61.53 *(8.00)* [a]	67.63 *(9.93)* [c]	63.87 *(8.66)* [b]	72.92 *(10.10)*
Chronic diseases (baseline)	1.40 *(1.31)*	1.45 *(1.34)*	1.66 *(1.45)*	1.36 *(1.28)*	1.41 *(1.27)*
Chronic diseases (follow-up)	1.46 *(1.36)*	1.50 *(1.37)* [a]	1.89 *(1.58)*	1.40 (1.33)	1.57 *(1.43)*
Financial adequacy (baseline)	0.68 *(0.47)*	0.68 *(0.47)*	0.68 *(0.47)*	0.68 *(0.47)*	0.69 *(0.47)*
Financial adequacy (follow-up)	0.70 *(0.46)*	0.70 *(0.46)*	0.64 *(0.48)*	0.71 *(0.46)*	0.69 *(0.47)*
Caregiving (baseline)	0.04 *(0.20)*	0.04 *(0.20)* [a]	0.16 *(0.36)*	0.04 *(0.19)* [b]	0.18 *(0.39)*
Marital quality (baseline)	0.00 *(1.67)*	-0.20 *(1.77)*	-0.20 *(1.77)*	0.19 *(1.56)*	0.52 *(1.81)*
Region Indicators					
Region – north	0.18 *(0.39)*	0.19 *(0.39)*	0.20 *(0.41)*	0.18 *(0.38)*	0.12 *(0.33)*
Region – west	0.53 *(0.50)*	0.51 *(0.50)*	0.54 *(0.50)*	0.54 *(0.50)*	0.63 *(0.49)*
Region – south	0.29 *(0.46)*	0.30 *(0.46)*	0.25 *(0.44)*	0.29 *(0.45)*	0.25 *(0.44)*

[a] Bonferroni multiple-comparison test: married women differ significantly from widowed women; p≤.05

[b] Bonferroni multiple-comparison test: married men differ significantly from widowed men; p≤.05

c Bonferroni multiple-comparison test: widowed women differ significantly from widowed men; p≤.05

Fixed-effects regression models

　　The first model (table 2.2) contains widowhood as an explanatory variable, with age, chronic conditions and income adequacy as control variables. Growing older significantly decreases the number of depressive symptoms; suffering from more than two chronic conditions is associated with significantly worse mental health. Higher levels of income adequacy lead to reporting less symptoms of depression (regression coefficients for age, chronic conditions and income adequacy not shown here). As expected, widowhood significantly increases the number of depressive symptoms by 1.078 units.

　　Model 2 adds an interaction effect between widowhood and gender but this interaction effect turns out to be insignificant. The increase in depression for respondents who became widowed between the two waves is comparable for men and women.

　　Model 3 interacts widowhood with marital quality. At zero marital quality, the effect of widowhood on average depression is positive with a coefficient of 1.070. That is, even in marriages with average happiness levels, widowhood increases the levels of depression. At higher levels of marital quality, this effect becomes even stronger at a rate of 0.268 per unit. Widowhood has a more positive effect on depression the happier the marriage was.

　　Model 4 interacts widowhood with caregiving. For non-caregivers, the effect of widowhood on average depression is positive with a coefficient of 1.212. For caregivers, this effect becomes weaker by -0.812 units. However, this interaction effect turns out to be almost insignificant. In other words, widowhood increases the levels of depression for caregivers and non-caregivers to an almost comparable extent.

　　To test whether there are differences in the impact of widowhood on mental health across Europe, Model 5 adds interaction effects between European regions and widowhood, with Southern Europe serving as the reference category. The results indicate that there is some variation between countries. The effect of becoming widowed on average depression while living in Southern Europe is positive with a coefficient of 1.642. Becoming widowed while living in Northern Europe reduces this effect by -1.340 units. In other words, widowhood has a more

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positive effect on depression when living in Southern Europe. The interaction effect between widowhood and living in Western Europe is insignificant. Thus, widowhood has a comparable effect on depression for Western and Southern Europeans. Comparing the explained variance of Model 1 with the explained variance of Model 5, where region interaction effects were added, it can be concluded that only a very small amount of variance lies on the country level.

Model 6 is the full model, which includes all variables. Controlling for all variables does not change the overall results from the previous models. However, the coefficients for the interactions between widowhood and marital quality, widowhood and caregiving as well as widowhood and region are larger than in the single models. The interaction effect between caregiving and widowhood becomes significant once the interaction effects between widowhood and gender, widowhood and marital quality, and widowhood and region are held constant. Furthermore, it turns out that there is also a significant difference between Western European countries and Southern Europe in the full model.

To sum up, one can conclude that widowhood in general is associated with higher numbers of depressive symptoms. Additionally, the analyses show that the negative experience of widowhood affects the levels of depression of men and women to a comparable extent. Widowed caregivers report a smaller increase in the number of symptoms of depression than non-caregivers, following a relief model. Although higher marital quality is usually associated with better mental health outcomes, widowed persons who experienced high marital quality show a larger increase in the number of depressive symptoms after the death of their spouse than widowed respondents who report lower marital quality. Widowhood is associated with a smaller increase in the number of depressive symptoms in Northern Europe and Western Europe compared to Southern Europe.

Table 2.2: Fixed-effects Regression Analyses for the Number of Depressive Symptoms (source: SHARE release 2.5, own calculations)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Widowhood [a)]	1.078*** (0.16)	1.058*** (0.28)	1.070*** (0.16)	1.212*** (0.18)	1.642*** (0.32)	1.764*** (0.41)
Widowhood* female		0.031 (0.34)				0.297 (0.35)
Marital quality at baseline * widowhood			0.268** (0.09)			0.330*** (0.09)
Caregiving at baseline * widowhood				-0.812+ (0.43)		-1.158** (0.44)
Northern Europe * widowhood [b)]					-1.340** (0.49)	-1.537** (0.50)
Western Europe * widowhood [b)]					-0.569 (0.38)	-0.755* (0.38)
constant	2.869*** (0.54)	2.869*** (0.54)	2.867*** (0.54)	2.870*** (0.54)	2.877*** (0.54)	2.877*** (0.54)
R^2 (within)	0.019	0.019	0.021	0.020	0.020	0.023
Number of cases	7,844	7,844	7,844	7,844	7,844	7,844
Number of observations	15,688	15,688	15,688	15,688	15,688	15,688

Note: regression coefficients; standard errors in parentheses; all models controlled for age, number of chronic diseases, and income adequacy
*+ p<0.10. * p<0.05. ** p<0.01. *** p<0.001 (two-tailed test)*
reference category: a) continuously married; b) Southern Europe

Discussion

The analyses show that widowhood is a negative event in life and widowed persons show more depressive symptoms than married persons even when holding constant confounding factors. There seems to be no gender-specific effect of depression: although women in general suffer from more depressive symptoms than men, widowhood has a comparable effect on men *and* women. This result is in line with some other studies using longitudinal data (see also Lee & DeMaris, 2007).

Umberson and coworkers (1992) stress the importance of gender-specific strains associated with widowhood. Although widowhood is an extremely distressing event for both genders, they conclude that widowhood affects men and women in very different ways. Since, for example, "the primary mechanism linking widowhood to depression among women is financial strain" and "[a]mong men the more critical mechanisms seem to be strains associated with household management" (Umberson et al., 1992, p.10), further analyses should put more emphasis on those gender-specific strains resulting from widowhood.

Although this is out of the scope of this paper, a straightforward way to test the assumption of gender-specific strains would be to implement three-way interactions between gender, widowhood, and financial adequacy. Preliminary analyses (not shown here) assume that financial hardship seems to increase the number of depressive symptoms more for widowed men than for widowed women. Although the SHARE data does not offer the information on how much time is spent doing housework, the information on who is mainly responsible for doing the household chores is available. Further analyses should also incorporate this information interacted with gender to see whether household management is a possible mechanism to identify some gender differences in the increase of depressive symptoms following widowhood.

Putting more emphasize on the importance of gender-specific strains is also in line with the results of Nieboer and coworkers (1998a), who find that the production of psychological well-being through instrumental goals deteriorates differently for men and women in widowhood, but after a certain period of time the difference in well-being between widowed men and widowed women vanishes. Future analyses should specifically control for the different aspects of marriage and

widowhood, which have gender-specific impact on the production of status, comfort, behavioral confirmation, affection, and stimulation.

Marital quality and caregiving moderate the association between widowhood and depressive symptoms. Although the direct effects of marital quality and caregiving cannot be analyzed in the fixed-effects models, the significant interactions between marital quality and widowhood on the one hand, and caregiving and widowhood on the other, support previous studies by Carr and coworkers (2000), Carr and Boerner (2009), Prokos and Keene (2005), and Keene and Prokos (2008), which find that widowhood has even more negative psychological consequences for those who rate their marriage positively, but has less a negative impact on those who provide care to their spouse before their death. Some preliminary analyses (not shown here) suggest that with regards to caregiving and marital quality, there is no difference between men and women in the psychological reaction to widowhood. Especially with regards to caregiving, future studies should further analyze the impact of the duration of caregiving (short-term vs. long-term), the amount of time spent for providing care, the kind of caregiving tasks carried out, as well as whether the caregiving spouse receives additional help from other sources from inside or outside the household.

Although there is a significant difference between Northern Europeans and Southern Europeans in the increase of depressive symptoms after becoming widowed, only a small amount of the variation in the increase of depressive symptoms after becoming widowed can be explained by contextual factors, such as the regions the respondents live in. Nevertheless, it would be interesting to find out whether it is different social welfare policies that drive this difference between European regions, or whether it is different cultural gender roles which account for differences between countries and regions. Further analysis should specifically test these two different mechanisms. Another interesting question that is yet to be answered is whether there are regional effects regarding gender differences in the psychological reaction to widowhood.

Social support, either by family or friends (Ha et al., 2006; Onrust et al., 2007) constitutes an important resource regarding psychological well-being after widowhood. Many studies prove that within Europe many different regional patterns of familial relations and support exist. Further analyses should try to find out if and how these differences in social support influence depression levels after becoming widowed. Studies also show that volunteer work buffers against the

negative aftermaths of widowhood (Li, 2007). Therefore, further analyses should also incorporate other aspects such as social networks and family relations.

This study has several limitations. The analyses have been conducted with the first and second wave of the "Survey of Health, Ageing and Retirement in Europe" (SHARE). The number of respondents who lost their spouses between the waves is still very small. This small number becomes problematic once we compare different countries since the number of widowed respondents in each single country is extremely small.

Additionally, the division of the respondents into continuously married and widowed between the waves might be insufficient as it only covers the marital status since 2004. It is possible that some of the persons who were married in 2004 have been widowed before and have re-married before the first interview in 2004 was conducted. Therefore I cannot rule out the possibility that some of those in the married group had recovered from being widowed and remarried.

Of those who have been widowed, I only use the information that they became widowed between the two waves, but not exactly when the event happened. But the course of the psychological strain after becoming widowed follows a crisis model. This could lead to problems, as very recently widowed respondents are not distinguished from those who have been widowed for almost two years.

The large reduction of the sample size (SHARE original sample vs. analytical sample) constitutes another important limitation. Firstly, a very small sample size makes it more difficult to detect significant association. Secondly – and more importantly – such a large reduction of the sample might lead to biases, since reductions due to panel attrition and item non-response are often not random. As the analyses showed, there is a bias in the analytical sample compared to the original sample. The analytical sample less depressed, younger, financially better off, and healthier than the original sample. Therefore, one has to be very careful when trying to generalize the results.

The goodness of fit measure R^2-within seems to be very small. Indeed, it is much smaller than in standard OLS regressions. It can be interpreted as the amount of time-variation in depression which is explained by variation over time in the independent variables. In contrast to OLS regression R^2, the fixed effects R^2-within neglects the explanatory effects of the intercept and thus does not quantify the overall effect of groups on the model fit.

While this study applies the social production function theory as a theoretical framework which can explain the mechanisms that translate socio-economic status into mental well-being, there are also other theories which have been applied in other studies. Among them are role theory, attachment theory, and the stress paradigm – just to mention three prominent examples. Further studies should try to incorporate those theories in order to explain the psychological consequences of widowhood from different angles and thus get to a better and more complete understanding of the underlying mechanisms.

This paper is the first analysis of psychological consequences of widowhood among older persons using the SHARE data. The number of cases who became widowed during the waves is still very small, which does not allow for detailed analyses of the different gender- or region-specific strains associated with widowhood. For this reason, the analyses presented here can only provide a first impression. With more and more waves of SHARE in the future, the number of widowed respondents will grow and more detailed analyses of the variance of the effect of widowhood within a European context from a comparative perspective will be possible.

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3. The association between retirement and depression and the moderating role of quality of work

Abstract

Objective. To examine the relationship between retirement, quality of work and depressive symptoms among older European adults from a longitudinal perspective.

Method. Data come from the 2004, 2006, and 2010 waves of Survey of Health, Ageing and Retirement in Europe (subsample of N = 6,730). Fixed-effects regression modeling with an unbalanced sample was used to determine the longitudinal association between depression, retirement, and the different factors describing quality of work.

Results. Retirement as such is not associated with significant changes in the level of depressive symptoms, whereas higher levels of effort-reward imbalance increase the number of depressive symptoms. Effort-reward imbalance is a moderator in the association between depression and retirement, suggesting a relief reaction after retirement. Considering the single dimensions of quality of work, only reward and (partly) control have moderating effects.

Discussion. Splitting the EURO-D scale into its two underlying factors leads to the conclusion that retirement and quality of work have a stronger relation to symptoms of depression related to affective suffering rather than motivation.

Keywords: retirement, depression, quality of work, panel data

Introduction

For a long time, sociologists, gerontologists, and psychologists have been trying to answer the question whether retirement is linked to mental health. Whereas there is some evidence, that retirement is related to an increase in mental health, there are also studies showing that retirees experience worse mental health outcomes compared to employees. Whether retirement is experienced as a relief or a burden heavily depends on the circumstances of the retirement process and work characteristics. This study investigates whether quality characteristics of the last job (like high efforts and low rewards) moderate the association between retirement and mental well-being.

Health problems – including mental health - are one major reason for early retirement in Europe. Stressed workers often quit their jobs prior to regular retirement age and despite financial losses arising from quitting the active labor force earlier, expecting their (mental) health to recover after retirement (Doshi et al., 2008; Karpansalo et al., 2005; Schofield et al., 2011). On the other hand, many workers are forced into retirement once they reach the regular retirement age, regardless their health status or skills. Workers, who are forced into retirement, report lower well-being than those who retire voluntarily (Calvo et al., 2009).

In sociology, two opposing research streams have dominated the portrayal of work (Drentea, 2002): One stream followed the Marxist traditions (Marx, 1973; Weber, 1972) and views work as alienating. Workers are described as being estranged from their work and work environment, having no control or decision power over their work, being part of a fragmented work process where only very limited amounts of skills are needed, and facing bureaucratic constrictions all the time. From this perspective, retirement from an alienating work environment should elevate the levels of well-being since retirees should experience more autonomy and freedom over their day-to-day lives compared to workers.

Another research stream however notions the health benefits of being employed. As many studies show, labor force participants have better mental and physical health outcomes compared to their non-working counterparts (e.g. Butterworth et al., 2006; Christ et al., 2007; Jang et al., 2009; Mandal & Roe, 2008; Ross & Mirowsky, 1995). From the perspective of health sociology, work provides individuals with greater financial stability, a social network and social integration, and a higher sense of control over their lives. Retirement is associated with worse

health outcomes since retirees are missing all the benefits of an empowering work environment.

This study aims to add to the understanding of the association between work characteristics, retirement, and mental well-being by using the longitudinal "Survey of Health, Ageing and Retirement in Europe" (SHARE) and by observing a large group of older Europeans over three survey waves (covering a period of 6 years) as some of them make the transition from employment into retirement whereas the others continue their working life. Mental well-being is assessed by asking for several symptoms of depression at all time points. Quality of work is assessed by item batteries, which cover the core dimensions of Karasek's demand-control model (Karasek, 1979; Karasek et al., 1998) and Siegrist's effort-reward imbalance model (Siegrist et al., 2004).

Retirement and (psychological) well-being

Retirement is one of the most important status transition in (later) life. Although much research has been done in the last couple of decades, our knowledge about the psychological consequences of entering retirement is still incomplete and inconsistent. The results so far have been very contradictory with some studies showing that retirement has positive effects on life satisfaction, and goes along with lower stress levels and better health outcomes in general (e.g. Calasanti, 1996; Midanik et al., 1995). Other studies in contrast find that retirement is associated with negative health outcomes such as higher depression levels, less life satisfaction, and lower activity levels (e.g. Kim & Moen, 2002; Ross & Drentea, 1998). Still other studies find no difference between retirees and employed persons with regards to physical health, self-reported mental health, and depression (Midanik et al., 1995; Salokangas & Joukamaa, 1991).

According to Wang (2007) and Kim & Moen (2002) these inconsistent findings are due to two weaknesses of previous studies. Firstly, many studies relied on cross-sectional data and compared currently employed respondents to *other* respondents who are retired at the time of the interview. This has two implications: one the one hand, the actual effect of the transition into retirement on within-person changes in well-being cannot be observed. On the other hand, retirees and employed respondents in cross-sectional designs might belong to different cohorts (since the group of retirees usually is older on average than the employees in the study) and

therefore show differences in cohort-associated variables (such as higher fraction of persons with physically demanding jobs in older cohorts), which might have an impact on comparisons between the groups.

Secondly, Wang (2007) acknowledges that retirees follow different retirement transitions and different adjustment processes. An overview by Szinovacz (2003) finds that a minority of retirees reports problems with adjusting to retirement which results in declines in life satisfaction, whereas the majority of retirees on average exhibits high levels of life satisfaction. Previous studies focused primarily on the male retirement model, neglecting that with an increase in female labor force participation, more and more women make the transition from workforce into retirement. The female perspective on retirement so far only received little attention, but since women often experience different working histories, one has to distinguish between "his" and "her" transition (e.g. women, who are often employed in part-time contracts might adapt to retirement more easily). Additionally, with increased longevity and decreasing retirement ages, retirement has become a "couple event" (Szinovacz and Davey 2004a). The retirement decision of one spouse may influence the retirement decision of the other spouse and dual-earner couples do not always retire at the same time, which results in different combinations of employment and retirement within a couple. Szinovacz and Davey (2004a) show that recently retired husbands married to continuously employed wives experience more adverse effects of mental well-being compared to husbands whose wives are not continuously employed. Wives who enter retirement after their husband already retired reported more depressive symptoms.

One theoretical perspective which helps to explain why these different subgroups exist is role theory (Wang et al., 2011). According to role theory, men and women who retire are vulnerable to feelings of role loss, especially if the occupational role is highly valued and constitutes the central role in life. This role loss can lead to negative psychological consequences like reduced well-being and enhanced levels of depression. On the other hand, if the occupational role is considered as demanding, unpleasant, and stressful, retirement might be associated with increased levels of psychological well-being. In this latter case, retirement results in a relief from role strain (Wheaton, 1990).

Quality of work and (psychological) well-being

Whether the job role is experienced as unpleasant or as empowering depends on occupational characteristics. Previous studies showed a strong association between work characteristics (e.g. work stress) and different health outcomes (Almadi et al., 2012; Andel et al., 2012; Pisljar et al., 2011; Wolf, 2006), especially between occupational stress and mental health (Chen et al., 2009; Karasek, 1979; Mezuk et al., 2011; Rugulies et al., 2006; Wang et al., 2009; Wickrama et al., 2008). Theoretical frameworks developed so far point out that stress alone is not necessarily pathogenic, but that it is rather the composition of high stress situations paired with low levels of control or reward which fosters (mental) health problems (Karasek, 1979; Karasek et al., 1998; Siegrist et al., 2004). Karesek's demand-control model assumes that a work environment which is characterized by high demands on the one hand and low control over decisions on the other hand (decision latitude) has adverse effects on health (Karasek, 1979; Karasek et al., 1998). Siegrist's effort-reward imbalance model (Siegrist et al., 2004) suggests that an imbalance between high efforts spent and low rewards received (such as money, recognition, career opportunities) cause an increase in health problems. The effort-reward imbalance model (ERI) is built upon the sociological concept of social reciprocity. Social reciprocity at the workplace exists if adequate rewards (like money, recognition, support, career opportunities) are exchanged against distinct obligations (like time pressure or heavy physical demands) (Siegrist et al., 2004). A lack of reciprocity will result in negative emotional and psychological responses, which might have long-term adverse effects on health. Learned helplessness or the sense of control over outcomes in life are regarded as the pathway from job strain to a deterioration of mental well-being (Mirowsky & Ross, 2003; Wang et al., 2009).

Methods

Data Source

The analyses apply the "Survey of Health, Ageing and Retirement in Europe" (SHARE; see Blom & Schroeder, 2011; Börsch-Supan et al., 2008; Börsch-Supan & Jürges, 2005; Malter & Börsch-Supan, 2013; Schroeder, 2011). SHARE is designed as a panel study. Wave 1 was collected in 2004/2005. Wave 2 was collected in 2006/2007. In 2008 (wave 3) SHARE collected retrospective life histories from its respondents. Data collection of wave 4 began in fall 2010. Currently, data of waves 1,

2, 3, and 4 are publicly available. SHARE contains computer-assisted face-to-face interviews with more than 55,000 individuals aged 50 years and older in 20 European countries. SHARE is modeled closely after the U.S. 'Health and Retirement Study' and it is the first data set to combine extensive cross-national information on socio-economic status, health, and family relationships of Europe's elder population. The following analyses apply data from wave 1, wave 2, and wave 4 only (since wave 3 does not contain the variables of interest for this study).

This study uses a subsample of the SHARE data. The subsample consists of respondents who participated at least in two of the three waves in use. Furthermore, the sample is restricted to respondents who are employed in wave 1 (thus neglecting retirees, homemaker, and unemployed respondents) and who are either employed or retired in waves 2 and/or 4. Respondents who did not answer the questions on depressive symptoms (the EURO-D item battery) or the questions on quality of work are not taken into account. The analytical sample thus consists of 6,730 individuals or 15,651 observations (unbalanced panel). Of those 15,651 observations, 5,305 observations make the transition into retirement within the covered period of time.

Comparing the analytical sample with the original sample shows, that the original sample members are on average slightly more depressed, are more likely to be female, report more financial hardship, and exhibit lower quality of work compared to the analytical sample. Those who have to be dropped from the analytical sample because of item nonresponse are slightly more depressed in waves 1 and 4, but not in wave 2, are slightly younger, are less likely to be female, and report more financial hardship than those who have valid values on all variables.

Dependent Variable

The primary outcome variable in all analyses is respondents' state of mental well-being, measured by the number of depressive symptoms reported in the interview. This variable is operationalized using the EURO-D scale (Prince et al., 1999a; Prince et al., 1999b). The EURO-D scale has been developed for measuring the prevalence of depression among older people within a European context, but has many similarities with the widely used CES-D scale (Radloff, 1977). The EURO-D scale ranges from zero (no symptoms of depression existent) to 12 (12 symptoms of

depression existent). The symptoms are depressed mood, pessimism, suicidality, excessive feelings of guilt, sleeping problems, loss of interest, irritability, diminution in appetite, fatigue, difficulties in concentrating on entertainment or reading, lack of enjoyment in recent activities, and tearfulness. Binary variables indicate the presence of the aforementioned symptoms within the last month. Cronbach's alpha for the EURO-D scale within SHARE is 0.75.

Principal component analyses as conducted by Prince, Reischies et al. (1999b) within the EURODEP study suggested, that the EURO-D scale consists of two underlying factors, namely affective suffering and motivation. Castro-Costa et al. (2008) conducted confirmatory factor analyses using SHARE data and confirmed the existence of the two factor solution of the EURO-D as suggested by Prince, Reischies, et al. (1999b) within the SHARE data. However, cross-country validity was higher for the affective suffering component compared to the motivation component.

Previous research by Prince and colleagues (1999a) and by Verropoulou and Tsimbos (2007) suggest that the two factors differ in their associations with other variables. Whereas affective suffering is responsible for gender differentials in depression, motivation accounts for age differentials. Verropoulou and Tsimbos (2007) find also different association with other indicators. In order to test whether retirement and quality of work have different associations with affective suffering and motivation - the two underlying factors - this study also applies principal component factor analyses on the analytical sample. The Kaiser criterion suggests retaining two factors, which account for 31% of the explained variance. After orthogonal varimax rotation (with factor 1 explaining 19 percent and factor 2 explaining 12 percent of the variance), we see that factor 1 is mostly defined by depressed mood, excessive feelings of guilt, sleeping problems, irritability, fatigue, and tearfulness. Factor 2 is mostly defined by pessimism, loss of interest, diminution in appetite, difficulties in concentrating on entertainment or reading, and lack of enjoyment in recent activities. As these results are in general in line with the results of Castro-Costa and colleagues (2007) the two factors will be referred to as "Affective Suffering" (factor 1) and "motivation" (factor 2) in the remainder of this study. Suicidality is the only variable that does not clearly define one of the factors.

Independent Variables

Quality of work is assessed using a short battery of (a) items focusing on the low control dimension derived from Karasek's Job Content questionnaire (Karasek, 1979) and (b) items derived from Siegrist's effort-reward-imbalance model questionnaire (Siegrist et al., 2004). The effort-reward-imbalance (ERI) is measured by first building the sum score of the key dimensions effort (2 items on a four-point Likert scale: effort (two items of a four point Likert scale: "My job is physically demanding.", "I am under constant time pressure due to a heavy workload.") and reward (5 items on a four point Likert scale: "I receive adequate support in difficult situations.", "I receive the recognition I deserve for my work.", Considering all my efforts and achievements, my [salary is/earnings are] adequate.", "My [job promotion prospects/prospects for job advancement] are poor.", and "My job security is poor."), with higher values indicating higher effort or higher rewards respectively. The crucial hypothesis of the ERI model is that an imbalance between high "costs" and low "gain" is responsible for adverse health effects. Thus, a ratio between effort and reward is built, ranging between 0.25 and 4, with higher values indicating a poorer quality of work.

Low control is measured by building the sum score of two Likert-scale-items ("I have very little freedom to decide how I do my work.", "I have an opportunity to develop new skills."), each ranging from 1 to 4 with higher values indicating lower levels of control at work.

Finally, all four variables, effort-reward imbalance, effort, reward, and low control, are standardized, which means that they were rescaled to have a mean of zero and a standard deviation of one.

The questions on quality of work were only asked to respondents who were employed at the time of the interview. For respondents who made the transition into retirement between the waves the information is only existent for the waves when they were still part of the active labor force. For those respondents, the information collected in the last wave of employment is used to fill the gap for the waves of retirement in order to prevent missing values on the variables. Thus, the information on quality of work becomes time-invariant as soon as a person enters retirement.

Another central variable is retirement status. This dummy variable contrasts employed or self-employed respondents with retired respondents. Being employed includes self-employment, part-time employment as well as full-time employment.

Interaction effects between retirement status and the quality of work indicators are also an essential part of the analyses.

Table 3.1: Measures of quality of work

Dimension	Item (strongly agree, agree, disagree, strongly disagree)
Low Control	I have very little freedom to decide how I do my work.*
	I have an opportunity to develop new skills.
Effort	My job is physically demanding.*
	I am under constant time pressure due to a heavy workload.*
Reward	I receive adequate support in difficult situations.
	I receive the recognition I deserve for my work.
	Considering all my efforts and achievements, my [salary is/earnings are] adequate.
	My [job promotion prospects/prospects for job advancement] are poor.*
	My job security is poor.*

*Items with an asterisk entered the analyses with inverse coding.

Covariates

The existing literature considers the fact as well confirmed that age, education and chronic diseases are correlated with mental health. Prevalence of depression rises with age, persons suffering from chronic diseases are more likely to also suffer from depression (co-morbidity), and persons with higher education are less likely to show symptoms of depression (Mirowsky & Ross, 2003). Thus, variables on age (in years), and the number of diagnosed physical chronic diseases (e.g. diabetes, osteoporosis, high blood pressure, cancer, Parkinson's disease) enter the analyses. In the age group of this study education can be considered as time-invariant and is therefore disregarded in the fixed-effects regression. Income adequacy is measured using a question on whether respondents are able to make

ends meet with their household income (Litwin & Sapir, 2009). The variable used in the analysis is dummy coded, with 0 indicating difficulties with the financial situation (therefore including the categories "with great difficulty" and "with some difficulty") and 1 indicating respondents' ability to make ends meet (including the categories "fairly easy" and easy").

Statistical Model and Modeling Strategy

A straightforward way to investigate effect of the transition into retirement as well as changes in work characteristics on psychological well-being is to compare the mental health status of people before and after going into retirement. This is only possible with panel data, where we observe the same individuals over time. To test the effect of retirement on depression fixed-effects regression analysis is applied in order to exploit the panel structure of the data. An error-component model

(a) $\gamma_{it} = \beta_1 x_{it} + \nu_i + \varepsilon_{it}$

(where γ_{it} is the dependent variable with i = entity and t = time; x_{it} represents the independent variable with β_1 as the coefficient for the independent variable, ν_i is the person-specific error and ε_{it} is the idiosyncratic error) is averaged over time for each *i:*

(b) $\overline{\gamma}_i = \beta_1\overline{x}_i + \nu_i + \overline{\varepsilon}_i$ (between transformation).

Subtracting equation (b) from equation (a) results in

(c) $\gamma_{it} - \overline{\gamma}_i = \beta_1(x_{it} - \overline{x}_i) + \varepsilon_{it} - \overline{\varepsilon}_i$ (within transformation),

which eliminates the person-specific error term ν_i.

The fixed-effects estimator presents the dependent variable y and the independent variable x in the form of their deviations from the person-specific mean. Thus, the statistical model allows within-person comparisons to be made (comparing the same person *before and after* going into retirement), instead of between-person comparisons (comparing persons who are currently employed with *other* persons who are currently retired).

A fixed-effects linear regression model allows controlling for time-constant unmeasured characteristics of individuals that might bias the association between retirement and depression or are linked with depression. However, self-selection due to unmeasured time-variant factors cannot be ruled out by fixed effects. A

disadvantage of fixed-effects regression is that it does not allow for the inclusion of time-invariant variables (e.g. gender). Thus, the main effects of time-invariant characteristics like gender and country cannot be analyzed. However, it is possible to include interactions with time-varying variables (e.g. interacting retirement and quality of work since quality of work is time invariant for retirees).

The analyses consist of stepwise regression models. The first model regresses the number of depressive symptoms on retirement status, and the covariates (age, chronic conditions, ability to make ends meet, and marital status), controlling for wave. In model two, the number of depressive symptoms is regressed on quality of work, the covariates, and wave. In the third step, the number of depressive symptoms is regressed on quality of work, retirement status, and the covariates (age, chronic conditions, ability to make ends meet, and marital status). The final step repeats the model from the previous step, but adds the interaction between retirement status and quality of work to the analyses.

In the next stage, the regression models described above are repeated, but this time with different outcome variables: In the first model the factor scores for affective suffering are regressed on quality of work and retirement, the interaction between the two, as well as the covariates. In the second model the factor scores for motivation are regressed on the independent variables and the covariates.

Furthermore, several regression models are run in order to assess the correlation of the core dimensions of quality of work and depressive symptoms. Separate models are estimated for a) effort as independent variable, b) reward as independent variable, and c) low control at work as independent variable. As in the previous set of model, the regressions are run for the three different outcome variables, namely the number of depressive symptoms, the factor scores for affective suffering, and the factor scores for motivation.

All analyses are performed using Stata 12.

Results

Descriptive Findings

Table 3.2 describes the characteristics of the sample by treatment group. Three groups are distinguished: a) the group of observations, who are continuously employed throughout all three waves, b) observations, who will make the transition

into retirement, while they are still employed (will be referred to as the "soon-to-be retired" in the remainder of this section), and c) those observation, who are already retired (will be referred to as the "retirees" in the remainder of this section).

Table 3.2: unweighted means and *standard deviations* of the sample for all variables by retirement group (source: SHARE wave 1 & wave 2 release 2.5, SHARE wave 4 release 1.0)

	Pooled Sample		Continously employed		Later retirees, while still being employed		Retired	
	15,651 obs		10,346 obs		2,822 obs		2,483 obs	
	mean	sd	mean	sd	mean	sd	mean	sd
Individual Indicators								
Number of depressive symptoms	1.74	1.83	1.77	1.85	1.72	1.80	1.65	1.79
Retired	0.16	0.37	0.00	0.00	0.00	0.00	1.00	0.00
Effort-Reward Imbalance Ratio a)	0.00	1.00	-0.02	0.99	0.02	1.00	0.04	1.02
Effort a)	0.00	1.00	-0.01	0.99	0.02	1.02	0.02	1.01
Reward a)	0.00	1.00	0.02	1.01	-0.02	0.98	-0.06	0.99
Low control a)	0.00	1.00	-0.02	0.99	0.04	1.01	0.06	1.02
Age	57.97	4.78	56.32	4.05	58.73	3.55	63.97	3.70
Number of chronic conditions	0.97	1.06	0.88	1.02	1.07	1.07	1.24	1.16
Female	0.47	0.50	0.48	0.50	0.46	0.50	0.44	0.50
Living with partner/spouse	0.81	0.39	0.81	0.39	0.83	0.37	0.81	0.39
Ability to make ends meet	0.76	0.43	0.75	0.43	0.79	0.41	0.78	0.42
Regional Indicators								
Northern Europe	0.27	0.44	0.27	0.45	0.26	0.44	0.26	0.44
Western Europe	0.49	0.50	0.47	0.50	0.54	0.50	0.52	0.50
Southern Europe	0.18	0.38	0.20	0.40	0.13	0.33	0.14	0.34
Eastern Europe	0.06	0.24	0.05	0.23	0.07	0.25	0.08	0.27

a) z-score standardized

One-way analyses of variance (Bonferroni corrected) are used to compare the three different groups of observations with each other. The continuously employed report the highest numbers of depressive symptoms, the retirees show the lowest number of depressive symptoms and differ significantly from the continuously employed. The "soon-to-be retired" do not significantly differ from the other two groups.

The retirees report the highest levels of effort-reward imbalance (measured prior to retiring) and significantly differ from the continuously employed who show the lowest effort-reward imbalance in the sample. The "soon-to-be retired" show moderate levels of effort-reward imbalance and do not differ significantly from the other two groups. Similar patterns can be found for the other measures of quality of work as well: the continuously employed report the highest levels of control, lowest levels of effort, and the highest levels of rewards. Except for effort, the continuously employed always significantly differ from the retirees.

Taking together the comparisons of the three groups with regards to depressive symptoms and quality of work one could assume, that retirement might lead to better mental well-being, while there is a self-selection of those who experience the highest effort-reward imbalance into retirement.

Comparing the three groups regarding the covariates, we find that the groups significantly differ regarding age, with the continuously employed being the youngest group and the retirees the oldest group. The fraction of female respondents is highest among the continuously employed and lowest among the retirees. Not surprisingly, the group of the retired observations exhibits the highest number of chronic diseases, whereas the groups of continuously employed seems to be the healthiest groups regarding chronic physical diseases such as diabetes and high blood pressure.

The continuously employed have the smallest fraction of observations who are able to make ends meet. They significantly differ from the "soon-to-be retired" (who are most unlikely to report financial hardship) and the retirees. The continuously employed observations are the group with the highest number of respondents living as single.

Fixed-effects regression models

The first set of fixed-effects regressions models (table 3.3) tests how changes over time in the effort-reward imbalance and retirement status within an individual influence changes in the number of depressive symptoms. Model 1 regresses the number of depressive symptoms on retirement status, the covariates, and wave. Making the transition from employment into retirement is not associated with significant changes in the levels of depression. The coefficient has a negative sign (and thus points to the assumption that the transition into retirement is beneficial for mental health), but the association is not significant. Financial hardship and an increase in the number of physical chronic conditions are significantly associated with an increase in the number of depressive symptoms. Living as single also increases the number of depressive symptoms. Growing older is not significantly related to changes in the number of depressive symptoms when holding constant the other variables.

Model 2 regresses the number of depressive symptoms on the effort-reward imbalance ratio. The association is positive and significant with a coefficient of 0.19. A higher effort-reward imbalance is associated with an increase in the number of depressive symptoms.

Model 3 adds the variable for retirement status into the regression of model 2. Thus, we are able to observe the coefficient for retirement while holding constant an indicator for quality of work. The coefficient for retirement status again has a negative sign, and still does not reach significance. That is, even when taking work characteristics into account, the transition into retirement still does not affect mental well-being.

Model 4 finally introduces the interaction effect between effort-reward imbalance and retirement status into the regression from model 3. Making the transition from employment into retirement is still insignificant for those who experience average effort-reward imbalance (and thus average quality of work). For those, who are still employed, changes in the effort-reward imbalance significantly affect the number of depressive symptoms with a coefficient of 0.20. For retirees, this effect becomes significantly smaller at a rate of -0.14 per unit. Retirement has a more positive effect on mental health the poorer the quality of work was.

Table 3.3: Fixed-effects Regression Analyses for the Number of Depressive Symptoms
(source: SHARE wave 1 and 2 release 2.5, SHARE wave 4 release 1.0, own calculations)

	Model 1	Model 2	Model 3	Model 4
Retired [a]	-0.0985	-	-0.1177	-0.1150
	(0.064)		(0.064)	(0.064)
Effort-Reward Imbalance Ratio (z-score)	-	0.1992***	0.2024***	0.2066***
		(0.038)	(0.038)	(0.038)
Retired * Effort-Reward Imbalance Ratio	-	-	-	-0.1411*
				(0.059)
Age	0.0167	0.0069	0.0091	0.0116
	(0.053)	(0.053)	(0.052)	(0.052)
Number of chronic conditions	0.1988***	0.1934***	0.1946***	0.1931***
	(0.030)	(0.030)	(0.030)	(0.030)
Able to make ends meet	-0.1364*	-0.1117	-0.1185	-0.1161
	(0.069)	(0.069)	(0.069)	(0.069)
Living with spouse/partner	-0.5099***	-0.5197***	-0.5228***	-0.5272***
	(0.150)	(0.150)	(0.150)	(0.150)
constant	1.0644	1.6346	1.5489	1.3968
	(3.247)	(3.241)	(3.238)	(3.238)
R^2 (within)	0.018	0.025	0.025	0.027
Number of cases	6730	6730	6730	6730
Number of observations	15651	15651	15651	15651

Note: regression coefficients; standard errors in parentheses; all models controlled for wave
* p<0.05. ** p<0.01. *** p<0.001 (two-tailed test)
reference category: a) employed

The second set of fixed effects regressions (table 3.4) repeats the first set, except for a change in the outcome variable. Number of depressive symptoms is replaced by the factor scores for affective suffering. The results are similar to the first set of regression models. Again, for those who are employed, the effect of effort-reward imbalance is positive with a coefficient of 0.09 in model 4. The transition from employment into retirement is not significantly associated with affective suffering at average effort-reward imbalance. That is, in an average quality-of-work environment going into retirement is not associated with changes on average depression. At higher levels of effort-reward imbalance however, the effect becomes significant at a rate of -0.06 units.

Table 3.4: Fixed-effects Regression Analyses for the Factor "Affective Suffering" (source: SHARE wave 1 and 2 release 2.5, SHARE wave 4 release 1.0, own calculations)

	Model 1	Model 2	Model 3	Model 4
Retired [a]	-0.0443	-	-0.0530	-0.0517
	(0.035)		(0.035)	(0.035)
Effort-Reward Imbalance	-	0.0904***	0.0919***	0.0938***
Ratio (z-score)		(0.021)	(0.021)	(0.021)
Retired * Effort-Reward	-	-	-	-0.0670*
Imbalance Ratio				(0.030)
Age	0.0099	0.0055	0.0065	0.0077
	(0.029)	(0.029)	(0.029)	(0.029)
Number of chronic conditions	0.1058***	0.1034***	0.1039***	0.1032***
	(0.016)	(0.016)	(0.016)	(0.016)
Able to make ends meet	-0.0812*	-0.0701+	-0.0731+	-0.0720+
	(0.038)	(0.038)	(0.038)	(0.038)
Living with spouse/partner	-0.2387**	-0.2432**	-0.2446**	-0.2467**
	(0.081)	(0.081)	(0.081)	(0.081)
constant	-0.4531	-0.1946	-0.2332	-0.3055
	(1.779)	(1.780)	(1.779)	(1.780)
R^2 (within)	0.016	0.020	0.021	0.022
Number of cases	6730	6730	6730	6730
Number of observations	15651	15651	15651	15651

Note: regression coefficients; standard errors in parentheses; all models controlled for wave
*+ p<0.10. * p<0.05. ** p<0.01. *** p<0.001 (two-tailed test)*
reference category: a) employed

The third set of fixed-effects regressions (table 3.5) repeats the two previous sets, but this time the factor scores for motivation serve as the outcome variable. In this set of regression models nearly all coefficients, which were significant in the previous two sets of models, have lost their significance. The only exception is effort-reward imbalance. Making the transition into retirement is not associated with any significant changes on average depression given an average effort-reward imbalance. Increases in effort-reward imbalance have a positive effect on the number of depressive symptoms, which measure motivation. The interaction effect between retirement and effort-reward imbalance is negative, but insignificant. That is, even with higher levels of effort-reward imbalance during working life, the transition into retirement does not change the number of depressive symptoms which measure the motivation factor.

Table 3.5: Fixed-effects Regression Analyses for the Factor "Motivation" (source: SHARE wave 1 and 2 release 2.5, SHARE wave 4 release 1.0, own calculations)

	Model 1	Model 2	Model 3	Model 4
Retired [a]	-0.0212	-	-0.0270	-0.0266
	(0.043)		(0.043)	(0.043)
Effort-Reward Imbalance	-	0.0608*	0.0615*	0.0622*
Ratio (z-score)		(0.025)	(0.025)	(0.025)
Retired * Effort-Reward	-	-	-	-0.0226
Imbalance Ratio				(0.043)
Age	0.0102	0.0074	0.0079	0.0083
	(0.035)	(0.035)	(0.035)	(0.035)
Number of chronic conditions	0.0329	0.0313	0.0316	0.0314
	(0.019)	(0.019)	(0.019)	(0.019)
Able to make ends meet	0.0078	0.0148	0.0132	0.0136
	(0.047)	(0.046)	(0.047)	(0.047)
Living with spouse/partner	-0.1700	-0.1732	-0.1739	-0.1746
	(0.101)	(0.102)	(0.102)	(0.102)
constant	-0.5056	-0.3387	-0.3584	-0.3828
	(2.188)	(2.188)	(2.186)	(2.184)
R^2 (within)	0.003	0.004	0.004	0.004
Number of cases	6730	6730	6730	6730
Number of observations	15651	15651	15651	15651

Note: regression coefficients; standard errors in parentheses; all models controlled for wave
 * $p<0.05$. ** $p<0.01$. *** $p<0.001$ (two-tailed test)
reference category: a) employed

The next set of models regress the number of depressive symptoms on the core dimensions of effort-reward imbalance, namely on effort, on reward, and on low control at work (table 3.6.1). The set consists of eight fixed-effects regression models. Model 1 regresses the number of depressive symptoms on reward and the covariates, controlling for wave. The coefficient for reward is negative and significant with a value of -0.1923. That is, an above the average rewarding work environment is associated with a decrease in the number of depressive symptoms. Model 2 regresses the number of depressive symptoms on effort and the covariates, again controlling for wave. The coefficient for effort is positive, but not significant. That is, a work environment which requires above the average levels of effort is not associated with a significant increase in the number of depression. The third model, which regresses the number of depressive symptoms on low control (again including the covariates and controlling for wave), shows the same result as model 2: the coefficient for low control is positive, but does not reach significance. A work environment, which is defined by above the average levels of low control does not affect the number of depressive symptoms. Model 4 regresses the number of depressive symptoms on all three dimensions of quality of work together. The results are in line with those of models 1 to 3, since in the combined model reward is again the only variable with a significant coefficient. Model 5 adds retirement status

into the analyses. The coefficient for retirement is negative, but does not reach significance. That is, at average levels of work quality measured by reward, effort, and low control, making the transition into retirement does not affect the number of depressive symptoms. Model 6 adds the interaction effect between retirement status and reward. The interaction effect is slightly significant and positive with a value of 0.1181. Retiring from an above the average rewarding work environment is associated with an increase in the number of depressive symptoms. Model 7 adds an interaction effect between retirement status and effort to model 5. The interaction effect is negative, but insignificant. The level of effort which is required in a certain work environment does not moderate the association between retirement and depressive symptoms. Model 8 adds the interaction effect between retirement status and low levels of control into the model. The interaction effect is negative and significant with a value of -0.1089. Retiring from a work environment with average levels of low control is not associated with an effect on average depression; the effect of retirement on average depression becomes stronger if the work environment is defined by above the average levels of low control.

In the next step the set of regression models which regress the number of depressive symptoms on the single components of quality of work is repeated, but this time with the factor scores for affective suffering as the outcome variable. (table 3.6.2) The results are very similar to the previous set of regression models. Going into retirement is not associated with changes in affective suffering, given average levels of reward, effort, and low control. Reward is the only one of the three quality-of-work variables which is significantly associated with affective suffering. Reward is also the only variable, which moderates the association between retirement and affective suffering.

The last set of models repeats the previous two sets but with the factor scores for motivation as outcome variable (table 3.6.3). At an average level of effort, reward, and low control, retirement does not affect motivation. An above the average rewarding work environment is associated with better mental well-being, but none of the single components of quality of work moderates the association between   retirement   and   motivation.

Table 3.6.1: Fixed-effects Regression Analyses for the Number of Depressive Symptoms (source: SHARE wave 1 and 2 release 2.5, SHARE wave 4 release 1.0, own calculations)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Reward (z-score)	-0.1923***	-	-	-0.1867***	-0.1865***	-0.1905***	-0.1864***	-0.1863***
	(0.032)			(0.033)	(0.033)	(0.033)	(0.033)	(0.033)
Effort (z-score)	-	0.0696	-	0.0504	0.0550	0.0554	0.0584	0.0552
		(0.036)		(0.037)	(0.037)	(0.037)	(0.037)	(0.037)
Low control (z-score)	-	-	0.0520	0.0066	0.0054	0.0056	0.0058	0.0096
			(0.033)	(0.034)	(0.034)	(0.034)	(0.034)	(0.034)
Retired [a]	-	-	-	-	-0.1061	-0.1008	-0.1060	-0.0989
					(0.064)	(0.064)	(0.064)	(0.064)
Retired * reward	-	-	-	-	-	0.1181*	-	-
						(0.057)		
Retired * effort	-	-	-	-	-	-	-0.0948	-
							(0.053)	
Retired * low control	-	-	-	-	-	-	-	-0.1089*
								(0.051)
constant	1.4235	1.3040	1.1673	1.5350	1.4604	1.3347	1.3589	1.4332
	(3.241)	(3.248)	(3.247)	(3.240)	(3.237)	(3.238)	(3.237)	(3.236)
R^2 (within)	0.026	0.019	0.018	0.026	0.027	0.028	0.027	0.027
Number of cases	6730	6730	6730	6730	6730	6730	6730	6730
Number of observations	15651	15651	15651	15651	15651	15651	15651	15651

Note: regression coefficients; standard errors in parentheses; all models controlled for age, being able to make ends meet, living with a spouse/partner, number of chronic conditions, and wave
*+ p<0.10. * p<0.05. ** p<0.01. *** p<0.001 (two-tailed test)*
reference category: a) employed

Table 3.6.2: Fixed-effects Regression Analyses for the Factor "Affective Suffering" (source: SHARE wave 1 and 2 release 2.5, SHARE wave 4 release 1.0, own calculations)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Reward (z-score)	-0.0864***	-	-	-0.0845***	-0.0844***	-0.0868***	-0.0844***	-0.0844***
	(0.018)			(0.018)	(0.018)	(0.018)	(0.018)	(0.018)
Effort (z-score)	-	0.0359	-	0.0278	0.0299	0.0301	0.0309	0.0300
		(0.020)		(0.020)	(0.020)	(0.020)	(0.020)	(0.020)
Low control (z-score)	-	-	0.0189	-0.0021	-0.0027	-0.0025	-0.0025	-0.0014
			(0.019)	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)
Retired [a]	-	-	-	-	-0.0487	-0.0455	-0.0486	-0.0466
					(0.035)	(0.035)	(0.035)	(0.035)
Retired * reward	-	-	-	-	-	0.0703*	-	-
						(0.030)		
Retired * effort	-	-	-	-	-	-	-0.0285	-
							(0.030)	
Retired * low control	-	-	-	-	-	-	-	-0.0313
								(0.029)
constant	-0.2918	-0.3347	-0.4089	-0.2312	-0.2654	-0.3403	-0.2959	-0.2732
	(1.780)	(1.779)	(1.779)	(1.780)	(1.779)	(1.780)	(1.779)	(1.779)
R^2 (within)	0.021	0.016	0.016	0.021	0.022	0.023	0.022	0.022
Number of cases	6730	6730	6730	6730	6730	6730	6730	6730
Number of observations	15651	15651	15651	15651	15651	15651	15651	15651

Note: regression coefficients; standard errors in parentheses; all models controlled for age, being able to make ends meet, living with a spouse/partner, number of chronic conditions, and wave

* p<0.05. ** p<0.01. *** p<0.001 (two-tailed test)

reference category: a) employed

Table 3.6.3: Fixed-effects Regression Analyses for the Factor "Motivation" (source: SHARE wave 1 and 2 release 2.5, SHARE wave 4 release 1.0, own calculations)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Reward (z-score)	-0.0614**	-	-	-0.0597**	-0.0596**	-0.0595**	-0.0596**	-0.0596**
	(0.021)			(0.022)	(0.022)	(0.022)	(0.022)	(0.022)
Effort (z-score)	-	0.0089	-	0.0022	0.0031	0.0031	0.0045	0.0032
		(0.023)		(0.023)	(0.023)	(0.023)	(0.023)	(0.023)
Low control (z-score)	-	-	0.0206	0.0074	0.0071	0.0071	0.0073	0.0089
			(0.021)	(0.022)	(0.022)	(0.022)	(0.022)	(0.022)
Retired [a]	-	-	-	-	-0.0213	-0.0215	-0.0213	-0.0183
					(0.043)	(0.043)	(0.043)	(0.043)
Retired * reward	-	-	-	-	-	-0.0043	-	-
						(0.040)		
Retired * effort	-	-	-	-	-	-	-0.0403	-
							(0.036)	
Retired * low control	-	-	-	-	-	-	-	-0.0454
								(0.035)
constant	-0.3991	-0.4681	-0.4791	-0.3932	-0.4082	-0.4037	-0.4513	-0.4195
	(2.186)	(2.188)	(2.190)	(2.185)	(2.184)	(2.183)	(2.182)	(2.183)
R² (within)	0.005	0.003	0.003	0.005	0.005	0.005	0.005	0.005
Number of cases	6730	6730	6730	6730	6730	6730	6730	6730
Number of observations	15651	15651	15651	15651	15651	15651	15651	15651

Note: regression coefficients; standard errors in parentheses; all models controlled for age, being able to make ends meet, living with a spouse/partner, number of chronic conditions, and wave

*+ p<0.10. * p<0.05. ** p<0.01. *** p<0.001 (two-tailed test)*

reference category: a) employed

Additional analyses

Some additional analyses are carried out in order to find some other factors, which could possibly have an association with quality of work and retirement status. (The tables with the results of the additional analyses are not shown here, but are available upon request.)

Retirement duration: In order to find out whether the effect of retirement becomes stronger or weaker with duration of retirement, the above mentioned analyses are repeated, but instead of a binary variable for retirement status, a variable for the duration of retirement is added to the analyses and interacted with quality of work. Given an average quality of work (measured by effort-reward imbalance ratio) retirement duration does not have a significant association with the number of depressive symptoms. But with increasing levels of effort-reward imbalance, each year of retirement duration is associated with a decrease in the number of depressive symptoms.

Skill level: In general one could assume that employees who carry out elementary occupations, such as plant and machine operators or assemblers, experience higher levels of works stress since these occupations are often characterized as low rewarding (in terms of salary and recognition), with high efforts (physically demanding) and low control over outcomes or freedom of decision making. On the other hand, previous analyses by Wolf (2006) showed that psychosocial pressure and stress is higher among occupational groups with higher prestige. The analyses of this study show that respondents working in jobs which require low skill levels (based on the first digit of the ISCO-88 codes) report significantly higher effort-reward imbalance than respondents with higher skilled occupations. Separate fixed-effects regressions by skill-level with depressive symptoms regressed on retirement status, effort-reward imbalance, suggest that effort-reward imbalance moderates the association between retirement and depression especially in the group of employees with higher skills, but not for lower skilled employees. However, fixed-effects regressions with threefold interaction terms (effort-reward imbalance * retired * skill level) reveal that the interaction between effort-reward imbalance and retirement status is not moderated by skill level of the respondent.

Gender: As Kim and Moen (2002) state previous studies often focus solely on male retirement processes and neglect the female perspective as well as the couple

perspective. Female retirement might be very different from male retirement (e.g. Calasanti, 1996). As Kubicek and colleagues (2011) show job satisfaction has very different effects on well-being in retirement for men and women. Whereas men's well-being is negatively affected by job satisfaction, women's well-being is positively affected. Results from the British Whitehall Study (see Stansfeld et al., 1999) suggest, that the adverse effects of a negative psychosocial work environment are stronger for men compared to women since the work role has a higher significance to men (as women have more available alternative roles, like the family role). Comparing employed men and women in a simple T-test shows that there is no significant difference in the levels of effort-reward imbalance within the SHARE sample. However, breaking quality of work down into its core dimensions reveals that men do report significantly higher levels of effort, whereas women report significantly higher levels of low control. Fixed-effects regression analysis with a three-way interaction of retirement status, gender, and effort-reward imbalance (or its core dimensions respectively) suggest that gender does not make a difference in the way how quality of work moderates the association between depressive symptoms and retirement.

Region: Different retirement regulations across Europe shape the retirement decisions and processes of the older population. Furthermore, macro processes can impact the working conditions and thus the quality of work. Dragano and colleagues (2011) point out that for instance the perception of job security depends – amongst others - on institutional dismissal-protection laws on the one hand and economic cycles on the other; and effects of job loss on health are also dependent on the existence and the conditions of national unemployment insurance. In general, one might assume that welfare state regimes and policies could make a difference in the association between quality of work, retirement, and health outcomes. In order to test this assumption, the thirteen European countries within the dataset are clustered into four separate regions representing Northern Europe (Denmark, Sweden), Western Europe (The Netherlands, Belgium, France, Germany, Austria, and Switzerland), Southern Europe (Italy, Spain, and Greece), and Eastern Europe (Czech Republic, Poland). The classification of the countries into the four clusters is in line with Eikemo et al (2008), who apply Ferrera's welfare state classification (Ferrera, 1996) plus one additional category ("Eastern Europe") as well as with Dragano and colleagues (2011), who apply Esping-Andersens welfare state typology (Esping-Andersen, 1990) and add the Southern regime as a forth additional type. The results

of the fixed effects regressions for each of the four regions show that an increase in effort-reward imbalance is associated with an increase in depressive symptoms in Northern Europe, Western Europe, and Eastern Europe, but not in Southern Europe. Retirement – given an average work quality – increases the number of depressive symptoms in Western Europe only, but not in the other four regions. The interaction effect is significant at the 10 percent level in Northern and Western Europe, but not in Eastern and Southern Europe, which alludes to the guess that the relief model (retirement decreases the number of depressive symptoms more for respondents with low job quality) might be valid in the Northern and Western part of Europe. However, fixed-effects regressions with threefold interaction terms (effort-reward imbalance * retired * region dummies) reveal that the four welfare state groups do not significantly differ in the interaction between effort-reward imbalance and retirement status.

Since the classification of the countries into the four groups is rather approximate further analyses are needed in order to assess if specific characteristics and differences of the welfare states and their policies or other macro-indicators (e.g. unemployment rate, economic crisis) could possibly moderate the association between quality of work and retirement.

Discussion

This study is designed to provide answers to three questions: (a) Is going into retirement associated with a change in the number of depressive symptoms? (b) Is quality of work associated with depressive symptoms? (c) Does quality of work moderate the association between retirement and mental well-being?

In the bivariate model entering retirement is associated with a lower number of depressive symptoms with retired observations reporting significantly less depressive symptoms compared to employed observations. However, when holding constant a number of covariates the retirement effect becomes insignificant. Thus, it is not retirement per se which has an impact on mental well-being, but rather the circumstances under which the retirement process takes place.

Quality of work is significantly related to mental well-being. The results of this study are in line with the results of earlier studies which find that high job stress and especially the combination of high job strain and low job satisfaction are

associated with worse mental health outcomes (e.g. Chen et al., 2009; Mezuk et al., 2011).

From the theoretical considerations one would suggest that retiring from a stressful work environment, which elevates the number of depressive symptoms while still being employed, would be associated with a relief reaction and thus with an increase in mental health after quitting the active labor force (Oksanen et al., 2011; Westerlund et al., 2009), whereas retiring from an empowering occupation would lead to feelings of (role) loss and thus have negative effects on mental well-being. The results of this study partly support these assumptions. Retiring from a job, which is characterized by an effort-reward imbalance above the average, is associated with a stronger decrease in the number of depressive symptoms. But breaking quality of work down into its core dimensions suggests that it is a rewarding work environment, and also partly work environment characterized by low control, which drives the associations. Retirees who experienced their work environment as rewarding seem to have slightly more difficulties with adjusting to their new role in life compared to persons who experienced a non-rewarding work environment. Regarding low control and the number of depressive symptoms we can identify a relief reaction: a work environment characterized by low levels of control decreased the number of depressive symptoms after retirement. Effort – however - does not significantly moderate the association between depressive symptoms and retirement.

The number of depressive symptoms is measured by the EURO-D scale, and analyses (see Castro-Costa et al., 2008) suggest two underlying factors, namely "affective suffering" and "motivation". One goal of this study is to find out whether retirement and quality of work have stronger associations with one of the two factors. Comparing the R^2 – within of the different models shows that the explained variance in the models with the factor scores for motivation as the outcome variable is much lower than in the models that apply the factor scores for affective suffering or number of depressive symptoms as outcome. This suggests that quality of work and the transition into retirement have stronger effects on depressive symptoms that measure affective suffering (such as depressed mood, excessive feelings of guilt, sleeping problems, irritability, fatigue, and tearfulness) compared to those that measure motivation.

This study has several limitations. First of all, it does not offer a real long-term perspective on retirement since the publicly available data so far include only

three observation points in time (with uneven time lags). Thus, there is currently only limited possibility to investigate on how the effect of quality of work on mental health might change after several years of retirement. The time frame of this study covers only retirees, who retired between 2004 and 2012, representing just one cohort of retirees. Since work experiences differ according to the historical period and regional context in which they take place, the results for the retirees in this study may not be representative for past and future generations of retirees. Long-term effects and possible differences between cohorts of retirees will be observable once further waves of SHARE will become available.

Furthermore, the generalizability of the results is limited since there is a certain selection bias. The respondents in the analytical sample are less depressed than respondents in the original sample. If the higher depression rates in the original sample were caused by quality of work, the results of this study would be biased.

There are many aspects which could not be considered in this study, but which deserve further analysis and further investigation:

As Atchley (2000) already notes activities before and after the event of retirement play a crucial role in the successful adaptation to the retirement process. Future study investigating the associations between quality of work, retirement, and mental well-being should also take activities into account.

Further analyses of the association between quality of work, retirement and mental well-being should also take into account reasons for retirement. Some respondents retire early and they do this voluntarily whereas others have to retire because of health reasons. Still others have to leave the workforce at a certain age due to legal regulations. Another important aspect in the retirement decision is often the employment status of the partner or spouse (Pienta & Hayward, 2002; Szinovacz & Davey, 2004a, b): an increase in female labor force participation took place during the last couple of decades and thus, many couples are dual earner couples. Retirement has become a "couple event" where retirement decisions of one spouse influence the retirement decision of the other spouse. If husbands retire while their wives remain part of the active workforce, retirement has more adverse effects on the mental health of those husbands. Joint retirement, on the contrary, is positive impact on psychological well-being.

The life course perspective could also help to get a better understanding of retirement and well-being. Results from the French GAZEL study suggest, that

psychosocial factors at work during mid-life have long-term effects on health even after labor market exit (Wahrendorf et al., 2012). Therefore, it is suggested not only to observe the work environment a few years prior to retirement, but to also take work conditions during mid-life into account. The SHARELIFE data offers the possibility to enrich the analyses of this study with the life-course perspective.

What do we learn from this study? Lower job quality leads to elevated levels of depression, which is associated with higher health service utilization and thus with increasing costs for the health care systems (Luppa et al., 2013). On the other hand, low job quality leads to early retirement (Siegrist et al., 2007), resulting in an increasing number of economically dependent individuals. This phenomenon - paired with the fact that societies are aging - leads to a growing disproportionateness of economically active versus economically dependent individuals in Europe. Thus, policy makers are advised to invest in measures which improve the quality of work. The results are also important for policy makers with regard to the health status of retirees. Inflexible retirement and working age regulation force highly skilled workers to exit the labor market which has adverse effects on their mental well-being due to feelings of role loss. Thus, models that allow gradual retirement processes such as bridge retirement could be beneficial.

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

Abstract

Objectives: This study assesses the role of personal education as a moderator and a mediator in the association between family background during childhood and depressive symptoms in later life by applying Ross & Mirowsky's resource substitution and structural amplification theory of health and education.

Methods: OLS regression models are estimated using data from the "Survey of Health, Ageing and Retirement in Europe" (SHARE), which covers information on current social and health status as well as retrospective life histories from 20,453 respondents aged 50 or older from thirteen European countries.

Results: The association between family background and depressive symptoms is partly mediated by personal education. Higher education helps overcoming the negative consequences of a poor family background. Since people from poor families are less likely to attain higher educational levels, they lack exactly the resource they need in order to overcome the negative consequences their non-prosperous background has on depressive symptoms. Thus, low family background and low personal education amplify each other.

Discussion: Even though the gaps in the levels of depression between higher and lower educated persons on the one hand and between persons from well-off and poorer family background on the other hand widen with age, the interaction between family background and personal education on depressive symptoms does not vary with age.

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

Introduction

A great deal of evidence so far suggests an association between family background during childhood and health outcomes in adult life and older age (Brandt et al., 2012; Case et al., 2005; Hayward & Gorman, 2004; Mazzonna, 2011). However, only very few studies investigated whether this association abates with age. Moody-Ayers and colleagues (2007) found that the impact of family background becomes smaller in old age. Another constant finding in research is the association between education and health: better educated persons report better health outcomes regarding many different aspects of health and well-being (Cagney & Lauderdale, 2002; Lauderdale, 2001; Ross & Mirowsky, 2010; Ross & Wu, 1995), including psychological health (Cairney & Krause, 2005; Clarke et al., 2011; Grzywacz et al., 2004; Ladin, 2008). The gap in health between better educated and poorer educated individuals appears to widen with age (Mirowsky & Ross, 2008; Ross & Wu, 1996).

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

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

interaction becomes weaker or stronger as people age.

The remainder of this study is structured as follows: first, an overview over the existing literature will address how family background, education, and mental health are associated. Next, the theoretical background, which offers an explanation for the association between family background and education on health – namely the theory of resource substitution and structural amplification - will be described. The next section describes the data and the empirical strategy for the analyses. Thereafter, the results will be presented. The final section offers conclusions and suggestions for further research.

Family background's association with health and educational attainment

Family background in childhood is found to have an impact on physical health (Bowen & Gonzalez, 2010; Brandt et al., 2012; O'Rand & Hamil-Luker, 2005; van den Berg et al., 2011; van den Berg et al., 2009) as well as on psychological well-being and cognitive health in later life (Gilman et al., 2002; Luo & Waite, 2005). Childhood health is a possible pathway: as several studies demonstrate, children of parents with low socio-economic status exhibit worse health outcomes during childhood compared to their counterparts from well-off families (e.g. Bauldry et al., 2012; Case et al., 2002; Currie et al., 2007; Reinhold & Jürges, 2012). Childhood health in turn is a strong predictor for health in adulthood and old age (e.g. Blackwell et al., 2001; Case et al., 2005; Haas, 2007, 2008). So far, very few studies investigated whether the impact of family background becomes weaker as people age. Moody-Ayers and colleagues (2007) find that the impact of socio-economic status during childhood abates in old age and suggest that other age-related factors (such as an increase in functional limitations and chronic diseases) dominate family background, or that survivorship (i.e. persons with less educated parents who reach a high age could be resistant to the negative effects of low parental education) might explain the weaker association between family background and health among the oldest old.

Parent's socioeconomic status does not only affect the health outcomes of their offspring, but also has an impact on their educational attainment. The literature on intergenerational mobility suggests that children's educational outcomes are largely determined by the socio-economic status of their parents (e.g.

Carvalho, 2012; Jerrim & Micklewright, 2009). Health appears to be an important pathway of intergenerational status transmission: children from socially disadvantaged backgrounds are more likely to experience negative health outcomes during childhood (see above), which has adverse effects on their success in school (Case et al., 2005). Educational attainment in turn is strongly associated with health outcomes in adulthood, partly mediated through health behavior and socio-economic status during adulthood (Gall et al., 2010; Ross & Mirowsky, 2006, 2010, 2011).

Education and psychological well-being

Education has been found to be beneficial for both physical health and mental health (Cairney & Krause, 2005; Clarke et al., 2011; Ladin, 2008; Mirowsky & Ross, 2003; Ross & Mirowsky, 2006). Higher educated individuals accumulate more financial and psychosocial resources that are needed in the production of health. According to Ross & Mirowsky (2011) education is a resource in itself as well as a resource needed to generate other resources. As a resource in itself, education stands for learned effectiveness and personal control. Education does not only impart knowledge on certain fields or subjects. From the viewpoint of the theory of learned effectiveness education indicates resourcefulness. Education also produces abilities and skills people need in everyday life. Education teaches people how to learn, how to collect and process information, and how to effectively solve problems; therefore education produces a feeling of control over own life outcomes (Mirowsky & Ross, 1998, 2003), whereas "its absence breeds learned helplessness" (Ross & Mirowsky, 2006, p. 1401)

Personal control has been found to be an important mediator in the association between education and depression. Many studies show that a strong sense of control enhances people's levels of psychological well-being (Aneshensel, 1992; Krause & Stryker, 1984; Mirowsky & Ross, 1990, 2003; Pearlin et al., 1981; Ross & Mirowsky, 1989).

Education also helps to generate other health advancing resources, since it has an impact on future work and economic conditions. Education, work, earnings, wealth, and income are often regarded as interchangeable measures for socio-economic status, but one has to acknowledge that education functions as a determinant of work, prestige, wealth, and income (Mirowsky & Ross, 1998) since

better educated individuals are better able to accumulate resources such as better jobs, higher prestige, and higher income. Thus, education is a key determinant for an individual's placement in the social stratification system. Better jobs and higher income in turn are associated with better (mental) health outcomes (Back & Lee, 2011; Berchick et al., 2012). Since resources associated with education, especially those which are beneficial to health, cumulate with age, several studies suggest that the education gap in health diverges with age due to cumulative (dis-)advantages (Mirowsky & Ross, 2008; Ross & Wu, 1996).

The theory of resource substitution and structural amplification

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

Following the approach of Ross and Mirowsky (2006, 2010, 2011) the resource substitution model has the general form:

H_0: Number of depressive symptoms
$= b_0 - b_1(\text{education}) - b_2(\text{family background}) + b_3(\text{education} \times \text{family background})$

Structural amplification is a special case of resource substitution. Structural amplification occurs "when social conditions decrease the likelihood of attaining personal resources that otherwise would moderate the conditions undesirable consequences" (Ross & Mirowsky, 2011, p. 592). In this case education is the resource, which would be necessary to alleviate the impact of a disadvantaged

family background on health outcomes in later life. But it is exactly the disadvantaged family background, which reduces the likelihood of accomplishing high educational levels.

Summary

This study elaborates the role of education as a moderator and a mediator in the association between family background and psychological well-being in later life. Education is a mediator, as the socio-economic status of parents is an important determinant for the educational attainment of their children. Education in turn is associated with health outcomes in adulthood, mediated through health behavior and socio-economic status. The resource substitution theory of education and health hypothesizes that education has a stronger impact on the psychological well-being of persons with disadvantaged family origins and thus defines education as a moderator in the association between family background and depressive symptoms.

Since the literature so far suggests that a) the impact of family background on health diminishes with age, and b) the educational gap on health increases with age, this study tests whether the interaction between family background and personal education on psychological well-being increases or decreases with age.

Methods

Data Source

The analyses use the "Survey of Health, Ageing and Retirement in Europe" (SHARE; for an overview see Börsch-Supan et al., 2008; Börsch-Supan & Jürges, 2005; Malter & Börsch-Supan, 2013). SHARE is designed as a panel study. So far, four waves have been collected (2004-05, 2006-07, 2008-09, 2010-11). SHARE contains computer-assisted face-to-face interviews with more than 55,000 individuals aged 50 years and older in 20 European countries. SHARE is modeled closely after the U.S. 'Health and Retirement Study' and it is the first data set to combine extensive cross-national information on socio-economic status, health, and family relationships of Europe's elder population. Probability samples were drawn in each participating country. However, the institutional conditions with respect to sampling in the participating countries are so different that a uniform sampling

design for the entire project was infeasible. As a result the sampling designs used vary from a simple random selection of households (in the Danish case, for example, from the country's central population register) to rather complicated multi-stage designs (as, for example, in Greece, where the telephone directory was used as a sampling frame). Whereas waves 1, 2, and 4 collected information on the current living conditions of the respondents, the third wave of SHARE, the SHARELIFE project (for a methodological overview, see Schroeder, 2011) collected retrospective life histories of the respondents, including the living conditions during childhood.

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

The basis for the sample is the third wave SHARELIFE with 27,974 individual interviews. Observations from wave 1, 2, or 4 are merged to the wave 3 dataset. Respondents who participated – apart from the SHARELIFE wave – in more than one other wave with are only considered once, taking their most recent status. The combined dataset consists of 27,504 individuals. Individuals with missing age indication or who are younger than 50 years are dropped. So are individuals with missing information on the variables of interest. The analytical sample thus consists of 20,453 individuals; see table 4.1 for descriptive statistics.

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

Table 4.1: Pooled sample characteristics (unweighted), N=20,453

	mean	standard deviation
number of depressive symptoms (EURO-D)	2.31	2.23
Life history explanatory variables		
education (in years)*	10.55	4.27
number of book shelves*	2.09	1.20
skill level of main breadwinner*	2.04	0.75
number of rooms per capita*	0.80	0.52
number of facitilies*	2.00	1.76
family background (index, first principal component)	0.00	1.39
past episodes of financial hardship (yes/no)	0.23	-
ever unemployed (yes/no)	0.11	-
Contemporary explanatory variables		
ability to make ends meet (yes/no)	0.64	-
retired	0.58	-
unemployed	0.02	-
employed	0.24	-
disabled	0.03	-
homemaker	0.13	-
control beliefs	5.55	2.30
Control variables		
gender (female=1)	0.55	-
age (in years)	67.29	9.50
living with a spouse/partner (yes/no)	0.74	-
more than 2 chronic conditions (yes/no)	0.45	-

*unstandardized
Source: SHARE (waves 1 – 4), own calculations

Dependent variable

The primary outcome variable in all analyses is respondents' state of mental well-being, measured by the number of depressive symptoms reported in the interview. This variable is operationalized using the EURO-D scale (Prince et al., 1999a; Prince et al., 1999b). The EURO-D scale has been developed for measuring the prevalence of depression among older people within a European context, but has many similarities with the widely used CES-D scale (Radloff, 1977). The EURO-D scale ranges from zero (no symptoms of depression existent) to 12 (12 symptoms of depression existent). The symptoms are depressed mood, pessimism, suicidality, excessive feelings of guilt, trouble sleeping, loss of interest, irritability, diminution in appetite, fatigue, difficulties in concentrating on entertainment or reading, lack of enjoyment in recent activities, and tearfulness. Respondents answer "yes" or "no" to questions about the presence of the aforementioned symptoms. All the items refer to the presence of those symptoms within the last month. The reliability (Cronbach's alpha) of the EURO-D scale within SHARE is 0.82.

Education and family background

The number of years in in fulltime education measures personal education. The variable ranges from 0 to 20 years, with a mean of 10.55 years.

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

In order to account for country-specific differences in education level and family background, each of the four variables on family background as well as education are standardized for the analyses, which means that 1) the country-specific mean for the variable is subtracted from the individual value for each case, and 2) the difference between the score of the individual and the country-specific mean is divided by the country-specific standard deviation.

Following Mazzonna (2011), a principal component analysis (PCA) is conducted in order to build an index for family background. The PCA is a measure for data reduction, which provides a linear weighting system of the variables described above, that are used as an approximation of family background. The analysis suggests retaining one component only to represent family background. The first

principal component explains about 48% of the total variance and thus contains the most relevant information. It is therefore used to represent family background. One could doubt the accuracy of the retrospective SHARELIFE data on childhood circumstances, which are the basis for the constructed index on family background, since the information collected is prone to recall bias. Havari and Mazzonna (2011) show that the retrospective data collected in SHARELIFE shows good internal and external consistency and conclude that the data is useful in assessing how childhood circumstances impact living conditions in later life.

Further explanatory variables

Current financial hardship is measured using a question on whether respondents are able to make ends meet with their household income (Litwin & Sapir, 2009). The original variable ranges from 1 representing "with great difficulty" to 4 representing "easily". The variable used in the analysis is dummy coded, with 0 indicating difficulties with the financial situation (therefore including the categories "with great difficulty" and "with some difficulty") and 1 indicating respondents' ability to make ends meet (including the categories "fairly easy" and easy"). The analyses also contain a dummy variable on past episodes of financial hardship (after age 25) in order to capture a more complete life course perspective on financial hardship. Lower levels of education are associated with an increased risk for financial hardship (Ross & Wu, 1995). Financial hardship in turn is associated with an increase in depressive symptoms (Butterworth et al., 2012; Mirowsky & Ross, 2001).

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

& de Gracia, 2012), and unemployment in turn increases the number of depressive symptoms (Berchick et al., 2012).

The sense of control over outcomes in own life is measured by building an additive index using a couple of questions from the CASP item battery (see Hyde et al., 2003; Wiggins et al., 2004). CASP is an item battery designed in order to measure quality of life in older people. It contains questions on control, autonomy, self-realization and pleasure. The SHARE questionnaire uses a short form of CASP containing 12 questions. The questions on control are: "My age prevents me from doing the things I would like to"; "I feel that what happens to me is out of my control"; and "I feel left out of things". The single variables range from 0 to 3 with higher values representing a higher sense of control. The additive index on control then ranges from 0 to 9. The reliability of the scale (Cronbach's alpha) is 0.69.

Control variables

The existing literature considers as well confirmed the fact that gender, age, and chronic diseases are correlated with mental health. Women report more symptoms of depression (Mirowsky & Ross, 1995; Ross & Mirowsky, 2006), prevalence of depression rises with age (Mirowsky & Ross, 1992), persons suffering from chronic diseases are more likely to also suffer from depression (co-morbidity) (Braam et al., 2005; Ostergaard et al., 2013). Thus, variables gender, age (in years), and the number of diagnosed physical chronic diseases (e.g. diabetes, osteoporosis, high blood pressure, cancer, Parkinson's disease) enter the analyses.

Persons living with a spouse or partner report higher psychological well-being compared to persons without a partner or spouse (Clarke et al., 2011). Therefore, a dummy variable, which contrasts persons living with a spouse or partner to persons living as single is part of the analyses.

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

Statistical analyses

The analyses consist of stepwise ordinary least square regression models with an interaction term between personal education and family background in

order to test the association between depressive symptoms and family background. The theory of structural amplification states that education is a moderator as well as a mediator in the association between family background and depressive symptoms. Following Baron and Kenny (1986) education mediates the effect of family background on depressive symptoms if four conditions are met: 1) family background has a significant effect on education; 2) family background significantly affects depressive symptoms in the absence of the mediating variable "education"; 3) education has a unique effect on depressive symptoms; and 4) the effect of family background on depressive symptoms shrinks when controlling for education. Thus, the first set of regression models (models 1 to 3) assesses whether the conditions postulated by Baron and Kenny (1986) are met and regresses education on family background (model 1). Next, depressive symptoms are regressed on family background (model 2) and on family background and education (model 3).

In order to test whether education is also a moderator in the association between family background and depressive symptoms, model 4 regresses the number of depressive symptoms on family background, education, and the interaction term between family background and education, holding constant the covariates (country, age, birth cohort, wave, living with a partner, more than two chronic conditions). Model 5 additionally includes variables, which represent the economic consequences of education, such as current and past episodes of financial hardship, current employment status, as well as an indication for periods of unwanted unemployment. Model 6 finally adds the index for perceived control over life outcomes to the set-up of model 5.

Testing the hypothesis that the strength of the role of education as a moderator and a mediator in the association between family background and depressive symptoms might vary across age groups requires additional analyses which include the three-way interaction term between family background, personal education, and age, as well as the main effects of family background, personal education, and age, and the two-way interaction terms between a) personal education and family background, b) personal education and age, and c) family background and age. Stepwise OLS models regress the number of depressive symptoms on age, family background, personal education, and the covariates plus a) the interaction effect between family background and age (model 7), b) the interaction effect between personal education and age (model 8), and c) the interaction effects between personal education and age, family background and age, family background and

personal education, and the three-way interaction between family background, personal education and age (model 9). (The two-way interaction between family background and personal education has already been tested in models 4 to 6.)

All statistical analyses are conducted with Stata 12.

Results

Education as a mediator

Models 1 to 3 in table 4.2 show the results of the regression analyses which test if the four conditions are met which qualify education as a mediator in the association between family background and depressive symptoms. Family background is positively associated with the number of years in education. One standard deviation increase in the socio-economic status in childhood increases the number of years in full-time education by 0.28 units. Thus, condition 1 is met. The results of model 2 show that family background is also negatively associated with the number of depressive symptoms. Increasing the socio-economic status in childhood by one standard deviation in the absence of education as a control variable leads to a significant reduction of the number of depressive symptoms by -0.09 units, which illustrates that condition 2 is also met. Model 3 shows that conditions 3 and 4 are met: education is negatively associated with the number of depressive symptoms. An increase in years in full-time education by one standard deviation significantly decreases the number of depressive symptoms by -0.13 units (condition 3). Moreover, holding constant educational attainment in the model reduces the coefficient for family background. Although family background is still significantly associated with the number of depressive symptoms, the size of the coefficient recedes from -0.09 in model to -0.05 in model 3 (condition 4). The Sobel-Goodman mediation test in Stata also reveals that education is a significant mediator in the association between family background and depressive symptoms; about 42 percent of the total effect is mediated by education (results not shown here, but available upon request).

Table 4.2: OLS regression coefficients (standard errors); education regressed on family background (model 1), number of depressive symptoms regressed on family background (model 2), education (model 3), the interaction effect of family background and education (model 4), effects of eduction (model 5), and control beliefs (model 6): SHARE waves 1 to 4

	model 1 education	model 2 EURO-D	model 3 EURO-D	model 4 EURO-D	model 5 EURO-D	model 6 EURO-D
family background	0.281***	-0.086***	-0.050***	-0.060***	-0.050***	-0.052***
	(0.005)	(0.011)	(0.011)	(0.012)	(0.012)	(0.011)
education	-	-	-0.128***	-0.131***	-0.081***	-0.059***
			(0.017)	(0.017)	(0.016)	(0.015)
family background * education	-	-	-	0.031**	0.032**	0.027**
				(0.010)	(0.010)	(0.009)
ability to make ends meet	-	-	-	-	-0.553***	-0.331***
					(0.036)	(0.034)
retired[a]	-	-	-	-	-0.152***	-0.066+
					(0.042)	(0.040)
unemployed[a]	-	-	-	-	0.329**	0.216*
					(0.112)	(0.103)
disabled[a]	-	-	-	-	1.045***	0.817***
					(0.101)	(0.095)
homemaker[a]	-	-	-	-	0.021	0.011
					(0.059)	(0.056)
past eps. of financial hardship	-	-	-	-	0.318***	0.264***
					(0.036)	(0.034)
ever unemployed	-	-	-	-	0.004	-0.010
					(0.046)	(0.044)
control beliefs	-	-	-	-	-	-0.332***
						(0.007)
constant	1.133***	1.023***	1.168***	1.174***	0.604***	3.711***
	(0.062)	(0.146)	(0.147)	(0.147)	(0.164)	(0.167)
N	20,453	20,453	20,453	20,453	20,453	20,453
R-sq	0.249	0.148	0.151	0.151	0.178	0.275

[a] reference category: employed
education and family background are standardized by country
adjusted for gender, age, living with spouse/partner, chronic conditions, country, and wave; standard errors in parentheses
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Education as a moderator

Models 4 to 6 (see also table 4.2) test whether the resource substation theory of education and health is valid. Model 4 regresses the number of depressive symptoms on family background, on education, and on the interaction effect between family background and education. A more well-off family background and more years of education reduce the number of depressive symptoms. Given an average family background (equals zero), an increase of education by one standard deviation decreases the number of depressive symptoms at a rate of -0.13 units. Given an average level of education (equals zero), each standard deviation increase in family background lowers the number of depressive symptoms by -0.06 units. As predicted by the theory, the interaction effect is significant and has a positive value of 0.03. That is, at increasing levels of education, the effect of family background becomes smaller by 0.03 units. In other words, the higher the levels of personal education, the smaller the impact of family background becomes. Figure 4.1 displays the interaction effect: For persons with an educational level 2 standard deviations *above* the country-specific average, family background has no impact on the number of depressive symptoms. On the other hand, persons with an educational level 2 standard deviations *below* the country-specific average, family background plays a crucial role: low educated persons from a well-off family background report significantly lower numbers of depressive symptoms compared to low educated persons from families with a low socio-economic status.

Model 5 adds variables on past and current work and economic conditions to model 4. Currently being able to make ends meet significantly reduces the number of depressive symptoms. Phases of financial hardship in the past are associated with an increased number of depressive symptoms. Retirees report lower number of depressive symptoms compared to currently employed respondents (=reference category). Unemployed and disabled persons report more depressive symptoms than employed persons. Homemakers and employed to not differ regarding the number of depressive symptoms. The indicator for phases of past unemployment is not associated with an increase or a decrease in the number of depressive symptoms (even if NOT holding constant current employment status; results not shown here but available upon request).

Model 6 finally adds perceived control to the analyses. Having the feeling of being in control over outcomes in life is associated with a lower number of

depressive symptoms. Adding the variables on the economic consequences of education and control beliefs explains about 55 percent of the association between education and depressive symptoms ((-0,131-(-0,059))/-0,131) and about 13 percent of the association between family background and depressive symptoms ((-0,06-(-0,052))/-0,06).

Figure 4.1: Depressive symptoms by family background at five levels of education
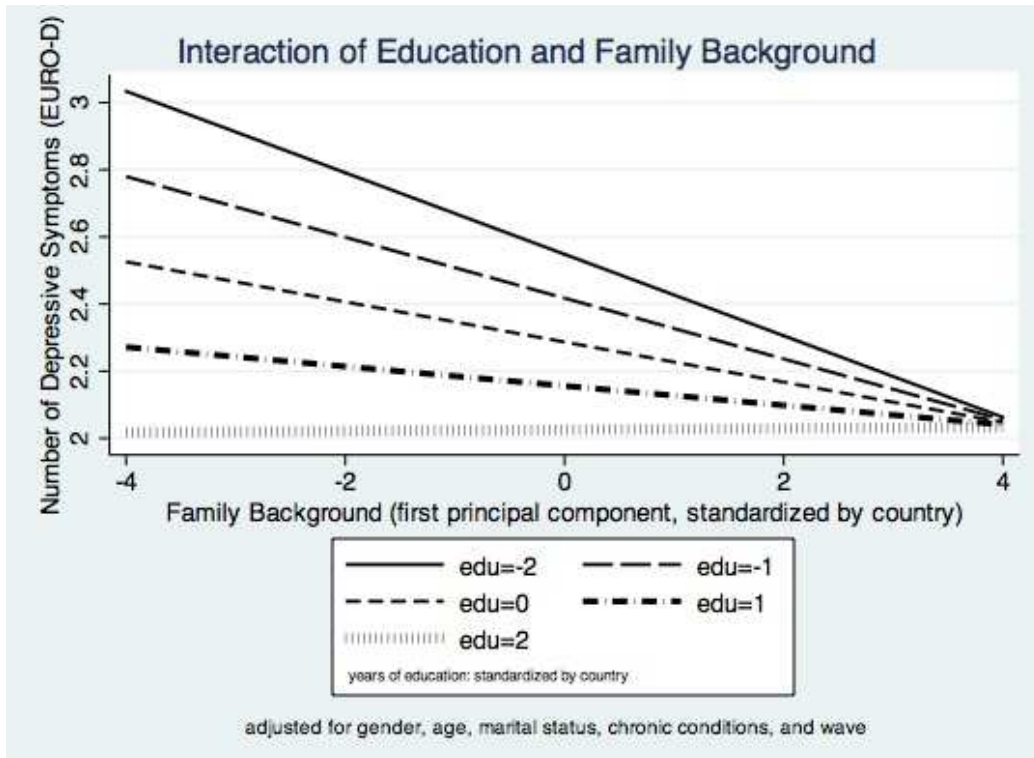
Age differences

      The next set of models (table 4.3) tests, whether family background, personal education, and the interaction effect between family background and education are moderated by age.

Model 7 regresses the number of depressive symptoms on family background, personal education, age, and the interaction term between family background and age (and the covariates country, gender, living with a partner, chronic diseases, and wave). Given an average level of family background increasing age by one year is associated with an increase in depressive symptoms by 0.008 units. At higher levels of family background the rate becomes smaller by -0.002 units per standard

deviation. That is, the more well-off the family background the smaller the impact of age becomes. In other words, the gap in depression between individuals from well-off family backgrounds and poor family backgrounds widens with age (see also figure 4.2).

Table 4.3: OLS regression coefficients (standard errors) by region; education regressed on family background (model 1), number of depressive symptoms regressed on family background (model 2), education (model 3), SHARE waves 1 to 4

|	model 7 EURO-D	model 8 EURO-D	model 9 EURO-D
family background	0.104	-0.050***	-0.027
	(0.077)	(0.011)	(0.090)
education	-0.127***	0.128	0.019
	(0.017)	(0.109)	(0.122)
age	0.008***	0.008***	0.008***
	(0.002)	(0.002)	(0.002)
education * family background	-	-	0.135+
			(0.075)
age * family background	-0.002*	-	-0.001
	(0.001)		(0.001)
age * education	-	-0.004*	-0.002
		(0.002)	(0.002)
education * family background * age	-	-	-0.002
			(0.001)
constant	1.169***	1.176***	1.118***
	(0.147)	(0.147)	(0.152)
N	20,453	20,453	20,453
R-sq	0.151	0.151	0.151

education and family background are standardized by country
adjusted for gender, living with spouse/partner, chronic conditions, country, and wave
Standard errors in parentheses
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Figure 4.2: Depressive symptoms by age at five levels of family background
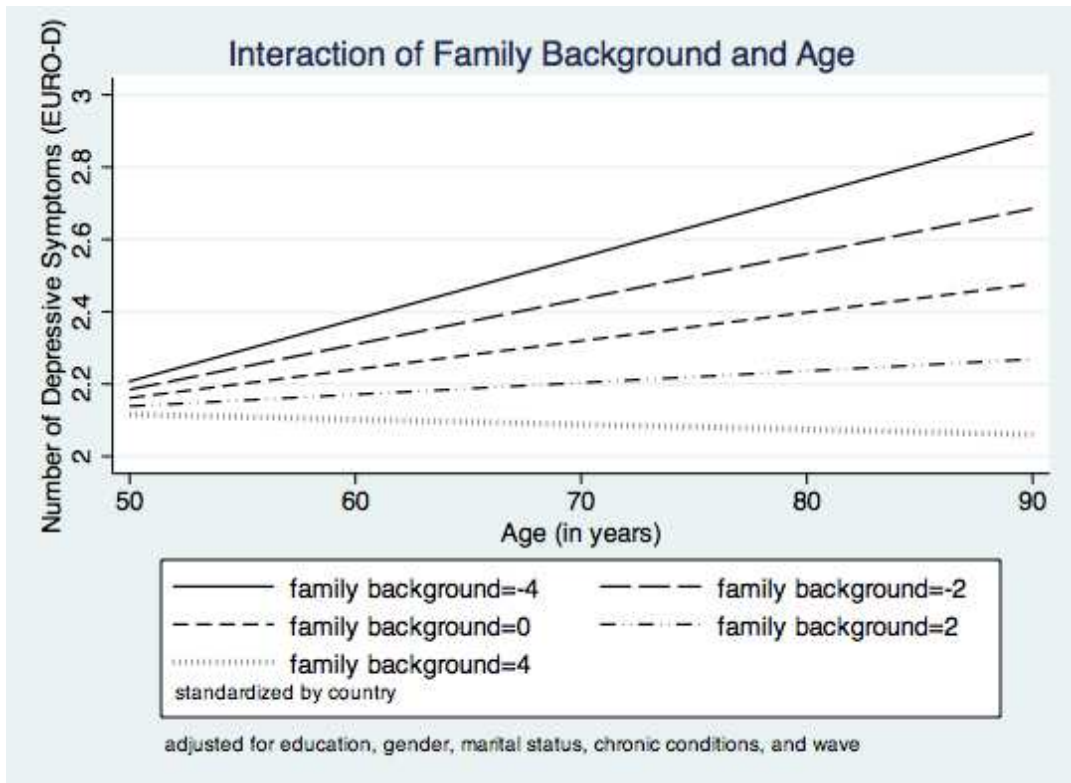
Model 8 regresses the number of depressive symptoms on family background, personal education, age, and the interaction term between education and age (and the covariates country, gender, living with a partner, chronic diseases, and wave). Given an average level of education increasing age by one year is associated with an increase in depressive symptoms by 0.008 units. At higher levels of education this rate becomes smaller by -0.004 units. That is, the higher the education the smaller the impact of age becomes. Or in other words, the gap between higher educated individuals and lower educated individuals regarding depression becomes larger with age (see also figure 4.3).

Figure 4.3: Depressive symptoms by age at five levels of education
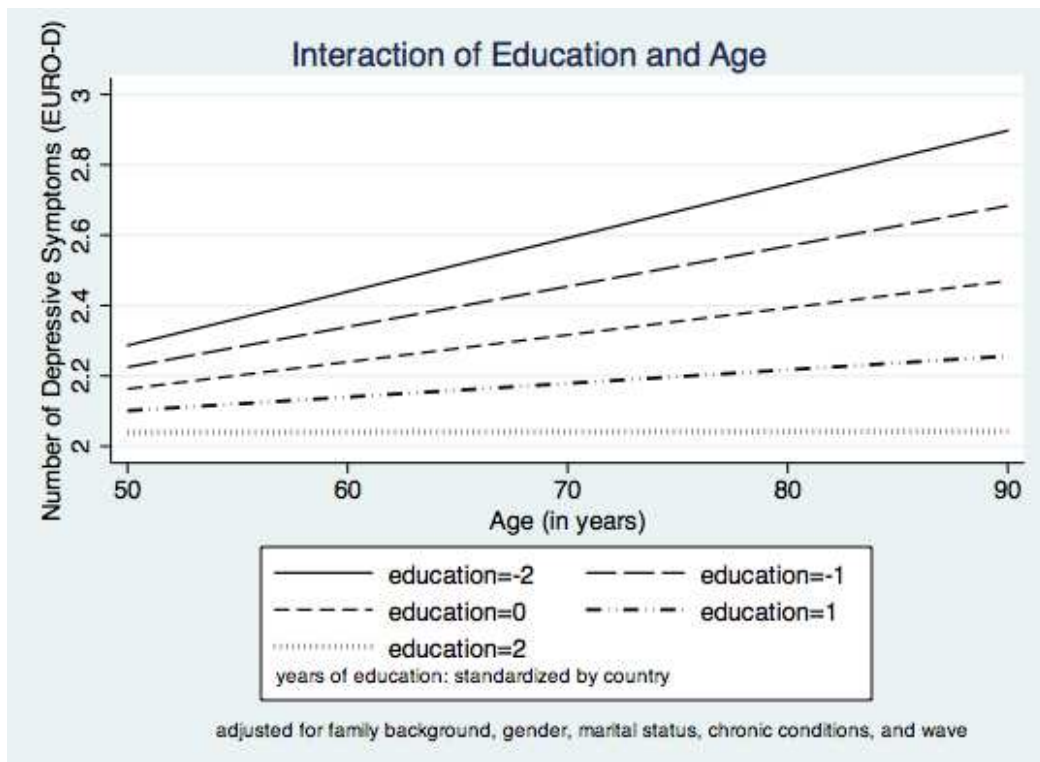
Model 9 finally includes all main effects (family background, personal education, age), the two-way interaction term between the main effects and the three-way interaction between the main effects. The interaction between family background and personal education is significant on the 10 percent level only. The three-way interaction is insignificant, which alludes to the conclusion that the moderating effect of personal education in the association between family background and depressive symptoms does not depend on age.

Discussion

Family background is an important factor for health in later life. Individuals from a well-off family background report better psychological well-being compared to individuals from a less prosperous family background. This association is partly mediated by education: higher levels of education are associated with lower numbers of depressive symptoms. But education does not only function as a mediator, it also serves as a moderator. The significant interaction between family background and education has two sides: On the upside, higher education helps

overcoming the negative consequences of a poor family background. The more years of education one accomplishes, the weaker the impact of family background on mental well-being becomes. But there is also a downside: since people from poor families are less likely to attain higher educational levels, they lack exactly the resource they need in order to overcome the negative consequences their non-prosperous background has on depressive symptoms. Thus, low family background and low personal education amplify each other.

The differences in psychological well-being between higher educated and lower educated persons become larger with age. The gap between individuals with a well-off family background and from a poor family background regarding the number of depressive symptoms also widens with age, which contradicts the results found by Moody-Ayers and colleagues (2007). Whereas age makes a difference in the association between personal education and depressive symptoms on the one hand and family background and depressive symptoms on the other hand, the three-way interaction between family background, personal education and age is insignificant, which means that the moderating effect of education in the association between family background and depressive symptoms does not become stronger or weaker with age.

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

Future research should elaborate whether role of education as a moderator between family background and health differs across the European context. Unfortunately, this is out of the scope of this study, but tentative analyses suggest some country differences: whereas education is a mediator in the association between family background and depression all over Europe, there is evidence that the role of education as a moderator is of different significance throughout the European countries. However, it is not clear yet, which factors account for these

differences and which characteristics and qualities of the different welfare systems are most helpful to explain these differences. According to Di Paolo et al (2010), Southern European countries exhibit the highest levels of persistence in educational attainment, whereas the Northern European countries show higher levels of mobility. The authors suggest, that the north-south gradient exists because a) Southern European countries implemented compulsory school reforms much later compared to countries in Northern and Western Europe, b) Southern European countries invested less public resources into the educational system, and c) the Nordic countries introduced a comprehensive structure of secondary education, which "[...] considerably reduces the statistical association between child's schooling and parental background [...]" (Di Paolo et al., 2010, p.22). Thus, detailed analyses, which take into account expenditures on schooling and schooling reforms are needed to answer the question whether and why differences exist in the moderating effects of personal education in the association between family background and (mental) health across European countries.

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

Acknowledgment

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Eidesstattliche Erklärung

Hiermit erkläre ich, die vorliegende Dissertation selbständig angefertigt und mich keiner anderen als der in ihr angegebenen Hilfsmittel bedient zu haben. Insbesondere sind sämtliche Zitate aus anderen Quellen als solche gekennzeichnet und mit Quellenangaben versehen.

Stuttgart, den 8. April 2013

Barbara Schaan