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Economic stress in childhood and adulthood, and poor psychological health: three life course hypotheses

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Abstract

Investigations of mental health in a life course perspective are scarce. The aim is to investigate associations between economic stress in childhood and adulthood, and poor psychological health in adulthood with reference to the accumulation, critical period and social mobility hypotheses in life course epidemiology. The 2008 public health survey in Skåne is a cross-sectional postal questionnaire study. A random sample was invited which yielded 28,198 respondents aged 18–80 (55% participation). Psychological health was assessed with the GHQ12 instrument. Logistic regression models were used to investigate the associations adjusting for age, country of birth, socioeconomic status, emotional support, instrumental support and trust, and stratifying by sex. The accumulation hypothesis was confirmed because combined childhood and adulthood exposures to economic stress were associated with poor psychological health in a graded manner. The social mobility hypothesis was also confirmed. The critical period hypothesis was not confirmed because both childhood and adulthood economic stress remained significantly associated with poor psychological health in adulthood. Economic stress in childhood is associated with mental health in adulthood.

Key words: Economic stress, mental health, GHQ12, life course perspective, social capital, Sweden

1.Introduction

Poor psychological health is one of the chronic health problems with highest prevalence globally. In Sweden, 39.8% of all newly granted sickness benefits among men and 41.5% among women in 2006 were due to psychiatric disorders and syndromes, including "burnout" syndrome (Danielsson, 2009). A 10-15% proportion of all adults in Sweden are estimated to have mental health problems which would motivate seeking help within the health care system (Persson, 2005). Poor psychological health is not only a highly prevalent cause of chronic disease in the general population. It is also an important explanation behind socioeconomic differences in health in the general population. Socioeconomic differences in psychiatric disorders have been observed internationally for decades (Stanfield and Marmot, 1992). A recent study in southern Sweden has indicated that the non-manual employees in higher positions category has a similar prevalence of poor psychological health as non-manual employees in middle positions, non-manual employees in lower positions, skilled manual workers, unskilled manual workers and self-employed (no significant differences when analyzed with non-manuals in higher positions as references group) among both men and women. In contrast, the early retired, the unemployed, students and persons on long term sick leave have significantly higher odds ratios of poor psychological health among both men and women (Lindström et al., 2012). Poor psychological health in adulthood is also associated with other current conditions in adulthood such as age, sex, country of birth (Lindström, 2004), emotional support, instrumental support and generalized trust in other people (Lindström et al., 2012). Trust in others may be regarded alternatively as a psychological trait or as an aspect of social capital (Putnam, 2000).

Psychological health and socioeconomic differences in psychological health in adulthood may, however, also be causally affected not only by current social and economic conditions in adulthood but also by a wide variety of comparatively prevalent childhood conditions. Childhood seems to be a particularly sensitive period with regard to environmental disturbances which increase risk of depression (Heim et al., 2010). Experiences of childhood adversity with psychological consequences reaching into adulthood in the form of depression and anxiety are prevalent in western countries. In the USA, the rate of child abuse and neglect reached 10.6% in 2007 (US

Department of Health and Human Services, 2009). It has been estimated that approximately 30-40% of the risk of depression across the life course is genetically determined, while the rest of the risk can be attributed to environmental factors (Merkangas and Swendsen, 1997; Heim and Binder, 2012). The role of early life environmental stress factors in developing major depression, apart from genetic factors, has been demonstrated in twin studies (Kendler et al., 2000). Such childhood stressors include physical, sexual, emotional and verbal abuse, neglect, social deprivation, household dysfunctions including violence and witnessing violence, poverty, parental separation, parental death or illness, disaster, substance abuse and criminal activity (Brown et al., 2009). Recent studies suggest a substantially increased risk of internalizing depressive and anxiety disorders into adulthood following early life stress in childhood (Kendler et al., 2003; Nugent et al., 2011). Childhood sexual or physical abuse was shown to be associated with increased risk of symptoms of depression and anxiety, addiction, psychiatric admissions and suicide attempts (McCauley et al., 1997). Poor paternal relationship or maternal overprotection is also associated with increased risk of depression (Lizardi et al., 1995). In fact, there seems to be a dose-response relationship between the severity of the experience of childhood adversities and the severity of depressive episodes and overall lifetime experience of chronic depression (Chapman et al., 2004) as well as between childhood adversities and adult experience of mental health problems in general (Edwards et al., 2003).

In the latter two decades there has been a surge in life course research, i.e. research concerning the influence of risk factors in early life on health later in life. The notion that exposure to risk factors in early life in utero or in childhood may causally affect health later in life was first empirically investigated by Barker in relation to the metabolic syndrome, type II diabetes and cardiovascular diseases. Barker suggested that the last trimester of life in utero was a “critical period” which if exposed to growth retardation would eventually result in a number of increased risk factors and diseases related to the metabolic syndrome (Barker, 1995; Barker, 1998). The critical period hypothesis has later been empirically investigated with regard to a variety of diseases other than the metabolic syndrome and its clinical consequences (Sahade et al., 2011). The literature concerning childhood experiences of psychological and psychosocial adversities and their effects on depression, anxiety and other mental disorders in adulthood suggests that childhood may be regarded as a “critical period”

also for these conditions. Since Barker's original work, an entire theoretical framework, several models, a range of concepts connected with this theoretical framework, and other complementary as well as competing life hypotheses have emerged. Such hypotheses include the accumulation of risk hypothesis in several forms including accumulation of risk over time and accumulation of risk over time by clustering of risk factors over time, birth cohort effects, chains of risk models and several variants of the critical period hypothesis (Ben-Schlomo and Kuh, 2002; Kuh et al., 2003). Two main life course hypotheses other than the critical period hypothesis are the accumulation of risk and social mobility hypotheses. The accumulation of risk hypothesis suggests that exposures accumulate during the life course in order to cumulatively increase the risk of chronic disease in adulthood (Hallqvist et al., 2004). The social mobility hypothesis is more directly focused on life course *social* epidemiology. The idea behind the social mobility hypothesis is that intra- and inter-generational social mobility, mostly defined in terms of socioeconomic status (SES) by occupational status, education, income or economic stress, will have an effect on health in adulthood. This hypothesis also implies that social mobility per se should be considered a potentially important social cause of disease (Lynch et al., 1994).

In this study the aim is to empirically test the critical period, accumulation and social mobility hypotheses in the 2008 public health survey distributed to a random sample of 18-80 year old adults in Skåne, southern Sweden, in relation to poor psychological health in adulthood. A public health survey item concerning recalled economic stress in childhood will be combined with an item concerning the current experience of economic stress in adulthood. Previous studies have suggested the importance of childhood poverty, social deprivation and various household dysfunctions as early life stressors for mental health in childhood *and* adulthood (e.g. Brown et al., 2009), but no study has empirically tested the association between both childhood and adulthood economic stress and poor psychological health in relation to the accumulation, critical period and social mobility hypotheses. The item concerning economic stress in adulthood has been analyzed in relation to health and health related behaviours in earlier studies based on earlier public health surveys in Sweden (Fritzell and Burström, 2006). A previous study based on the 2008 Skåne survey has investigated the associations between economic stress in childhood, economic stress in adulthood and self-rated global health (Lindström, Hansen and Rosvall, 2012). A second study

has analyzed associations between economic stress in childhood and adulthood and tobacco smoking (Lindström et al., 2013). We investigate whether economic stress in childhood or economic stress in adulthood are critically associated with poor psychological health in adulthood when investigated in the same model (critical period), whether economic stress in childhood and economic stress in adulthood have a graded association with poor psychological health in adulthood (accumulation), and if social mobility is associated with poor psychological health in adulthood (social mobility).

The aim is to investigate the associations between economic stress during childhood and adulthood, and poor psychological health with reference to the accumulation, critical period and social mobility hypotheses, including demographic, socioeconomic, psychosocial factors and trust in the multiple adjusted models.

2. Methods and materials

2.1 Study population

The 2008 public health survey in Skåne in the southernmost part of Sweden is cross sectional. A total of 28,198 persons randomly selected from the official population registers of people living in Skåne born between 1928 and 1990 answered a postal questionnaire in August-September 2008, and the participation rate was 55%. Two reminder letters were sent. The study has been approved by the Ethical Committee at Lund University, Sweden (No. 2010/343).

2.2 Definitions

2.2.1 Dependent variable

Self reported psychological health (GHQ12) includes twelve items reflecting different aspects of psychological health. The items included in the GHQ12 are ”Have You been able to concentrate on what You have been doing during the past weeks?”, ”Have You had problems with Your sleep during the past weeks?”, ”Do You feel that You have been useful during the past weeks?”, “Have You been able to make

decisions in different areas during the past weeks?", "Have You felt tense during the past weeks?", "Have You during the past weeks been able to appreciate what You have been doing during the days?", "Have You been able to deal with Your problems during the past weeks?", "Generally speaking, have You felt happy during the past weeks?". These eight items had four alternative answers: "More/better than usually", "As usual", "Less than usual" and "Much less than usual". The items were dichotomised with two alternatives denoting "good" psychological health and two alternatives denoting "bad" psychological health. Four other items had somewhat different alternative answers: "Have You felt unable to deal with Your own personal problems during the past weeks?", "Have You felt unhappy and depressed during the past weeks?", "Have You lost faith in Yourself during the past weeks?" and "Have You felt worthless during the past weeks?". The four alternative answers to these four items were: "Not at all", "No more than usually", "More than usually" and "Much more than usually". The answers to these items were also dichotomised to denote "bad" psychological health or "good" psychological health. If three or more of all the twelve items denoted "bad" psychological health, general psychological health (GHQ12) was denoted as "bad". This instrument for the measurement of psychological health is the shortest (other GHQ measures contain for instance 28 or 60 items) but has still been shown to be a very robust measure of psychological health (Goldberg et al., 1997).

2.2.2 Independent variables

Age was divided into 18-24, 25-34, 35-44, 45-54, 55-64 and 65-80 year age intervals.

All analyses were stratified by *sex*.

Born in Sweden/born in other country than Sweden. All participants born outside Sweden were aggregated into a single category which was compared with the category born in Sweden.

Socioeconomic status (SES) by occupation included the employed categories higher non-manual employees, medium level non-manual employees, low level non-manual employees, skilled manual works and unskilled manual workers, and also self-

employed/farmers. The substantial proportion outside the workforce entails early retired before age 65 (health reasons or early retirement entitlement in the employment contract reasons), on long term sick leave, unemployed, students, old age pensioners above age 65, and unclassified.

Emotional support was assessed with the question "Do you feel that you have one or some persons that can give you accurate personal support in order to cope with the stress and problems of life". It has four alternative answers: "Yes, I am absolutely certain to get such support", "Yes, possibly", "Not certain", and "No". The three latter alternatives were depicted as low emotional support.

Instrumental support stems from the question "Can you get help from one or some persons in case of illness or practical problems (borrow minor things, help with reparation, help to write a letter, get advice and information)?" It had the same alternative answers as emotional support, and was dichotomized correspondingly.

Generalized trust in other people is a variable which assesses the individual's perception of generalized trust in other people (including unknown). It was appraised by the item "Generally, you can trust other people" with the four alternative answers: "Do not agree at all", "Do not agree", "Agree", and "Completely agree". The options were dichotomized, the two first alternatives indicating low trust and the two latter high.

Economic stress in childhood was appraised with the question "Did your family experience economic hardship during your childhood?" with the three alternatives "No, no significant problems" (category 1), "Yes, less severe problems and/or problems during short time periods" (category 2) and "Yes, severe problems and/or problems during long time periods" (category 3).

Economic stress in adulthood was assessed with the question "How often during the past twelve months have you had problems paying your bills?" with the four alternative answers "never" (category 1), "occasionally" (category 2), "every second month" (category 3) and "every month" (category 3). The two latter options "every

second month" and "every month" were collapsed (into category 3) which yielded three categories.

Economic stress in childhood and *economic stress in adulthood* (current situation) were analyzed combined to address the three hypotheses concerning accumulation, critical period and social mobility (Lindström, Hansen and Rosvall, 2012; Lindström et al. 2013):

The accumulation hypothesis was investigated by adding the exposure to economic stress in childhood and adulthood: respondents with no problems in childhood as well as in adulthood being the most optimal combination (1+1), respondents with no problems in either adolescence or adulthood combined with lesser (medium) problems in either childhood or adulthood being the second best combination (1+2 or 2+1), the least optimal combination being severe economic stress in both childhood and adulthood (3+3). The (1+3), (3+1), (2+2) combinations were analyzed collapsed as well as the (2+3) and (3+2) combinations, yielding a total five combinations.

The critical period hypothesis was tested by including both economic stress in childhood and adulthood as two separate and categorized variables in the same multiple models.

The social mobility hypothesis was investigated by analyzing the mobility from no economic problems in childhood to either no problems (1+1), less frequent problems (1+2) or severe problems in adulthood (1+3). The baseline economic stress in childhood among respondents with less severe problems and/or problems during short time periods (2+1, 2+2, 2+3) as well as with severe problems and/or problems during long time periods (3+1, 3+2, 3+3) were analyzed similarly with economic stress in childhood as baseline.

2.3 Statistics

Prevalence (%) of poor psychological health, age, country of birth, socioeconomic status, emotional support, instrumental support, trust, economic stress in childhood and economic stress in adulthood stratified by sex were calculated (table 1).

Prevalences (%) and odds ratios with 95% confidence intervals (OR:s, 95% CI) of poor psychological health were calculated according to age, country of birth, socioeconomic status, emotional support, instrumental support, trust, economic stress in childhood and economic stress in adulthood (table 2). Crude, age-adjusted and multiple adjusted odds ratios and 95% confidence intervals of poor psychological health according to the accumulation hypothesis were calculated (table 3). Crude, age-adjusted and multiple adjusted odds ratios and 95% confidence intervals of poor psychological health according to the critical period hypothesis were calculated (table 4). Crude, age-adjusted and multiple adjusted odds ratios and 95% confidence intervals of poor psychological health according to the social mobility hypothesis were calculated (table 5). All statistical analyses in tables 2-5 were conducted in logistic regression models and stratified by sex. The statistical analyses were performed using the PASW software package version 20.0 (Norusis, 2012).

3. Results

Table 1 shows that 13.8% of the men and 18.2% of the women reported poor psychological health. The prevalence of demographic, socioeconomic status, emotional support, instrumental support, trust, and economic stress in childhood and adulthood variables among men and women are also shown in table 1.

Table 2 shows that poor psychological health was more common among the young, among those born abroad, with low socioeconomic status, unemployed, sick leave pensioners, low emotional support, low instrumental support, low trust, economic stress in childhood and economic stress in adulthood.

Table 3 shows that the crude odds ratios of poor psychological health were 1.50 (1.33-1.69) in the (1+2, 2+1) accumulation group, 2.82 (2.48-3.20) in the (1+3, 3+1, 2+2) accumulation group, 5.56 (4.61-8.70) in the (2+3, 3+2) accumulation group and 6.50 (4.83-8.73) in the (3+3) accumulation group compared to the (1+1) no life-course economic stress accumulation reference group among men, and the crude odds ratios were 1.41 (1.27-1.57), 2.58 (2.30-2.89), 3.11 (2.61.3.70), and 5.89 (4.47-7.77) among women, respectively. These patterns remained across the multiple analyses (table 3).

Table 4 shows that the crude and age adjusted odds ratios of poor psychological health according to economic stress in both childhood and adulthood were significant for both men and women compared to the no stress alternatives, respectively, when included in the same logistic regression model. The odds ratios were higher (higher effect measure) for economic stress in adulthood than for economic stress in childhood among both men and women. In the multiple adjusted model the odds ratios remained significant compared to the no economic stress in childhood and adulthood alternatives for men. In contrast, the less severe and/ or shorter period of economic stress in childhood (category 2) became not significant, odds ratio 0.98 (0.88-1.09), among women. The severe and/or longer period of economic stress in childhood (category 3) remained significant among women in the multiple adjusted model, odds ratio 1.43 (1.24-1.66), as well as the odds ratios of poor psychological health in the economic stress in adulthood categories (2 and 3) compared to the no economic stress in adulthood reference category (category 1) among women.

Table 5 shows that social mobility by moving from no economic stress in childhood to moderate economic stress in adulthood (category 1 to category 2) resulted in an odds ratio 1.29 (1.06-1.57) of poor psychological health among men and 1.59 (1.36-1.86) among women compared to the no economic stress in either childhood or adulthood reference group (category 1 to category 1), respectively, while moving from no economic stress in childhood to severe economic stress in adulthood (category 1 to 3) resulted in an odds ratio 3.35 (2.64-4.25) of poor psychological health among men and 3.13 (2.56-3.83) in the multiple models. Social mobility in the form of moving from moderate economic stress in childhood to no economic stress in adulthood (from category 2 to category 1) resulted in odds ratios 0.59 (0.47-0.73) among men and 0.66 (0.54-0.81) among women compared to the moderate-moderate (category 2 to category 2) reference group, while moving in the other direction from moderate to severe economic stress (from category 2 to category 3) resulted in an odds ratio 2.11 (1.58-2.83) among men and 1.16 (0.88-1.54) among women compared to the moderate-moderate (from category 2 to category 2) reference group in the multiple adjusted models. Compared to the age adjusted model, the odds ratio of poor psychological health for women thus became not significant in the multiple adjusted model. Finally, social mobility from severe to moderate economic stress (category 3 to category 2) resulted in odds ratios 0.64 (0.41-0.99) among men and 0.50 (0.33-

0.76) among women of poor psychological health compared to the severe-severe (from category 3 to category 3) reference group, while social mobility from severe to no economic stress (from category 3 to category 1) resulted in odds ratios 0.44 (0.30-0.64) among men and 0.48 (0.34-0.68) among women of poor psychological health compared to the severe-severe (from category 3 to category 3) reference group.

4. Discussion

This is the first study to investigate the accumulation, critical period and social mobility life course hypotheses with regard to the association between economic stress in childhood and adulthood and poor psychological health. The accumulation hypothesis was fully confirmed regarding the relation between economic stress in childhood and adulthood, and poor psychological health. The social mobility hypothesis was also confirmed. In contrast, the fact that both economic stress in childhood and economic stress in adulthood are significantly associated with poor psychological health throughout the multiple logistic regression analyses indicates that both periods are important, i.e. there seems to be no specific critical period for economic stress and poor psychological adult health.

The three life course hypotheses are interconnected. In fact, the social mobility hypothesis partly entails parts of the accumulation hypothesis, because when you, for example, move down the social hierarchy, you add an exposure to low socioeconomic status to your lifetime exposure and vice versa. The fact that we only have two observation points in time, one retrospective and one current in the cross-section, makes it harder to separate the test of the accumulation hypothesis from the test of the social mobility hypothesis in the analyses (Singer and Willett, 2003). This also necessitates the separation of measures of accumulation from measures of social mobility, which we have done to the extent possible in this study. The critical period hypothesis was not confirmed in this study, because both childhood and adulthood economic stress were significantly and consistently associated with poor psychological health when entered and analyzed simultaneously in the same crude, age adjusted and multiple adjusted logistic regression models. This result seems to be in conformity with previous literature which suggests that the importance of adverse childhood conditions for adult psychological health problems does not rule out the

complementary importance of current social and economic circumstances and other adversities in adulthood (Kendler et al., 2003; Nugent et al., 2011). In fact, the results suggest that both childhood and adulthood are sensitive periods for the association between economic stress and poor psychological health, because in contrast to the concept "critical period" the concept "sensitive period" does not exclude the possibility of two or more sensitive periods which each entail heightened sensitivity in terms of increased importance of the association between exposure (economic stress) and disease (poor psychological health) (Ben-Schlomo and Kuh, 2002).

The investigation of the effects of life course social and economic conditions on health is sometimes stated to require three points of observation in time (Hallqvist et al., 2004). In this study we have two points of observation in time. However, the second and third points of observation in time are both in adulthood in the Hallqvist et al. study (Hallqvist et al., 2004). In the present study we analyze, however, the answers from adults in the broad age interval 18-80 years. When we stratify for age by separately analyzing more narrow age intervals, we find the same results indicating significant associations between both childhood and adulthood economic stress and poor psychological health across all adult age intervals (not shown in tables). This result suggests that there seems to be no particular "critical period" of economic stress in adulthood for poor psychological health. Still, it should be noted that one previous Swedish study which highlighted adolescence, not specifically analyzed in our study, as one observation point in time found that the association between family economic stress (cash margin) and adolescents' health complaints largely disappeared when adolescents' own economic resources were controlled for (Aberg Yngwe and Östberg, 2013). Both economic stress in childhood and adulthood are significantly associated with current poor psychological health regardless of adult age interval, but the fact that the adolescence period is not included in the data and the fact that the study lacks observation points in time precludes further interpretation.

The fact that both childhood and adulthood economic stress are significantly associated with current poor psychological health in adulthood suggests that both childhood and adulthood socioeconomic and psychosocial circumstances are important to consider when health policy to promote good psychological health in adulthood is discussed, elaborated and implemented. This also suggests that items

concerning economic stress in both childhood and adulthood should be included in surveys which fully or partly concern adult psychological health. The result also further underpins the importance for health and health policy of reducing economic stress in childhood. Economic stress in childhood seems to be a significant risk factor not only for poor psychological health in childhood but also in adulthood regardless of adult age.

Logistic regression models and proportional hazards models are the most commonly used regression models in psychiatric epidemiology. Still, these statistical models have important limitations, because they e.g. neglect important information concerning inter-individual variability (Bollen and Curran, 2006). Different analytical tools which may broadly be labeled Structural Equation Modeling (SEM) are therefore recommended in order to deal with these methodological limitations (Papachristou et al., 2013). Such models utilizing more than two observation points over time would also permit reliable application of more advanced analytical tools, e.g. linear growth curve models which would determine the exact longitudinal trajectory of economic stress, the rate of change (slope) and the level (intercept) of economic stress across assessment points, the associations between the intercept and the slope with the outcome variable, and the effects of additional covariates on the risk trajectory in order to assess the life course hypotheses more accurately. Further studies including longitudinal studies with three observation points in time or more and utilizing Structural Equation Modeling are therefore warranted.

Causality cannot be inferred from cross-sectional studies. Still, one of the exposure variables in this study is a retrospective self-reported item concerning economic stress in childhood. Generally, the issue of causal inference is best addressed by Randomized Control Triats (RCT:s). Still, in life course epidemiology an even more important issue than the issue of temporality and longitudinal study design has been the implicit assumption of no unmeasured confounding rather than the type of data collection (Gilman, 2007). Furthermore, modern methods have been suggested to deal with linear and non-linear Structural Equation Models (SEM:s) in order to make causal inferences in the presence of unmeasured confounders (Pearl, 2000; Hernan and Robins, 2006; Martens et al., 2006), a fact which even further warrants future studies utilizing Structural Equation Modeling (SEM). Future studies may add more

longitudinal information by linking to register data, particularly concerning the critical period hypothesis.

This study has focused on the effects of prolonged exposure when testing the accumulation hypothesis and neglected accumulation by clustering, e.g. the accumulation of social and psychosocial risk factors such as low emotional support, low instrumental support and low trust on health. While such a cluster approach to accumulation is outside the scope of our study, we acknowledge this alternative approach to accumulation. The accumulation could for example also have been tested regarding accumulation as a phenomenon of increasing burden of economic stress during the life course, i.e. with one stable exposure category including (1+1), (2+2) and (3+3) in terms of economic stress, one increasing exposure category including (1+2), (1+3) and 2+3), and one decreasing exposure category (2+1), (3+2) and (3+1). However, this option would imply a higher risk of mixing different associations and effects, e.g. by including the (1+1) and (3+3) groups in the same category, and it would probably also result in an even lower level of differentiation between the accumulation and social mobility hypotheses.

The distribution of demographic, socioeconomic and social characteristics in a previous public health survey with a similar response rate conducted in 2000 accorded acceptably well with the distribution of these characteristics in the population of Skåne in 2000 when compared with register statistics depicting the same characteristics (Carlsson et al., 2006). Internationally unpublished data show some under-representation in the age interval 18-34 years (22.0% among respondents but 29.0% in the original sample) and some corresponding over-representation in the 65-80 year age interval (22.9% among respondents but 18.0% in the sample). Some under-representation of men (45.1% among respondents and 50.0% in the sample) and persons with low formal education (25.2% among respondents and 29.3% in the sample) was also observed. The most serious under-representation (also present in the data in the public health survey conducted in 2000) concerns people born outside Europe (4.1% among respondents but 6.9% in the sample), a fact which would introduce a problem in studies with the research focus on this particular group. Comparisons for the 2008 study have given similar unpublished results. The risk **of** selection bias thus seems to be limited although the participation rate was 55%.

Confounding by age, country of origin, socioeconomic status (by occupation and employment status), social (emotional and instrumental) support and trust was controlled for by adjustment in the age- and multiple analyses, and by stratifying for sex.

The number of internally missing is comparatively small. In the analyses in tables 3-5 we have included all respondents which suggest that fewer respondents are included in the final multiple than in the initial crude analyses because fewer respondents have answered all the items/variables. In order to control the results of the crude and age-adjusted analyses we restricted the number of respondents included to only those with full information on all items/variables included in the final model. The results of these alternative analyses suggest that missing data can be assumed to be missing under the Missing At Random (MAR) or even the Missing Completely At Random (MCAR) assumptions.

The GHQ12 instrument which includes twelve items for the measurement of psychological health is the shortest of the General Health Questionnaire instruments (other GHQ measures contain for instance 28 or 60 items) but still a valid and reliable measure of psychological health (Goldberg et al, 1997). Some prior studies have analyzed subjective economic hardships utilizing the same item or similar items and shown significant associations with differing health outcomes (Fritzell and Burström, 2006). Information concerning economic stress in childhood is scarce, so the presence of this variable in the data is a clear strength.

Conclusions: The accumulation and social mobility hypotheses were confirmed with regard to poor psychological health. In contrast, the fact that both economic stress in childhood and economic stress in adulthood are significantly associated with poor psychological health indicates that both periods are important, i.e. there seems to be no specific critical period.

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Table 1. Prevalence (%) of poor psychological health, age, country of birth, socioeconomic status, emotional support, instrumental support, generalized trust in other people, and economic stress in childhood and adulthood. Men (n = 12,726), women (n = 15,472), and total (n = 28,198). The public health survey in Skåne 2008.

	Men (n = 12,726)	Women (n = 15,472)	Total (n = 28,198)
Self reported psychological health (GHQ12)			
Good	86.2	81.8	83.8
Poor	13.8	18.2	16.2
(Missing)	(513)	(627)	(1140)
Age			
18-24	8.3	9.1	8.8
25-34	12.3	13.9	13.2
35-44	16.4	17.2	16.9
45-54	17.7	18.5	18.1
55-64	21.2	19.3	20.1
65-80	24.2	21.9	22.9
(Missing)	(0)	(0)	(0)
Country of birth			
Sweden	86.1	85.9	86.0
Other country	13.9	14.1	14.0
(Missing)	(273)	(282)	(555)
Socioeconomic status			
Higher non-manual	10.2	8.1	9.1
Medium non-manual	12.0	16.3	14.3
Lower non-manual	4.8	9.5	7.4
Skilled manual	10.7	8.7	9.6
Unskilled manual	11.6	11.1	11.3
Self-employed/farmer	7.7	3.7	5.5
Early retired	3.2	4.6	4.0
Unemployed	3.2	3.4	3.3
Student	4.9	6.7	5.9
Old age pensioner	26.2	23.2	24.6
Unclassified	4.7	3.4	4.0
Long term sick leave	0.9	1.3	1.1
(Missing)	(212)	(244)	(456)
Emotional support			
High	62.8	69.6	66.6
Low	37.2	30.4	33.4
(Missing)	(289)	(357)	(646)
Instrumental support			
High	71.3	76.6	74.2
Low	28.7	23.4	25.8
(Missing)	(295)	(338)	(633)
Trust			
High	66.1	64.3	65.2
Low	33.9	35.7	34.8
(Missing)	(522)	(685)	(1207)
Economic stress in childhood			
No significant problem	63.2	62.5	62.8
Less severe and/or shorter period	27.1	27.7	27.4
Severe and/or longer period	9.7	9.7	9.7
(Missing)	(341)	(354)	(695)
Economic stress in adulthood			
Never	79.5	76.5	77.8

Occasionally	14.1	15.7	15.0
Half the year	3.1	3.6	3.4
Every month	3.3	4.2	3.8
(Missing)	(307)	(335)	(642)

Table 2. Prevalence (%) and odds ratios (OR, 95% CI) in bivariate analyses of poor psychological health (GHQ12) according to age, country of birth, socioeconomic status, emotional support, instrumental support, trust in other people (horizontal trust), and economic stress in childhood and adulthood. Men (n = 12,726) and women (n = 15,472). The public health survey in Skåne 2008.

	Men (n=12,726)		Women (n=15,472)	
	%	OR(95%CI)	%	OR(95%CI)
Age				
18-24	19.5	1.00	31.5	1.00
25-34	18.4	0.93 (0.76-1.14)	23.8	0.68 (0.49-0.66)
35-44	15.3	0.74 (0.61-0.91)	20.8	0.57 (0.49-0.66)
45-54	16.2	0.80 (0.66-0.96)	16.8	0.49 (0.38-0.51)
55-64	12.4	0.58 (0.48-0.70)	15.2	0.39 (0.33-0.45)
65-80	8.1	0.36 (0.30-0.44)	10.8	0.26 (0.22-0.31)
(Missing)	(513)		(627)	
Country of birth				
Sweden	12.5	1.00	16.8	1.00
Other country	22.9	2.08 (1.83-2.37)	26.3	1.77 (1.58-1.97)
(Missing)	(680)		(804)	
Socioeconomic status				
Higher non-manual	13.1	1.00	16.7	1.00
Medium non-manual	11.7	0.88 (0.70-1.11)	15.5	0.91 (0.76-1.10)
Lower non-manual	14.2	1.10 (0.83-1.46)	16.7	1.00 (0.81-1.23)
Skilled manual	12.7	0.97 (0.77-1.22)	15.8	0.93 (0.71-1.15)
Unskilled manual	11.7	0.88 (0.70-1.11)	18.8	1.15 (0.95-1.46)
Self-employed/farmer	11.5	0.86 (0.66-1.11)	15.0	0.88 (0.67-1.17)
Early retired	36.7	3.84 (2.95-5.02)	29.0	2.04 (1.63-2.55)
Unemployed	37.2	3.93 (3.01-5.12)	40.9	3.44 (2.73-4.35)
Student	20.7	1.73 (1.33-2.24)	27.8	1.92 (1.56-2.36)
Old age pensioner	7.9	0.57 (0.46-0.70)	10.7	0.60 (0.49-0.72)
Unclassified	17.1	1.37 (1.04-1.86)	22.5	1.44 (1.11-1.88)
Long term sick leave	57.8	9.07 (5.99-13.72)	58.8	7.11 (5.16-9.79)
(Missing)	(649)		(807)	
Emotional support				
High	9.7	1.00	13.7	1.00
Low	21.0	2.48 (2.24-2.76)	28.8	2.55 (2.34-2.78)
(Missing)	(681)		(846)	
Instrumental support				
High	11.2	1.00	14.9	1.00
Low	20.7	2.07 (1.87-2.31)	29.2	2.35 (2.15-2.58)
(Missing)	(689)		(826)	
Trust (horizontal)				
High	10.6	1.00	13.6	1.00
Low	19.9	2.10 (1.89-2.33)	25.7	2.26 (2.07-2.46)
(Missing)	(898)		(1148)	
Economic stress in childhood				
No significant problem	11.4	1.00	16.0	1.00
Less severe and/or shorter period	16.2	1.50 (1.34-1.69)	20.1	1.32 (1.20-1.45)
Severe and/or longer period	23.2	2.35 (2.01-2.74)	26.2	1.86 (1.63-2.12)
(Missing)	(745)		(871)	
Economic stress in adulthood				
Never	10.8	1.00	14.2	1.00
Occasionally	20.7	2.16 (1.89-2.47)	26.2	2.14 (1.93-2.38)
Half the year	34.2	4.31 (3.44-5.39)	32.3	2.88 (2.38-3.48)
Every month	40.1	5.53 (4.46-6.85)	44.8	4.88 (4.13-5.78)
(Missing)	(705)		(844)	

Table 3. Prevalence (%) and odds ratios (OR, 95% CI) in crude, age-adjusted and multiple adjusted analyses of poor psychological health according to economic stress risk accumulation (childhood+ adulthood combined). Men (n = 12,726) and women (n = 15,472). The public health survey in Skåne 2008.

Men				
Risk accumulation	%	**OR(95% CI)[a]**	**OR(95% CI)[b]**	**OR(95% CI)[c]**
Lowest (1+1)	7.1	1.00	1.00	1.00
(1+2) or (2+1)	13.5	1.50 (1.33-1.69)	1.51 (1.34-1.70)	1.33 (1.17-1.51)
(1+3), (2+2) or (3+1)	22.2	2.82 (2.48-3.20)	2.85 (2.50-3.24)	2.31 (2.01-2.65)
(2+3) or (3+2)	35.6	5.56 (4.61-8.70)	5.41 (4.49-6.53)	4.06 (3.32-4.98)
Highest (3+3)	42.9	6.50 (4.83-8.73)	6.40 (4.75-8.61)	4.43 (3.20-6.13)
Women				
Risk accumulation	%	**OR(95% CI)[a]**	**OR(95% CI)[b]**	**OR(95% CI)[c]**
Lowest (1+1)	13.0	1.00	1.00	1.00
(1+2) or (2+1)	18.1	1.41 (1.27-1.57)	1.40 (1.25-1.55)	1.24 (1.11-1.39)
(1+3), (2+2) or (3+1)	27.7	2.58 (2.30-2.89)	2.47 (2.20-2.77)	1.96 (1.73-2.22)
(2+3) or (3+2)	32.3	3.11 (2.61-3.70)	2.89 (2.43-3.45)	1.85 (1.53-2.25)
Highest (3+3)	46.8	5.89 (4.47-7.77)	5.61 (4.24-7.43)	3.42 (2.53-4.63)

a Crude.
b Adjusted for age.
c Adjusted for age, country of birth, socioeconomic status, emotional support, instrumental support and trust..

Table 4. Odds ratios (OR, 95% CI) in crude, age-adjusted and multiple adjusted analyses of poor psychological health according to economic stress critical period (childhood+ adulthood included as separate variables in the same model). Men (n = 12,726) and women (n = 15,472). The public health survey in Skåne 2008.

Men			
Critical period	**OR(95% CI)[a]**	**OR(95% CI)[b]**	**OR(95% CI)[c]**
Economic stress in childhood			
No significant problem (1)	1.00	1.00	1.00
Less severe and/or shorter period (2)	1.59 (1.42-1.77)	1.64 (1.47-1.82)	1.50 (1.34-1.68)
Severe and/or longer period (3)	1.98 (1.71-2.30)	2.14 (1.84-2.48)	1.83 (1.56-2.14)
Economic stress in adulthood			
Never (1)	1.00	1.00	1.00
Occasionally (2)	1.75 (1.55-1.98)	1.62 (1.42-1.83)	1.45 (1.27-1.66)
Half the year/ every month (3)	4.24 (3.66-4.90)	3.96 (3.42-4.59)	3.16 (2.70-3.70)
Women			
	OR(95% CI)[a]	**OR(95% CI)[b]**	**OR(95% CI)[c]**
Economic stress in childhood			
No significant problem (1)	1.00	1.00	1.00
Less severe and/or shorter period (2)	1.10 (1.00-1.21)	1.14 (1.03-1.26)	0.98 (0.88-1.09)
Severe and/or longer period (3)	1.60 (1.40-1.83)	1.74 (1.52-2.00)	1.43 (1.24-1.66)
Economic stress in adulthood			
Never (1)	1.00	1.00	1.00
Occasionally (2)	2.01 (1.81-2.24)	1.73 (1.55-1.93)	1.50 (1.33-1.68)
Half the year/ every month (3)	3.70 (3.25-4.22)	3.29 (2.88-3.76)	2.46 (2.13-2.84)

a Crude.
b Adjusted for age.
c Adjusted for age, country of birth, socioeconomic status, emotional support, instrumental support and trust.

Table 5. Prevalence (%) and odds ratios (OR, 95% CI) in crude, age-adjusted and multiple adjusted analyses of poor psychological health according to social mobility (childhood to adulthood). Men (n = 12,726) and women (n = 15,472). The public health survey in Skåne 2008.

Men				
Social mobility (childhood-adulthood)	**%**	**OR(95% CI)[a]**	**OR(95% CI)[b]**	**OR(95% CI)[c]**
No-Never (1 to 1)	9.4%	1.00	1.00	1.00
No-occasionally (1 to 2)	17.5%	1.58 (1.32-1.90)	1.46 (1.22-1.76)	1.29 (1.06-1.57)
No-half the year/every month (1 to 3)	32.6%	4.25 (3.41-5.29)	4.12 (3.31-5.14)	3.35 (2.64-4.25)
Social mobility (childhood-adulthood)	**%**	**OR(95% CI)[a]**	**OR(95% CI)[b]**	**OR(95% CI)[c]**
Less severe-Never (2 to 1)	12.0%	0.49 (0.40-0.60)	0.54 (0.44-0.66)	0.59 (0.47-0.73)
Less severe-occasionally (2 to 2)	22.2%	1.00	1.00	1.00
Less severe-half the year/ every month (2 to 3)	39.7%	2.50 (1.90-3.28)	2.49 (1.89-3.27)	2.11 (1.58-2.83)
Social mobility (childhood-adulthood)	**%**	**OR(95% CI)[a]**	**OR(95% CI)[b]**	**OR(95% CI)[c]**
Severe-Never (3 to 1)	17.9%	0.33 (0.23-0.45)	0.36 (0.26-0.50)	0.44 (0.30-0.64)
Severe-occasionally (3 to 2)	29.7%	0.53 (0.36-0.80)	0.55 (0.37-0.83)	0.64 (0.41-0.99)
Severe-half the year/ every month (3 to 3)	42.9%	1.00	1.00	1.00
Women				
Social mobility (childhood-adulthood)	**%**	**OR(95% CI)[a]**	**OR(95% CI)[b]**	**OR(95% CI)[c]**
No-Never (1 to 1)	13.0%	1.00	1.00	1.00
No-	23.8%	2.02 (1.74-2.33)	1.76 (1.52-2.04)	1.59 (1.36-1.86)

occasionally (1 to 2)				
No-half the year/every month (1 to 3)	40.0%	4.47 (3.72-5.38)	4.05 (3.36-4.88)	3.13 (2.56-3.83)

Social mobility (childhood-adulthood)	**%**	**OR(95% CI)[a]**	**OR(95% CI)[b]**	**OR(95% CI)[c]**
Less severe-Never (2 to 1)	15.6%	0.46 (0.39-0.56)	0.58 (0.48-0.70)	0.66 (0.54-0.81)
Less severe-occasionally (2 to 2)	28.6%	1.00	1.00	1.00
Less severe-half the year/ every month (2 to 3)	33.8%	1.36 (1.05-1.75)	1.45 (1.12-1.87)	1.16 (0.88-1.54)

Social mobility (childhood-adulthood)	**%**	**OR(95% CI)[a]**	**OR(95% CI)[b]**	**OR(95% CI)[c]**
Severe-Never (3 to 1)	20.0%	0.30 (0.22-0.41)	0.33 (0.24-0.69)	0.48 (0.34-0.68)
Severe-occasionally (3 to 2)	30.3%	0.47 (0.33-0.69)	0.47 (0.33-0.69)	0.50 (0.33-0.76)
Severe-half the year/ every month (3 to 3)	46.8%	1.00	1.00	1.00

a Crude.
b Adjusted for sex and age.
c Adjusted for sex, age, country of birth, socioeconomic status, emotional support and, instrumental support and trust.
26,856 respondents included in analyses, 1342 respondents missing values.