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Adolescent predictors of unemployment and disability pension across the life course – a longitudinal study of selection in 49 321 Swedish men

Andreas Lundin
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Adolescent predictors of unemployment and disability pension across the life course – a longitudinal study of selection in 49 321 Swedish men[1]

by

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Abstract

Objective: This study investigated the associations of adolescent cognitive ability, mental status and adaptability to school and work with unemployment from youth to mid-life. It also investigated the associations of youth unemployment with later unemployment and disability pension.

Method: We used a cohort of 49 321 Swedish men, with information on cognitive ability, mental status, and school and personality characteristics in late adolescence in 1969. The information was linked to 32 years of annual administrative data to study predictors of unemployment and disability pension.

Results: We found a strong and consistent association between cognitive ability and risk of unemployment, which was independent of other individual characteristics. Other notable independent risk factors were psychiatric diagnosis, contact with police or childcare authorities, smoking, risk use of alcohol, not being liked in school, and having been dismissed from or having quit a job due to unfair treatment. Unemployment before age 18 was found to be associated with unemployment across the life course, and also with disability pension, most of which was explained by individual characteristics.

Conclusion: Certain individuals are more likely to be unemployed, and to be unemployed for more than one period, due to individual characteristics, which include cognitive ability, mental health, and labour-market related behaviour across the life course. However, people who become unemployed in youth have, regardless of their individual characteristics, an increased risk of becoming unemployed again. People who experience youth unemployment are also more likely to receive disability pension.

Keywords: Youth unemployment, scarring, mental health, behaviour, disability pension,
JEL-codes: J640, I130, I140

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1 Introduction

Unemployment, or involuntary job loss, is considered a critical life event (Kessler 1997). The individual is faced with the challenge of adapting to an interruption in his or her career, and there is a risk that job loss distinguishes the unemployed from the employed with regard to their future positions on the labour market (Heckman and Borjas 1980; Ruhm 1991; Arulampalam, Booth et al. 2000; Knights, Harris et al. 2002), and also to later mental health, personality and behaviour (Fergusson, Horwood et al. 1997; Fergusson, Horwood et al. 2001; Roberts, Caspi et al. 2003). The detrimental effects of unemployment are described differently in economics, sociology and social psychology, but the disciplines share the view that job loss potentially triggers chains of cumulative disadvantage, though environmental (e.g., the signalling of lower ability to work), social (e.g., new roles) and individual mechanisms (e.g., stress-induced mental ill-health and negative coping strategies).

The main determinants of employment and layoffs lie in the needs of firms and other organisations to create and destroy jobs (Davis, Haltiwanger et al. 1996). Hiring and firing is a selection process, involving the individual characteristics of the (potential) worker. Job histories (e.g., previous unemployment and work credentials), alongside assessments of other abilities (e.g., cognitive capacity, personality traits, illness and behaviour), are likely to be involved in this process. The study of individual predictors of unemployment is warranted, not least methodologically, because the consequence of unemployment, whether it be the risk of recurring unemployment, labour-market exit, ill-health or illicit behaviour, cannot be studied with accuracy if the unemployed and employed are heterogeneous with regard to the risk factors for becoming or staying unemployed. That is, there will be a non-causal association between unemployment and, for example, ill-health if people with ill-health, or with risk factors for ill-health, are more likely to become unemployed or less likely to exit unemployment (Stewart 2001).

Youth unemployment is regarded as an especially important critical event because it marks failure at an early stage in the trajectory of working life – a period when personality/identity/roles are shaped, and which is considered the time at which individuals obtain a foothold in the labour market (Goldsmith 1996). Youths make up a vulnerable group, in Sweden not least due to employment-protection legislation that

discriminates in favour of people with permanent jobs, and especially those with long employment tenure (Cahuc 2011).

This particular study of youth unemployment has some methodological advantages over earlier studies. Whereas underlying differences in mid-life between the unemployed and the employed may be shaped by accumulation processes that involve interplay between previous labour-market position, health, personality and behaviour (in a reciprocal manner), individual predictors of youth unemployment are unaffected by labour-market contact. Consequently, consideration of the detrimental effects of youth unemployment, e.g., that it causes adult unemployment, onset of psychiatric problems, or changed behaviour, has to be concerned only with the influence of individual predictors.

The current study aims to examine individual characteristics measured before or at an early stage of labour-market entry (ages 18–19, cognitive ability, mental health, and adaptability to school and work) in relation to unemployment across the life course (ages 24–43), and to early (ages 24–43) and later (ages44–59) disability pension. Two main questions are addressed:

- Are there associations of cognitive ability, mental health and adaptability to school and work with unemployment and disability pension across the life course?
- Is there an association between unemployment in youth and later unemployment, and, if so, to what extent can cognitive ability, mental health, and adaptability to school and work explain the associations of youth unemployment with later unemployment and disability pension?

The paper is structured as follows. First, there is a brief presentation of the study population. This is followed by an account of the study, which consists of two parts: in the first part, we present our investigation of adolescent predictors of unemployment; in the second part, we present our examination of the associations of youth unemployment with subsequent unemployment and disability pension. Each part has the following: 1) A brief introduction recapitulating the research question, 2) A presentation of the relevant literature, 3) A presentation of the variables used, 4) Data analysis, 5) Results, and 6) Discussion of the results. We conclude with a discussion of the strengths and weaknesses of the study and with some summary remarks.

2 Subjects

The study is based on a population of 49 321 Swedish men born 1949–1951 who underwent mandatory conscription examination in 1969, from which there are the results of cognitive tests, information on psychiatric status and behaviour, and a wealth of information on school relations and early labour-market experiences. From record linkage to national registers, there is also complete information on individual unemployment experience 1974–2008 and disability pension 1971–2008.

At this time, only 2–3% of Swedish young men were exempted from conscription,in most cases due to a severe handicap or congenital disorder. The study encompasses men born in 1949 (5%), 1950 (18%) and 1951 (77%), who jointly constitute 97.7% of all conscripts 1969–1970; 2.3% of the conscripts 1969–1970 were born before 1949, and were excluded. Conscription tests were carried out over two days, usually at age 18 of the individuals, for the purpose of selecting and placing them in training schemes according to their abilities. There are physical examinations and some psychometric tests, including four cognitive tests. In connection with the testing, the young men are also asked to complete two questionnaires, one concerned with their social and familial circumstances, the other with the use of alcohol and drugs. Thereafter, psychologists ranked the individuals, on the basis of the test results and a semi-structured interview, with regard to their psychological capacity. In the process of finding individuals with the ability to adapt/adjust to high-pressure circumstances, several questions are asked to examine how the individual function at works or in the school-related environment.

For this study, the individuals, by means of their unique personal identification numbers, were then linked to the Income and Taxation Register on Unemployment 1974–1990, the Swedish Social Insurance Agency's Administrative Register on Disability Pension 1970–1990, the Longitudinal Register of Education and Labour Market Statistics (LOUISE) 1990–2008, and the Swedish National Population and Housing Census 1970 (Table 1). After the data were anonymised, ethical approval for using the database was granted by the Karolinska Institutet Research Ethics Committee.

Table 1. Data collection

	Year	Age	Information
Conscription examination	1969	18–20	Information on cognitive ability, psychiatric status, behaviour, school and work adaptability, and youth unemployment
Income and Tax Register	1976–2001	25–41	Unemployment (benefit and assistance)
Swedish Social Insurance Agency	1970–1990	19–41	Disability pension
Longitudinal Register of Education and Labour Market Statistics	1991–2001	40–52	Disability pension

3 Part 1 - Adolescent predictors of unemployment

3.1 Introduction

Hiring and firing are selection processes in which jobs and workers are matched in accordance with supply and demand. Unemployment arises when a contract is ended, by the employer (involuntary job loss) or by the worker (quitting), and when the worker is jobless during his or her search for new employment (Abbott 2010). Unemployment also arises when the searching process or matching process is imperfect. Jobs and workers are heterogenous, and there can be mismatches, i.e., vacancies and unemployment in parallel. Mismatches are related to a variety of factors, structural, legislative, geographical, cultural, and attitudinal (Abbott 2010). Also, it has been suggested that individual characteristics, such as skills, health, personality and behaviour, are factors that influence individual unemployment risk and duration (Caspi, Wright et al. 1998). In the first part of this study, we examined the associations of cognitive ability, mental health, behaviour and adaptability to school with work and unemployment across the life course.

3.2 Literature

Cognitive and non-cognitive ability and youth and adult unemployment

Traditionally in economics, schooling and work experience (investment in human capital) are central to explaining labour-market position, as, for example, in the Mincerian account of human capital (Mincer 1958). It is, however, often stressed that there are other important individual characteristics, such as cognitive ability, personality, and mental health. Several attempts have been made to incorporate other variables concerned with worker ability of a more psychological and cognitive nature

into the concept of human capital, as, for example, in Becker's version of human-capital theory (Becker 1964). Cognitive ability and labour-market performance have also attracted much attention in psychology, where performance in the workplace, labour-market exit and unemployment have been used as measures of individual performance in society at large (Ree and Earles 1992). In the US, Herrnstein and Murray used data from 1979 in the National Longitudinal Survey of Youth 1979 Cohort (NLSY79), for which 12,686 14 to 22 year-olds were interviewed in 1979; the information came from a test developed to predict performance in military training programs (Herrnstein 1994). In their study, intelligence was found to be strongly associated with both being out of the labour force and being unemployed during a specific week in 1989 (at ages 24–32). The study marked the starting point of a long and contentious debate (the so-called Bell Curve debate). Heckman and colleagues, using the same material as Herrnstein and Murray, showed that cognitive tests did predict different social and labour-market outcomes, e.g., wage levels (Heckman 1995) and employment, but very little of these differences were due to cognitive ability. Rather, Heckman and colleagues argue that other, non-cognitive abilities were stronger predictors of "social performance" (Cawley, Heckman et al. 2001; Heckman, Stixrud et al. 2006). A couple of studies have been able to examine cognitive ability alongside other determinants of unemployment that can be regarded as reflecting non-cognitive ability (e.g., psychiatric factors and behaviour). In New Zealand, unemployment has been investigated in two prospective cohorts, with not only information on early cognitive ability, but also rich information on mental health, maladaptive behaviour, school involvement/performance, and family background. In the Dunedin Multidisciplinary Health and Development Study (DMHDS), covering 1037 individuals born 1972/1973, cognitive ability, behavioural adjustment, and personal and familial characteristics in childhood were found to predict youth unemployment at ages 15–21, both independently and via education (Caspi, Wright et al. 1998). In the Christchurch Health and Development Study (CHDS), covering 1265 individuals born in 1977, cognitive ability, psychiatric disorder, substance abuse and individual adjustment problems prior to leaving school all predicted unemployment at ages 16-18 (Fergusson, Horwood et al. 1997) and 18-25 (Fergusson, John Horwood et al. 2005; Fergusson, John Horwood et al. 2005). In the UK, data from the National Child Development Study (NCDS), covering 17 000 individuals born in 1958, followed up at

ages 7, 11, 16, 23, 33 and 42, have been used in several studies of unemployment; the NCDS gives information on cognitive ability (maths and reading, and non-vocabulary test scores), school readiness, progress in education, educational special needs, socioeconomic background, health and a wide range of behavioural problems. Many of these studies focus on childhood disadvantage and maladjustment, and unemployment at ages 16, 23, 33 and 42 (Narendranathan and Elias 1993; Montgomery, Bartley et al. 1996; Gregg and Machin 2000; Case, Fertig et al. 2005), and a couple also include measures of cognitive ability. In Sweden, Lindqvist and Vestman used Swedish conscription data linked to a representative sample (14 703 men) of the Swedish population (LINDA) born 1965–1974 (Lindqvist and Vestman 2011). In that study, cognitive ability at conscription (about age 18) was found to predict receipt of unemployment benefit in 2006. A composite measure of conscription-psychologist rankings of psychological indicators was, however, found to be a more important predictor of unemployment than cognitive ability. In another recent Swedish study, based on six national samples, the Evaluation Through Follow-Up (UGU) of 1948, 1953, 1967, 1972, 1977 and 1982 (with cohorts designed to assess ability and education in a total of 53 488 individuals), cognitive ability and also aspirations for years of schooling, measured in sixth grade (age 12–13), were found to be associated, at about the same strength, with employment at ages 20–58 years (Björklund, Fredriksson et. al. 2010). No measure of a psychiatric or behavioural nature was included in that study. To sum up, previous studies have indicated that cognitive ability, mental health and behaviour in youth are determinants of being unemployed. Typically, however, the studies did not stretch across young adulthood; did not have access to measures of cognitive ability or mental health or behaviour.

3.3 Variables

Data on unemployment

Information on individual yearly unemployment is recorded in Sweden's Income and Tax Register, and was obtained for the years 1976–2008. Unemployment benefit and cash labour-market assistance are recorded in SEK from reports to tax officials by the Unemployment Insurance Funds (benefit) and the Social Insurance Agency (assistance). We classify individuals who receive any benefit or assistance during the year as unemployed, and others as employed.

Cognitive ability, psychiatric status, behaviour and education 1969–1970

Cognitive ability

Information on cognitive ability (IQ) was obtained from the conscription test results. Four IQ tests were performed, with the aims of classifying general abilities to profit from education, of finding individuals eligible for military officers' education and leadership positions, and of weeding out those not suitable for armed service. The IQ tests concerned: instructions (a verbal-inductive test where each solution is embedded in verbal instructions), concept discrimination (a verbal-inductive test based on the composition of words), spatial-visualisation ability (using a paper form board test), and technical-mechanical comprehension. Each of the sets of test results were first normalised on standard-nine scales, which were then combined into a new standard-nine scale. The combined scale is used because it is the one designed to measure general ability.

Mental status

Measures of mental status come from the above-mentioned psychiatric diagnoses made by psychiatrists at conscription, here dichotomised as having or not having a mental diagnosis according to ICD–8 criteria (295–315). Information on self-rated health was obtained from the survey question *What is your current health status?* (coded 1 if *Rather poor* or *Very poor*). An additional indicator of psychiatric status was based on medication for nervous problems obtained from the survey question *Have you been on medication for nervous problems?* (coded 1 if *Yes, several times* or *Yes, sometimes*).

Behaviour

Three measures of maladaptive behaviour were used: Risk use of alcohol (experience of being apprehended for drunkenness, or using alcohol as morning relief (taking an 'eye opener'), or been drunk often/quite often, or reported alcohol consumption of at least 250 g pure ethanol/week); Smoking (>5 cigarettes/day); and Having been in contact with police or childcare authorities (coded 1 if *Yes*).

Adjustment

School

16 questions from the conscription-test surveys of psychosocial histories that referred to adaptability in school and/or the workplace were utilised. Nine questions referred to conditions in school, which were categorised into the following variables: School

dislike, from the question *Overall, how did you like school*? (coded 1 if *Pretty bad* or *Very bad);* Teacher relations, from the question *How did you get along with the teachers in school? (*coded 1 if *Not so well,* or *got along poorly);* Peer popularity, from the question *Were you liked by your classmates?* (coded 1 if *Perhaps not that well liked* or *Had some difficulties with peers*); Peer dislike, from the question *Were there classmates that you disliked?* (coded 1 if *By many*)*?;* Unfair treatment, from the question *Were you ever treated unfairly in school?*(coded 1 if *Yes, several times*)*;* Special education, from the question *Did you ever attend a special education class?* (coded 1 if *Yes*)*;* Held back in school, from the question *Were you held back a class in school? (coded 1 if Yes, several times,* or *Yes, once);* Truancy, from the question *How often were you absent from school or truanted?* (coded 1 if *Once every week* or *Once every month*)*?;* and Conduct, from the question *Have you ever had lowered conduct grades?* (coded 1 if *Yes, several times*).

Work

Seven questions referring to attitudes towards and experiences of the labour market were utilised: Job dislike, from the question *How do you like your job?* (coded 1 if *Neither good nor bad, Rather bad* or *Very bad*); Superior relations, from the question *How do you get along with your superiors at work?* (coded 1 if *Neither good nor bad, Rather bad* or *Very bad,* 2 if *Never had a job,* 0 otherwise); Colleague relations, from the question *Have you disliked any of your workmates?* (coded 1 if *Yes, several,* 2 if *Don't have a job,* 0 otherwise); Dismissed, from the question *Were you ever dismissed from a job?* (coded 1 if *Yes, Several times,* or *Yes, once*); Quit due to unfair treatment, from the question *Have you ever quit a job because you were subject to unfair treatment?* (coded 1 if *Yes, several times,* or *Yes, once*); Give up work tasks, from the question *Do you often quit difficult work tasks?* (coded 1 if *Yes, very often* or *Yes, rather often*) and; Responsibility, from the question *Do you like tasks with responsibility?* (coded 1 if *Not at all*).

3.4 Data analysis

The associations of the adolescent measures of cognitive and mental status, adaptability, and education with receiving unemployment benefit 1976–2008 were studied by means of odds ratios (ORs) obtained from logistic regression. The analyses were performed using the LOGISTIC procedure in the SAS statistical package (9.3.), with a binomial

distribution and logit link. The associations between the dependent and independent variables were first tested in a bivariable model and then in a multivariable model. The multivariable model includes risk factors that were found to be significant in the unadjusted models. School dislike was excluded because it was highly correlated with Teacher relations, which was the stronger predictor in the multivariable model. Similarly, Superior relations was excluded because of its strong correlation with Job dislike, which was the stronger predictor in the multivariable model. In the final analysis, only statistically significant variables were included, although the findings were similar to those when the weak predictors were included. Model 1 contained only the variables concerned with intelligence, personality and health-related behaviours (with 1a excluding, and 1b including, control for Not left school). Model 2 added adjustment for the school variables; Model 3 added adjustment for the work variables; while Model 4, the full multipredictor model, included all groups of variables.

3.5 Results

Young-adult predictors of unemployment

Of the 49 321 adolescents, 28 708 had been unemployed at some time 1976–2008. Table 2 shows the univariable associations between potential risk factors in 1969, at age 18 of the individuals, and unemployment 1976–2008. It also shows the prevalence of each risk factor among those (n)ever having experienced unemployment. These crude ORs show that all the measures of cognitive ability, psychiatric status, behaviour, and adaptability to school and work are significantly associated with register information on unemployment later in life.

Table 2. Associations between covariates and unemployment 1976–2008

			Employed 1976–2008	Unemployed 1976–2008	Unemployment 1976–2008
	N	%	%	%	OR 95% CI
IQ_1 (lowest)	1966	3.99	2.78	5.68	1.85 (1.67–2.04)
IQ_2	2630	5.34	4.11	7.06	1.55 (1.42–1.69)
IQ_3	4823	9.79	8.15	12.1	1.34 (1.25–1.44)
IQ_4	7017	14.2	12.3	16.9	1.24 (1.17–1.32)
IQ_5	8486	17.2	16.5	18.3	1
IQ_6	8733	17.7	18.6	16.5	0.80 (0.75–0.85)
IQ_7	7338	14.9	16.9	12.2	0.65 (0.61–0.69)
IQ_8	5052	10.3	12.3	7.37	0.54 (0.50–0.58)
IQ_9 (highest)	3201	6.50	8.33	3.95	0.43 (0.39–0.47)
Psychiatric diagnosis	5691	11.5	9.15	14.9	1.73 (1.64–1.83)
Psychotric drugs	5611	11.5	10.5	13.0	1.27 (1.21–1.35)
Poor self-rated health	8750	17.9	16.8	19.6	1.21 (1.15–1.27)
Contact with police/childcare	13965	28.8	24.4	34.9	1.66 (1.59–1.72)
Smoking	22992	47.4	42.9	53.6	1.54 (1.48–1.60)
Alcohol risk use	6422	13.6	10.7	17.6	1.77 (1.68–1.87)
School adaptability					
School dislike	5349	11.0	8.86	14.0	1.68 (1.58–1.78)
Poor teacher relations	4052	8.29	6.51	10.8	1.74 (1.63–1.85)
Special education	3465	7.16	5.47	9.51	1.81 (1.69–1.94)
Held back in class	7159	14.7	13.8	16.0	1.20 (1.14–1.26)
Truancy	8814	18.5	16.2	21.8	1.44 (1.38–1.51)
Peer dislike	9096	18.6	17.9	19.5	1.11 (1.06–1.16)
Low conduct grades	3059	6.20	5.06	7.79	1.58 (1.47–1.71)
Unfair treatment	3782	7.79	6.85	9.09	1.36 (1.27–1.45)
Not popular among peers	1391	2.85	2.47	3.38	1.38 (1.24–1.54)
Work adaptability					
Job dislike – no job	10957	22.2	25.4	17.8	0.66 (0.63–0.69)
Job dislike – yes	4713	9.56	8.11	11.6	1.34 (1.26–1.43)
Responsible	5107	10.4	9.39	11.7	1.28 (1.21–1.36)
Give up easily	4439	9.14	8.17	10.5	1.32 (1.24–1.40)
Quit due to unfair treatment	3271	6.63	4.95	8.98	1.90 (1.76–2.04)
Dismissed	1503	3.05	1.95	4.57	2.40 (2.16–2.67)
Superior relations – never a job	8128	16.5	19.0	13.0	0.65 (0.62–0.68)
Superior relations – poor	2957	6.00	5.21	7.09	1.29 (1.20–1.39)
Colleague relations – never a job	3638	7.38	8.62	5.65	1.51 (1.34–1.70)
Colleague relations – poor	1087	2.20	1.80	2.77	0.64 (0.60–0.69)

Table 3 shows the multivariable-adjusted associations between the risk factors and unemployment 1976–2008. In Model 1, it is shown that lower cognitive ability, psychiatric diagnosis and contact with police or childcare authorities, and also the weaker predictors, smoking and risk use of alcohol, are significant risk factors. Adding variables related to School (Model 2) or Work (Model 3) have a small ameliorating effect on psychiatric diagnosis and risk use of alcohol, but little other effect. Also, in the full multipredictor model (Model 4), it is clear that the work variables are only weakly affected by adjustment for school adaptation; early maladaptation in working life is a relatively strong predictor of unemployment later in life. It should also be added that removing any of the single variables does not lead to any major change in the other estimates, and that collinearity diagnostics indicate no major variance inflation.

Table 3. Bivariable and multivariable associations between covariates at age 18 and unemployment 1976-2008

	Crude	Model 1a (w. o. school)*	Model 1b	Model 2	Model 3	Model 4
Cognitive ability (IQ)	1.20 (1.19-1.21)	1.18 (1.16-1.19)	1.14 (1.13-1.15)	1.14 (1.13-1.15)	1.14 (1.13-1.15)	1.14 (1.13-1.15)
Psychiatric diagnosis	1.73 (1.64-1.83)	1.31 (1.24-1.40)	1.31 (1.23-1.39)	1.22 (1.15-1.31)	1.22 (1.14-1.30)	1.17 (1.09-1.25)
Contact with police/childcare	1.66 (1.59-1.72)	1.32 (1.26-1.38)	1.30 (1.24-1.36)	1.27 (1.21-1.33)	1.27 (1.21-1.33)	1.25 (1.19-1.31)
Smoking	1.54 (1.48-1.60)	1.26 (1.22-1.32)	1.23 (1.18-1.28)	1.20 (1.15-1.25)	1.21 (1.16-1.26)	1.19 (1.14-1.24)
Alcohol risk use	1.77 (1.68-1.87)	1.22 (1.15-1.30)	1.19 (1.12-1.27)	1.15 (1.08-1.23)	1.15 (1.09-1.23)	1.13 (1.06-1.20)
Poor teacher relations	1.74 (1.63-1.85)			1.15 (1.07-1.24)		1.11 (1.03-1.19)
Truancy	1.44 (1.38-1.51)			1.19 (1.13-1.25)		1.16 (1.10-1.22)
Peer dislike	1.38 (1.24-1.54)			1.20 (1.06-1.36)		1.15 (1.02-1.31)
Job dislike – no job	0.66 (0.63-0.69)				1.04 (0.98-1.10)	1.03 (0.97-1.09)
Job dislike – yes	1.34 (1.26-1.43)				1.30 (1.22-1.39)	1.28 (1.20-1.37)
Quit due to unfair treatment	1.90 (1.76-2.04)				1.32 (1.22-1.43)	1.29 (1.19-1.40)
Dismissed	2.40 (2.16-2.67)				1.47 (1.31-1.65)	1.43 (1.26-1.61)

Note: * Except for Model 1a, models 1–4 all include adjustment for not having left school.

Figure 1 shows the yearly prevalence of unemployment in the cohort and the yearly average unemployment rate in the Swedish Labour Force Survey (LFS) 1974–2007.

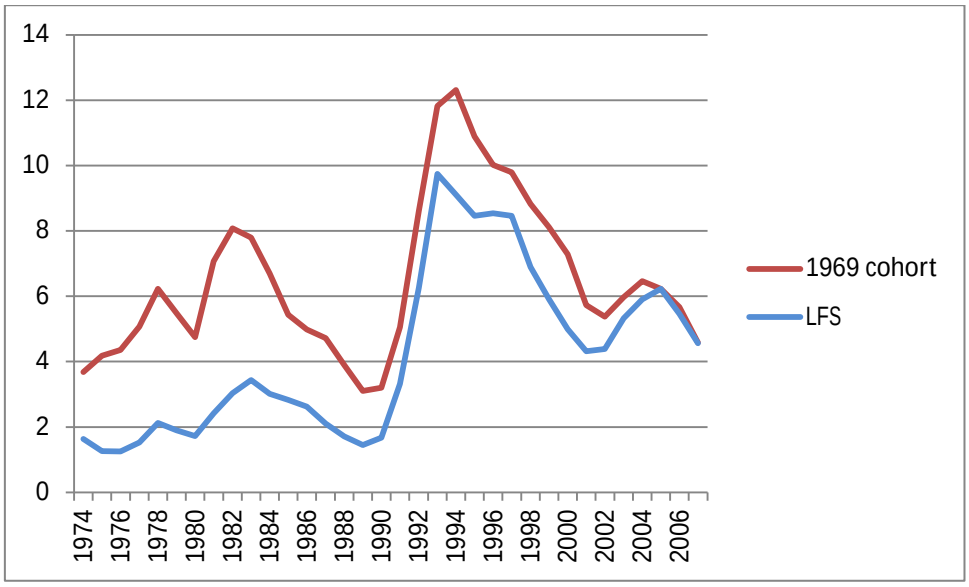

Figure 1. Unemployment in the Swedish conscription cohort of 1969 and in the Labour Force Surveys (LFS) 1974–2007 in percent.

The figure shows that unemployment prevalence in the cohort follows the general unemployment risk. Unemployment was generally low in Sweden until severe recession hit the country in 1991. Unemployment peaked in 1995, but declined steadily thereafter up to 2002.

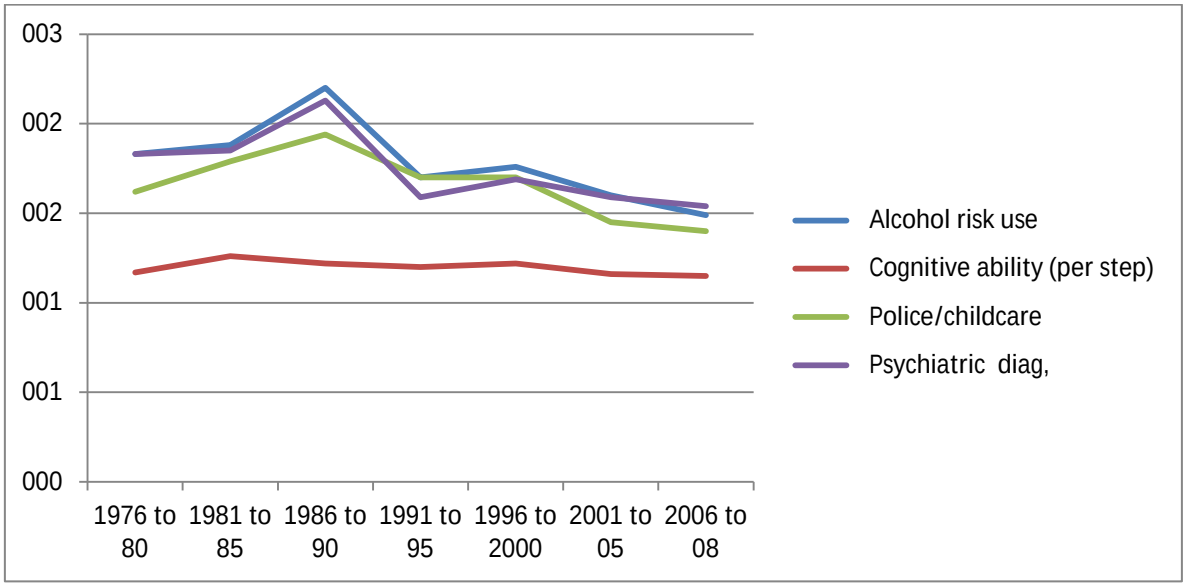

Figure 2. Bivariate associations between selected risk factors and unemployment in 7 periods

In order to establish whether the risk factors differed in their associations with becoming unemployed during 1976–2008, a period that encompassed both recession and boom, the relative risks of being unemployed in five-year intervals were calculated. Figure 2 shows the bivariate odds ratios of becoming unemployed for four selected risk factors: cognitive ability (per step decrease), psychiatric diagnosis, police or childcare contact, and risk use of alcohol. Although elevated in the period before the recession of the 1990s, the risk factors were associated with increased unemployment during all periods (data not shown).

3.6 Discussion

Cognitive ability and unemployment

The first part of this study set out to establish whether there are associations of cognitive ability, mental health and adaptability to school and work with later unemployment. We found that cognitive ability, and also mental health and behaviour related to adaptation to school and early labour-market experience, were associated with unemployment.

We also found that there is a strong and consistent association between cognitive ability and risk of unemployment, independent of other individual characteristics. This is consistent with some previous studies (Gregg 2001; Heckman, Stixrud et al. 2006), although, in some others, the effect of cognitive ability is small or non-existent (Caspi, Wright et al. 1998; Maloney 2004). In our study, persons with one-step lower cognitive ability on the standard-nine scale were about 14–20% more likely to become unemployed. Previous Swedish studies have modelled the association between cognitive ability and employment by using ordinary least squares (OLS) rather than logistic regression, which means that the estimates are not directly comparable (although significance tests and directions of associations are). Lindqvist and Westman found a 2.2 percentage point decrease in the probability of unemployment in year 2006 with every standard deviation increase in cognitive ability (Lindqvist and Vestman 2011). Across seven Swedish cohorts, Björklund and colleagues found that every standard deviation increase in cognitive ability increased the probability of being employed between ages 20 and 58 by 2.5 percentage points (Björklund, Fredriksson et al. 2010).

There is good reason to believe that cognitive ability is associated with employment and unemployment; more intelligent people are appointed by employers to certain

positions because these positions are critical to their organisation (Gottfredson 1986; Barrett and Depinet 1991). Cognitive ability is also predictive of higher education, and it is not clear how to separate out and interpret the associations of cognitive ability and education with labour-market outcome (Cawley, Heckman et al. 2001). On the one hand, higher cognitive ability is linked to pursuing a higher education and might therefore be a proxy for intelligence; on the other hand, education represents additionally acquired cognitive skill (human capital generated). In signalling theory, e.g., in Spence (Spence 1973), the well-known link between cognitive ability and education is posited as the reason why potential employers, when screening for worker ability, focus on educational credentials; quite simply, they signal general (worker) ability. For young people, education may have a comparatively strong signalling effect, since other measures of true ability, such as work credentials, are less relevant for the young.

Mental status and behaviour and unemployment

The links between mental status and personality and occupational position, employment and unemployment have attracted interest in the fields of psychology and sociology, and also of economics (Kessler, Turner et al. 1989; Dohrenwend, Levav et al. 1992; Hamilton, Merrigan et al. 1997; Muntaner, Eaton et al. 2004). In our study, the most notable independent risk factors were psychiatric diagnosis, contact with police or childcare authorities, smoking, risk use of alcohol, truancy, not being liked in school, having been dismissed from work, and having quit a job due to unfair treatment.

Selection into youth unemployment on the basis of psychiatric diagnoses and personality factors, and behavioural deviance and maladjustment in youth and young adulthood, have been identified previously in cohort studies in the UK (Gregg 2001; Healey, Knapp et al. 2004), Northern Ireland (Lynn, Hampson et al. 1984), New Zealand, Finland (Kokko, Pulkkinen et al. 2000; Kokko and Pulkkinen 2005) and Sweden (Hammarstrom and Janlert 1997), some of which have also controlled for cognitive ability (Lynn, Hampson et al. 1984; Gregg 2001; Healey, Knapp et al. 2004). In the current study, it was found that psychiatric status and indicators of maladaptation are associated with unemployment independently of cognitive ability. In New Zealand, in the DMDHS, delinquency, but not mental illness, at age 15 was found to be associated with unemployment at ages 15–21 (Caspi, Wright et al. 1998). In a cohort of 441 London boys, IQ at ages 8–10 and delinquency were associated with being

unemployed at age 33, although, after controlling for poor schooling, only delinquency remained statistically significant. In Northern Ireland, after controlling for education, measures of personality, motivation and work ethics, cognitive ability was found not to be significantly associated with unemployment one year after leaving school (Lynn, Hampson et al. 1984). In the British NCDS, age-11 behavioural deviance and maladjustment was related to youth unemployment at ages 16–23, and also to adult unemployment at ages 28–33 (Gregg 2001). There are two Swedish studies with longer follow-up, which, in addition to data on cognitive ability and education, have information on non-cognitive factors. Lindqvist and Vestman (Lindqvist and Vestman 2011) showed that psychologist rankings on an overall psychological profile at mandatory military conscription at age 18 are a stronger predictor of not being in the workforce at ages 41–50 than cognitive ability; and Björklund and colleagues (Björklund et. al 2010) showed that ambition to study and cognitive ability at ages 12–13 are associated, in the same magnitude, with employment at ages 20–58.

The associations of mental disorder and maladaptive behaviour with unemployment can be interpreted in two ways. Maladaptation will manifest itself in school achievement, through attendance and perseverance. Controlling for education might then mean biasing the risk of maladaptation downwards, given that it is an intermediate variable with no causal association with later unemployment. If, however, it is lower education that causes unemployment, and maladaptive behaviour affects education, then education can be interpreted as the mechanism via which people with mental disorder and maladaptive behaviour are placed at increased risk of unemployment.

Among our potential predictors of unemployment, several are conceptually related. First, anyone disliking school might dislike it because he or she is treated unfairly. Statistically, when including these variables simultaneously in a single model, their mutual correlation will give rise to insignificant estimates or estimates that are too low. Hence, to avoid too high a correlation we chose to exclude the weaker predictor. The excluded predictors were not irrelevant; they were excluded simply to obtain a more parsimonious model. Constructing a composite variable or index would have been possible, but would have offered less scope for interpretation. Second, some variables are mediators of other covariates, e.g., school and early work-life experiences might be the result of mental disorder. Here too, their mutual correlation leads to dilution of the

estimates, but such multicollinearity leaves scope for interpretation. Part of the direct effect of mental disorder on unemployment risk disappears when including the school and work variables. We interpret these as the mechanisms via which people with a mental disorder have higher risks (Baron and Kenny 1986). Similarly, part of the increased risk of unemployment associated with school and early work-life experiences can be explained by underlying clinical mental disorders. However, since dilution is only partial, and both mental disorder and reported experiences remain significant predictors of unemployment, we conclude that all the variables in the final model are themselves covariates of unemployment. Specific experiences in childhood and adolescence are interpretable as indicators of more general patterns of behaviour over time and across situations, i.e., personality traits.

4 Part 2 – Labour-market consequences of unemployment

4.1 Introduction

Youth unemployment has been shown to be a risk factor for adult unemployment, and possibly permanent exit from the labour market, e.g., due to the taking of a disability pension (Heckman and Borjas 1980; Lynch 1989; Narendranathan and Elias 1993; Hammer 1997; Upmark, Lundberg et al. 1999; Arulampalam, Gregg et al. 2001; Burgess, Propper et al. 2003; Skans 2004; Mroz and Savage 2006; Steijn, Need et al. 2006; Luijkx and Wolbers 2009). It is not clear whether the relationship between youth unemployment and later labour-market position in adulthood is causal, or whether it is simply an association created by individual characteristics that put some individuals at greater risk. In the second part of this study, we examined whether there are associations of exposure to unemployment in youth with a higher risk of later unemployment and disability pension, and, if so, whether the individual predictors of unemployment (in the first part of the study) can explain the associations.

4.2 Literature

Recurrence of unemployment

The consequences of youth unemployment for later unemployment have been addressed in a number of studies, in cohorts from the US (Heckman and Borjas 1980; Lynch 1989; Mroz and Savage 2006), the UK (Narendranathan and Elias 1993; Gregg 2001; Burgess, Propper et al. 2003), the Netherlands (Steijn, Need et al. 2006; Luijkx and

Wolbers 2009), Norway (Hammer 1997), and Sweden (Skans 2004). Most have reported a higher probability of becoming unemployed if an individual has been unemployed in the past, although the strength of the association is debated (Bell and Blanchflower 2011; Skans 2011). In a Swedish register-based study of school leavers, Nordström Skans (Skans 2004) showed that the association between initial unemployment (11 months following graduation from Swedish high school) and unemployment during the two following years is reduced by controlling for an older sibling being unemployed, which indicates that unmeasured individual characteristics confound the association between youth unemployment and later unemployment.

A couple of studies have been able to control for confounding by differences in cognitive ability, personality, or mental status. Two British studies have utilised the NCDS (Narendranathan and Elias 1993; Gregg 2001). Narendranathan and Elias found that, between ages 16 and 23, unemployment resulted in a 2.3 times higher risk of becoming unemployed the following year, but there was no increased unemployment risk beyond that first year. More recently, Paul Gregg found that unemployment between ages 16 and 23 was associated with unemployment at ages 28 and 33, but that controlling for low educational attainment, ability, financial deprivation and behavioural problems in childhood more than halved the strength of the association. (Gregg 2001) In New Zealand, Maloney showed that, in the CHDS, economic inactivity at age 25 was associated with previous economic inactivity at ages 16, 18 and 21, but that childhood variables concerning education, behavioural problems, IQ and socioeconomic background explained parts of the association between inactivity at age 21 and at age 25. (Maloney 2004) In Norway, Hammer used three waves of a national survey of 17–20 year-olds (1985, 1987, and 1993) with information on education, drug use, health status and motivation to work, variables that were shown to confound the association between one unemployment spell and the next (Hammer 1997). No information on cognitive ability was available for that study. In sum, the association between youth unemployment and later unemployment (and adult unemployment) remains unclear. That cognitive ability and mental health play a role in unemployment has been shown in a couple of studies from the UK and New Zealand, but not at ages beyond 33.

Unemployment and disability pension

Disability pension provides an exit from the labour market arising from difficulties in re-entering the market after longstanding somatic or psychiatric illness. Such health-related selection out of the workforce is differentially distributed across socioeconomic and occupational positions. It has been suggested that unemployment, representing a weak labour-market position, is a determinant of disability pension. In a recent Finnish study (n =14 489), individuals with short and long-term unemployment in 1998 showed an increased risk of disability pension over five years of follow-up (Lamberg, Virtanen et al. 2010). In that study, there was information on depression at the time of unemployment, but not before. Several studies have shown that individual factors, such as dissatisfaction with work-life, intention to retire, sickness absence, self-rated health (Krokstad, Johnsen et al. 2002), sense of coherence (Lundberg 1997; Suominen, Gould et al. 2005), and occupational strain (Krokstad, Johnsen et al. 2002; Vahtera, Kivimaki et al. 2005; Christensen, Lund et al. 2007; Harkonmaki, Korkeila et al. 2007; Laine, Gimeno et al. 2009), all of which could be interpreted as consequences of personality characteristics, are related to disability pension. These studies indicate that individual characteristics may be the consequences of labour-market position. In a recent Norwegian study of men born 1967–76 (n = 302 330), cognitive test results at conscription and general mental functioning assessed by a physician (at ages 18–19) were both predictors of disability pension 1991–2003 (Gravseth, Bjerkedal et al. 2008). In Sweden, Upmark and colleagues have used the Swedish conscript cohort of 1969, with age-18–20 information at baseline on cognitive ability, psychiatric status, and behavioural factors, and also youth unemployment, to estimate associations with disability pension 1970–1993 (Upmark, Hemmingsson et al. 1997; Upmark, Lundberg et al. 1999; Upmark, Lundberg et al. 2001). Mental status and cognitive ability in that material were found to be strongly associated with disability pension, but youth unemployment also made an independent contribution (Upmark, Lundberg et al. 1999).

4.3 Variables

Data on youth unemployment and unemployment 1976–2008

At conscription testing in 1969 (age 18), individuals were asked whether they had been without employment for more than 3 months since leaving school. There were four response options: *Yes*, *No*, *Have not left school*, and *Working at home*. Those respond-

ing *No* and *Working at home* were allocated to the Employed group. Information on unemployment (benefit and assistance) was obtained from the tax and income registers 1976–2008.

Data on disability pension 1971–2008

Information on disability pension is recorded yearly in the Swedish Social Insurance Agency's database, and was obtained from for the years 1971–1990. Information on disability pension 1991–2008 was obtained from LOUISE. Disability pension was introduced in Sweden as part of its general insurance scheme. Anyone between 16 and 65 years of age can be granted disability pension if their working capacity is impaired by at least 50% due to poor health. The reimbursement level is stipulated nationally, based on previous minimum and maximum income. Application for disability pension is usually made at the local Social Insurance Office by the individual, either alone, or in the company of Social Insurance Office officials and sometimes the employer. The following classification was used for psychiatric diagnosis: psychoses (ICD-8 and ICD-9 = 290 and 292–299); alcohol-related diagnoses or drug use, which includes alcoholism (ICD-8 and ICD–9 = 303), misuse of alcohol (ICD-9 0 305), alcohol psychoses (ICD-8 and ICD-9 = 291), drug psychoses (ICD-9 = 292) and drug addiction (ICD-8 and ICD-9 = 304); and other psychiatric diagnoses (ICD-8 = 300–308 except for 303 and 304, and ICD-9 = 300–311, except for 303–305). For individuals with more than one psychiatric diagnosis, the following priority order was stipulated: 1) psychoses, 2) alcohol- or drug-related diagnoses, and 3) other psychiatric diagnoses.

Data on cognitive ability, psychiatric status, behaviour and education 1969–1970

The variables presented and examined in Part One of the study were treated as confounders.

4.4 Data analysis

The associations between unemployment in adolescence and subsequent unemployment 1991–2008 and disability pension 1970–1990 and 1991–2008 were studied by means of odds ratios (ORs) obtained from logistic regression. The analyses were performed using the LOGISTIC procedure in the SAS statistical package (version 9.3).

4.5 Results

Covariates and young adulthood labour-market position; unemployment, employment and school continuation

In order to examine whether the risk factors found to be related to adult unemployment in Part One of this study were also related to youth unemployment, we tested their associations with self-reported unemployment before 18 years of age. If individual risk factors produce both youth unemployment and later unemployment, then there is a non-causal association between youth unemployment and later unemployment; that is, there is confounding that must be taken into account. Table 4 shows the prevalence of the risk factors for unemployment examined above among the employed, among those who had been unemployed for at least 3 months,

Table 4. Cross sectional bivariable associations between the covariates and age-18 employment status

	Employed	Unemployed	2ndary school	Unemployed (ref = working/ 2ndary school)	Unemployed (ref = working)
	%	%	%	OR 95% CI	OR 95% CI
IQ_1 (n = 1897) (lowest)	5.1	8.6	.6	2.29 (2.04–2.57)	1.85 (1.64–2.08)
IQ_2 (n = 2589)	7.3	9.9	.8	1.88 (1.68–2.10)	1.52 (1.36–1.69)
IQ_3 (n = 4728)	13.4	16.1	2.2	1.61 (1.47–1.77)	1.34 (1.22–1.47)
IQ_4 (n = 6840)	18.8	19.8	5.6	1.31 (1.20–1.43)	1.17 (1.07–1.27)
IQ_5 (n = 8184)	20.6	19.1	11.5	1	1
IQ_6 (n = 8277)	16.8	14.8	20.1	0.72 (0.66–0.79)	0.91 (0.83–1.00)
IQ_7 (n = 6870)	10.9	7.3	23.6	0.41 (0.36–0.46)	0.65 (0.58–0.74)
IQ_8 (n = 4663)	5.0	3.4	20.6	0.27 (0.23–0.32)	0.60 (0.51–0.70)
IQ_9 (n = 2926) (highest)	2.1	1.0	15.1	0.12 (0.10–0.16)	0.37 (0.28–0.48)
Psychiatric diagnosis. (n = 5396)	10.8	25.7	7.0	3.29 (3.08–3.51)	2.82 (2.63–3.02)
Psychotropic drugs (n = 5375)	10.5	20.0	9.9	2.16 (2.02–2.32)	2.10 (1.95–2.27)
Poor self-rated health (n = 8395)	16.8	26.3	16.6	1.78 (1.67–1.89)	1.77 (1.66–1.89)
Contact with police/childcare (n = 13603)	32.3	46.6	17.5	2.45 (2.32–2.59)	1.93 (1.82–2.04)
Smoking (n = 22221)	53.2	62.2	33.6	1.99 (1.88–2.10)	1.53 (1.44–1.62)
Alcohol risk use (n = 6249)	15.1	28.0	6.2	2.98 (2.80–3.18)	2.28 (2.13–2.44)
School adaptability					
School dislike (n = 5218)	12.8	22.7	4.2	2.85 (2.66–3.05)	2.10 (1.96–2.26)
Poor teacher relations (n = 3950)	9.1	17.7	3.8	2.88 (2.67–3.10)	2.25 (2.08–2.43)
Special education (n = 3392)	8.5	16.1	1.9	3.07 (2.83–3.32)	2.16 (2.00–2.35)
Held back in class (n = 6772)	12.3	15.7	17.6	1.09 (1.02–1.18)	1.27 (1.17–1.37)
Truancy (n = 8448)	16.7	30.9	16.5	2.22 (2.09–2.36)	2.20 (2.07–2.35)
Peer dislike (n = 8692)	17.8	23.7	17.8	1.43 (1.34–1.52)	1.42 (1.33–1.52)
Low conduct grades(n = 2982)	6.7	12.9	3.18	2.68 (2.46–2.91)	2.17 (1.98–2.37)
Unfair treatment (n = 3632)	7.6	12.0	6.5	1.77 (1.62–1.93)	1.67 (1.53–1.83)
Not popular among peers (n = 1334)	2.5	5.3	2.4	2.19 (1.93–2.49)	2.16 (1.89–2.47)
Work adaptability					
Job dislike – no job (n = 10634)	5.2	8.6	56.9	0.31 (0.28–0.34)	1.59 (1.44–1.77)
Job dislike – yes (n = 4636)	11.1	14.4	6.0	1.41 (1.30–1.52)	1.49 (1.37–1.62)
Responsible (n = 4948)	10.6	15.1	8.5	1.65 (1.53–1.79)	1.54 (1.42–1.67)
Give up easily (n = 4233)	7.5	14.4	9.5	1.83 (1.69–1.98)	1.99 (1.82–2.16)
Quit due to unfair treatment (n = 3233)	7.1	16.8	2.5	3.70 (3.42–4.00)	2.83 (2.61–3.07)
Dismissed (n = 1482)	2.6	11.1	.96	6.40 (5.76–7.11)	4.98 (4.46–5.56)
Superior relations – never job (n = 8039)	3.5	4.6	44.4	0.23 (0.21–0.26)	1.39 (1.22–1.60)
Superior relations – poor (n = 2911)	6.5	10.4	4.1	1.74 (1.59–1.91)	1.82 (1.65–2.00)
Colleague relrelations – never (n = 3591)	1.6	.95	20.2	0.11 (0.08–0.14)	0.59 (0.45–0.78)
Colleague relations – poor (n = 1066)	2.2	4.6	1.5	2.37 (2.06–2.72)	2.30 (1.99–2.66)
N	25420	6136	15457		

and among those who had not left school at age 18. About a third of the population had, at this time, not yet left school. The table also shows the cross-sectional associations between the risk factors and being unemployed for at least three months, compared with being employed (unemployment in the working population), and also with being employed or still at school. Individuals still at school are, by common definition, not in the workforce (work force = people working + the unemployed), and are disregarded when calculating unemployment rates. Including them in the reference category (ref = working/not left school) biases the relative risks of being unemployed upwards (Column 5 compared with Column 6 in Table 4). Cognitive ability is clearly skewed; among individuals who are still at school there are proportionally more above-average individuals, while there are proportionally more individuals with average cognitive ability or lower among the employed and unemployed. Further, there are proportionally more individuals with lower cognitive ability among the unemployed than among the employed. This pattern, with a higher prevalence of risk factors among the unemployed than among both the employed and individuals still at school, was found across all categories of risk factors.

Youth unemployment as a risk factor for later unemployment

In order to examine whether youth unemployment is a risk factor for later unemployment even after taking other individual risk factors into account, we calculated the relative risk of unemployment by labour-market status before age 18. Table 5 shows unemployment across the life course for three labour-market positions in 1969: the some-time unemployed, the employed, and the individuals who had not yet left school. In all time periods, people who were unemployed in youth showed higher prevalence of unemployment than those who were working. Further, the individuals who were still at school showed a much lower prevalence of unemployment than those who were working. Unemployment was lowest during the period 1986–90, but there was a change during the following five-year period. Here, the individuals who were still at school in youth and those who were working experienced a more dramatic increase in risk of unemployment, while the group of youth unemployed – who already had high unemployment in the low-unemployment period – experienced a less dramatic increase. Consequently, the relative risk of unemployment for the group with youth unemployment is lowest at times of overall high unemployment (OR=1.36) and highest at times

of overall low unemployment (OR=1.93). During 1996 to 2000, the period following the economic crisis, unemployment prevalence in all groups returned to levels similar to those during 1981–85. Controlling for individual risk factors for unemployment dilutes the association between youth labour-market position and unemployment, but during all time-periods there was an increased risk of unemployment associated with youth unemployment, which ranged from an 11% increased risk to a 44% increased risk.

Table 5. Youth unemployment and later unemployment

		Unemployment						
		1976–80	1981–85	1986–90	1991–95	1996–2000	2001–05	2006–08
Prevalence %	Youth unemployment	19.63 (1185/6038)	25.97 (1539/5926)	17.87 (1033/5782)	27.96 (1571/5619)	25.13 (1345/5353)	19.62 (994/5066)	12.55 (570/4543)
	2ndary school	9.53 (1466/15377)	9.47 (1448/15293)	5.82 (885/15198)	12.24 (1846/15083)	10.05 (1495/14871)	9.90 (1445/14603)	6.43 (899/13972)
	Employed	13.33 (3357/25186)	18.62 (4652/24988)	10.12 (2503/24742)	22.16 (5406/24394)	18.48 (4377/23687)	14.22 (3245/22823)	9.25 (1963/21224)
Crude OR (95% CI)	Youth unemployment	1.59 (1.48-1.71)	1.53 (1.44-1.64)	1.93 (1.79-2.09)	1.36 (1.28-1.46)	1.48 (1.38-1.59)	1.47 (1.36-1.59)	1.41 (1.28-1.56)
	2ndary school	0.69 (0.64-0.73)	0.46 (0.43-0.49)	0.55 (0.51-0.60)	0.49 (0.46-0.52)	0.49 (0.46-0.53)	0.66 (0.62-0.71)	0.68 (0.62-0.73)
	Employed	1 ----	1 ----	1 ----	1 ----	1 ----	1 ----	1 ----
Adjusted OR (95% CI)	Youth unemployment	1.26 (1.16-1.36)	1.20 (1.11-1.29)	1.44 (1.32-1.58)	1.11 (1.04-1.20)	1.19 (1.10-1.29)	1.22 (1.11-1.33)	1.20 (1.08-1.34)
	2ndary school	0.92 (0.84-1.00)	0.70 (0.64-0.76)	0.77 (0.69-0.86)	0.68 (0.63-0.74)	0.71 (0.65-0.78)	0.90 (0.82-0.99)	0.89 (0.79-1.00)
	Employed	1 ----	1 ----	1 ----	1 ----	1 ----	1 ----	1 ----

Note: Adjusted = includes adjustment for cognitive ability and measures related to mental status, behaviour, school adaptability and work adaptability.

Youth unemployment as a risk factor for disability pension

Table 6 shows the association between youth labour-market position and disability pension across the life course, 1971–2008.

Table 6. Youth unemployment and disability pension across the life course, 1971–2008

		Disability pension			
		1971–80	1981–90	1991–2000	2001–08
		OR 95% CI	OR 95% CI	OR 95% CI	OR 95% CI
Prevalence%	Youth unemployment	75/6136 (1.2%)	225/5946 (3.8%)	419/5626 (7.5%)	618/5075 (12.2%)
	Secondary school	57/15457 (0.3%)	109/15311 (0.71%)	296/15096 (2.0%)	709/14623 (4.8%)
	Employed	128/25420 (0.5%)	383/25028 (1.5%)	1160/24424 (4.8%)	1925/22880 (8.4%)
Crude	Youth unemployment	2.48 (1.86–3.30)	2.53 (2.14–2.99)	1.61 (1.44–1.81)	1.51 (1.37–1.66)
	2ndary school	0.73 (0.54–1.00)	0.46 (0.37–0.57)	0.40 (0.35–0.46)	0.56 (0.51–0.61)
	Employed	1	1	1	1
Model 1	Youth unemployment	1.29 (0.94–1.78)	1.60 (1.33–1.92)	1.13 (0.99–1.28)	1.20 (1.08–1.34)
	2ndary school	1.62 (1.11–2.35)	0.88 (0.69–1.13)	0.70 (0.61–0.81)	0.86 (0.77–0.95)
	Employed	1	1	1	1
Model 2	Youth unemployment	1.24 (0.88–1.74)	1.54 (1.27–1.88)	1.09 (0.95–1.24)	1.19 (1.07–1.33)
	2ndary school	1.48 (0.99–2.21)	0.79 (0.61–1.03)	0.69 (0.59–0.81)	0.83 (0.75–0.92)
	Employed	1	1	1	1
Model 3	Youth unemployment	1.11 (0.79–1.55)	1.50 (1.24–1.82)	1.07 (0.94–1.22)	1.18 (1.06–1.31)
	2ndary school	1.11 (0.71–1.71)	0.82 (0.62–1.10)	0.65 (0.55–0.77)	0.87 (0.77–0.98)
	Employed	1	1	1	1
Model 4 (full)	Youth unemployment	1.08 (0.76–1.55)	1.44 (1.18–1.77)	1.04 (0.91–1.20)	1.17 (1.05–1.31)
	2ndary school	0.94 (0.59–1.50)	0.75 (0.55–1.01)	0.64 (0.53–0.77)	0.84 (0.74–0.95)
	Employed	1	1	1	1

Notes:
Model 1 includes adjustments for cognitive ability and measures related to mental status and behaviour.
Model 2 includes adjustments for cognitive ability and measures related to mental status, behaviour, and school adaptability.
Model 3 includes adjustments for cognitive ability and measures related to mental status, behaviour, and work adaptability.
Model 4 includes adjustments for cognitive ability and measures related to mental status, behaviour, school adaptability, and work adaptability.

Large increases in disability-pension incidence were found for all groups over time. There was, however, in all periods, a strongly elevated risk of disability pension for individuals with unemployment in youth compared with those who were at school and the employed. Controlling for cognitive ability, psychiatric diagnosis, risk use of alcohol, smoking and having been in contact with police or childcare authorities strongly attenuated this excess risk (Model 1). Adding information on adaptability in school and early labour-market experience contributed little to further reducing the relative risk associated with youth unemployment (Model 4). Re-running the analysis separately for disability pension with psychiatric and somatic diagnoses showed that youth unemployment was not statistically significantly associated with either a somatic or a psychiatric diagnosis 1971–1980, but was associated with an increased risk of both somatic and psychiatric disability pension 1981–1990 (Table 7).

Table 7. Association between youth unemployment and early disability pension with psychiatric and somatic diagnosis 1971–80 and 1981–90

	Disability pension			
	1971–80		1981–90	
	Psychiatric	Somatic	Psychiatric	Somatic
Youth unempl.	58/6118 (1.0%)	18/6078 (0.3%)	161/5882 (2.7%)	64/5785 (1.1%)
2ndary school	40/15440 (0.3%)	17/15417 (0.1%)	79/15281 (0.5%)	30/15232 (0.2%)
Employed	84/25376 (0.3%)	44/25336 (0.2%)	232/24877 (1.0%)	151/24796 (0.6%)
Crude				
Youth unempl.	2.88 (2.06–4.03)	1.71 (0.99–2.96)	2.99 (2.44–3.66)	1.83 (1.36–2.45)
2ndary school	0.78 (0.54–1.14)	0.63 (0.36–1.11)	0.55 (0.43–0.71)	0.32 (0.22–0.48)
Employed	1	1	1	1
Adjusted				
Youth unempl.	1.27 (0.83–1.95)	0.77 (0.40–1.47)	1.46 (1.14–1.88)	1.41 (1.01–1.97)
2ndary school	0.98 (0.56–1.72)	0.91 (0.40–2.08)	0.89 (0.62–1.29)	0.53 (0.31–0.91)
Employed	1	1	1	1

Note: Adjusted: Adjusted includes adjustment for cognitive ability, and measures related to mental status, behaviour, school adaptability and work adaptability.

4.6 Discussion

The second part of the study set out to examine whether there are associations of youth unemployment with later unemployment and disability pension, and if so, the extent to which cognitive ability, mental health and adaptability to school and work can explain

the associations. We found that there was an association between youth unemployment and unemployment across the life course, partly because of confounding by cognitive ability, and mental health and behaviour related to adaptation to school and early labour-market experience. Youth unemployment was also found to be associated with disability pension, both early in work-life and later on, even after taking into account differences in cognitive ability, mental health, behaviour, and adaptability.

Youth unemployment as a risk factor for adult unemployment

A relationship between youth unemployment and increased probability of future unemployment has been demonstrated in previous studies, but it is uncertain whether this is because youth unemployment leaves permanent scars, or whether individuals prone to youth unemployment due to individual characteristics are also prone to adult unemployment. In this study, unemployment before age 18 in 1969/70 was found to be associated with unemployment 1976–2008, in a magnitude of ORs between 1.36 and 1.93. About half of the association was explained by the individual characteristics observed in our data. Several previous studies have found a scarring effect of youth unemployment on later unemployment (Narendranathan and Elias 1993; Hammer 1997; Gregg 2001 ; Maloney 2004; Steijn, Need et al. 2006; Luijkx and Wolbers 2009), but only a couple have been able to control for confounding. A previous Swedish register-based study of school leavers adopted a sibling-based approach so as indirectly to capture some of the unmeasured confounding by individual characteristics (Skans 2004). In that study, controlling for an older sibling being unemployed (as well as for demographics, socioeconomic factors, and information on school performance) had a great attenuating effect on the initially strong association between initial unemployment and unemployment over the two following years. Our study confirms this finding, but extends it by having a longer follow-up period and by controlling for measured confounders in the psychological domain. Our findings are also similar to those of the few studies assessing recurring unemployment that have also measured cognitive ability and behaviour. Gregg (Gregg 2001), using the NCDS from 1958, found that unemployment between ages 16 and 23 was associated with unemployment at ages 28–33. It was possible to control for a wide array of factors related to ability, behaviour and socio-economic circumstances, all measured at ages 7–16. In the full analysis there was a reduction in the association between age-16–23 unemployment and age-28–33

unemployment of 40%. In the CHDS (Maloney 2004), Tim Maloney found that people who were economically inactive at age 21 had a 25% increased risk of being inactive at age 25. After controlling for individual characteristics – IQ, classroom performance, conduct problems, peer associations, educational attainment, and variables related to socioeconomic circumstances – there was a 40% reduction in risk. Hammer (Hammer 1997) could not control for IQ, but – after controlling for health problems and drug use, as well as socioeconomic position, education, geography and working conditions – the effect of previous unemployment on later unemployment declined by 40%.

One explanation for the higher risk of becoming unemployed related to having been unemployed in the past, comes from human-capital theory. A work-life interrupted by an unemployment spell can potentially destroy human capital, through less work experience or un-modern abilities. Signalling theory, which is closely related to human-capital theory, stresses the importance of educational and work-life credentials in the matching of potential employers and potential employees, since these are two tangible indicators of actual work ability. Also, in Sweden, seniority rules, which stipulate that those hired last are the first to go in the case of downsizing, and are central to employment-protection legislation, generally increase the risk of recurring unemployment.

One hypothesis is that a lack of signalling devices, other than education, makes youth unemployment particularly dangerous, since it prevents individuals from gaining a foothold on, and provides no entry to the labour market; young individuals who happen to become unemployed are not re-employed because employers have very few signals of true ability.

Youth unemployment as a risk factor for disability pension

In this study, youth unemployment was found to be associated with disability pension, early in life as well as later on. Most of this association is explained by the individual characteristics that we can observe in our data, but a statistically significant increased risk remains in some periods even after adjusting for these characteristics. A previous Finnish study showed that unemployment predicted disability pension during five years of follow-up, with a 2–3 times increased risk (Lamberg, Virtanen et al. 2010). In that study, both unemployment and depression predicted disability pension, but depression was more common and more severe among individuals with unemployment, thereby increasing the risk of disability pension. In that study, depression and unemployment

were measured at the same point in time and, for the most part, in adulthood. In our study, we included adjustment for risk factors measured at an early stage in working life, with a longer follow-up period, and also adjusted for cognitive ability, psychiatric diagnosis, and behaviour. From our study, it is clear that not considering differences related to psychiatric status, cognitive ability, and behaviour, leads to an overstatement of the relative risks of disability pension associated with youth unemployment. Upmark and colleagues have previously reported a doubled risk of early-life disability pension associated with youth unemployment (Upmark, Lundberg et al. 1999), and our study also shows an increased risk of disability pension from somatic causes.

How might the association between youth unemployment and disability pension be explained? The strong attenuation of the association by individual characteristics indicates confounding, whereby youth unemployment and disability pension are both due to an underlying factor, and therefore non-causally associated. However, the weaker, but statistically significant, association that remains in the adjusted model, may represent some degree of causality. Youth unemployment may be indicative of a life with an elevated exposure to adverse work characteristics that eventually lead to illness and disability pension. Further, if youth unemployment is indicative of, or leads to, specific future jobs, then illness in those jobs may more often lead to disability pension. Health-related selection out of the labour force might be stronger in some jobs and sectors. Youth unemployment may also be indicative of a future life with increased exposure to adverse non-occupational factors that lead to ill-health and difficulties in working life.

5 Strengths and weaknesses of the study

This study has three principal strengths. First, rather than having a small and/or non-random sample, we examined what is close to a national birth cohort that spans over several decades, thereby making it possible for long-term consequences to be fully evaluated. Second, it relies on administrative data on unemployment rather than on self-report data, which eliminates the possibilities of recall bias and of the subjective classification of attachments to the labour market. Third, it relies on reliable, prospective information on cognitive ability and other individual characteristics, measured relatively early in life, before or just after entering the labour market.

A possible weakness is that we lack information on unemployment experiences in the period 1970–1975, when the individuals were aged 19–24. Most of the cohort were born in 1951 and would, if they pursued their secondary education, have left school in summer 1969 or summer 1970. By late autumn (October 1970), 29 727 had an attachment to the labour market and 28 906 were employed full-time, while 11 769 were students (pursuing secondary or tertiary education), and 5718 were doing their military service; 2 038 were economically inactive. Given that most men at this time did military service, many of the individuals were occupied with it during 1970–71, and possibly in 1972. There is, however, a possibility that our measures of individual characteristics are affected by early contact with the labour market. Cognitive ability might, on average, be lower among those not studying, simply because they are less exposed to schooling. As for deviance and personality, we believe that such traits are less likely to be the result of short working-life experience. In several studies, it has been argued that such traits are already generally well-defined before leaving school and that "experiences that occur following school-leaving such as unemployment are likely to play only a relatively minor role in determining variations in risk of disorder [p. 380]" (Fergusson, Horwood et al. 1997). Further, since our measure of youth unemployment refers to age 18 or below, it is limited to individuals in the workforce at this age and excludes those in secondary education. Since youth unemployment commonly encompasses ages 15-24, individuals in secondary (high-school) education can also be regarded as unemployed youth. The association between youth unemployment and adult unemployment is potentially different for this group.

The setting in which the information was gathered gives rise to questions of validity and reliability. It might be that cognitive tests, as well as self-report data, reflect low (or high) ambition regarding participation in military service or potential placement in the military-training scheme. It is hard to assess the potential bias generated by such non-random misclassification. Regarding the cognitive tests, misclassification may be due to underperformance. The correlation between age-13 cognitive tests and conscription cognitive tests in men born in 1948 (n = 4616) was as high as .78 (Härnqvist 1968). The prevalence of drug use found in our non-anonymous survey was lower than those found when administering previous and later anonymous versions of the same questionnaire (Benson and Kjellson 1984). However, record linkage of members of the cohort to

several registers has shown that the validity of the questionnaire is high; drug users generally respond truthfully to the questions (Benson and Holmberg 1985).

We categorise the unemployed as recipients of unemployment insurance from any of the unemployment insurance funds, or of cash labour-market assistance. They meet the criterion of being a job seeker registered at an employment service, who has no work, who is actively seeking work, who is currently available for work, and who is not on a labour-market program (UIN 2007). Individuals who do not register as unemployed but are not working or are underemployed, job-seeking students, and people on labour-market programs are defined as employed, even though they are unemployed in some sense. Since we studied unemployment over several decades, we do not believe that there are large groups outside the labour force who have never registered as unemployed or have never received disability pension. Members of the unemployment insurance funds who have a labour-market connection (previous income from work at a pre-specified level) who lose their job are entitled to benefit. Nevertheless, some might fail ever to qualify for any benefit, and would therefore be recorded as economically active.

Further, we did not have access to detailed information on early labour-market careers. Individuals who, at labour-market entry, chose a sector that has high unemployment, or an educational path in a sector with a high risk of unemployment will, if remaining in those sectors, continue to have a high risk of unemployment. The decision to choose a specific sector would then confound the association between youth unemployment and adult unemployment. Some of this confounding was most likely taken care of by controlling for the rich set of individual characteristics in the material, but there may still be some residual confounding from the other, unmeasured factors behind career choice.

Finally, we have studied risks in just one cohort, which is basically a birth cohort, over time. It is not possible to establish whether differences in particular periods represent secular changes or ageing effects. Disentangling of the two would require follow-ups of several age-cohorts over the same periods.

6 Conclusion

In both economics and psychology, individual characteristics, such as cognitive ability and psychological measures, have attracted interest in relation to labour-market outcomes. In this study, we investigated: 1) the associations of cognitive ability, mental health, behaviour and adaptability to school and work with unemployment across the life course; and, 2) whether there are higher risks of unemployment and disability pension associated with youth unemployment, and, if so, the extent to which individual characteristics can explain the associations across the life course.

It was found that cognitive ability, and also mental health and behaviour related to adaptation to school and early labour-market experience, are associated with both youth and adult unemployment.

Youth unemployment was found to be associated with an increased risk of adult unemployment across the life course. When including measures at age 18 of cognitive ability, mental status, behaviour and adaptability to school and work, much of the association between youth unemployment and later unemployment disappeared. However, even after controlling for the confounding variables, there was a statistically significantly elevated risk of unemployment associated with youth unemployment in comparison with the risk of individuals employed at age 18.

Youth unemployment was also found to be associated with the taking of disability pension, both early in work-life and later on. As with unemployment, part of this association was due to confounding by cognitive ability, mental status, behaviour, and adaptability to school and work.

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