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PSYCHIATRIC PROBLEMS DURING CHILDHOOD AND ADOLESCENCE AND LATER LABOUR MARKET MARGINALISATION

Ida Ringbom

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SARJA – SER. D OSA – TOM. 1818 | MEDICA – ODONTOLOGICA | TURKU 2024

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ABSTRACT

Low educational attainment and problems with employment are common among people with psychiatric disorders. Psychiatric disorders often start in childhood or adolescence.

The main goal of this thesis was to give an overview of later educational attainment and labour market outcomes for children and adolescents with psychiatric or neurodevelopmental problems.

We used the Finnish 1987 and 1997 birth cohort studies, which include everyone born in those years in Finland. In addition to this we used the national 1981 birth cohort, which consists of a representative sample of 10% of those born that year. In each of these years, around 60,000 people were born in Finland. The studies include information from a large number of registers. The 1981 birth cohort study also includes questionnaire data.

There were strong associations between all main psychiatric diagnostic groups and being outside of the labour market in young adulthood. The strongest associations were found for psychotic and autism spectrum disorders. In these groups, over a third was not in employment, education, or training for over five years between the age of 20 and 28. These associations were independent of sociodemographic factors. Those that had a diagnosed psychiatric or neurodevelopmental disorder in adolescence and did not finish upper secondary education were especially prone to be outside of the labour market in young adulthood.

Psychiatric symptoms in childhood were associated with educational attainment at the age of 35 years, independent of the educational attainment of the parents or the family structure. The proportion of those diagnosed with a psychiatric or neurodevelopmental disorder in early adolescence who had dropped out of school before upper secondary education increased between the 1987 and 1997 cohorts.

Targeting psychiatric and neurodevelopmental disorders in childhood and adolescence, providing rehabilitation, and fighting stigma seem to be crucial if we want to prevent labour market marginalisation of young people.

KEYWORDS: Epidemiology, psychiatry, childhood, adolescence, marginalisation, educational attainment

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TIIVISTELMÄ

Matala koulutustaso ja työllistymisongelmat ovat yleisiä henkilöillä, joilla on psykiatrinen häiriö. Psykiatriset häiriöt alkavat usein lapsuudessa ja nuoruudessa.

Väitöskirjan päätavoite oli antaa yleiskuva myöhemmästä koulutustasosta ja työllistymisestä lapsilla ja nuorilla, joilla on todettu psykiatrisia tai neuropsykiatrisia pulmia.

Käytimme aineistoina vuosina 1987 ja 1997 Suomessa syntyneiden syntymäkohortteja. Näiden lisäksi käytimme kansallista vuoden 1981 syntymäkohorttia, joka koostuu edustavasta 10 % otoksesta vuonna 1981 Suomessa syntyneistä. Kyseisinä vuosina syntyi vuosittain noin 60 000 henkilöä Suomessa. Kohorttitutkimukset sisältävät tietoa monesta rekisteristä. Lisäksi 1981 syntymäkohorttitutkimus sisältää kyselytuloksia.

Todettiin kaikkien psykiatristen päädiagnoosiryhmien olevan vahvassa yhteydessä työelämän ulkopuolella olemiseen nuorella aikuisiällä. Vahvimmat yhteydet todettiin psykoottisten ja autismikirjon häiriöiden kohdalla. Näissä ryhmissä yli kolmasosa oli koulutuksen, työharjoittelun ja työelämän ulkopuolella vähintään viiden vuoden ajan 20–28 vuoden iässä. Nämä yhteydet olivat riippumattomia sosiodemografisista tekijöistä. Henkilöt, joilla oli todettu psykiatrinen tai neuropsykiatrinen häiriö nuoruusiässä ja jotka eivät olleet valmistuneet toisen asteen opinnoista, olivat erityisen alttiita olemaan työelämän ulkopuolella nuorina aikuisina.

Psykiatriset oireet lapsuudessa olivat yhteydessä koulutustasoon 35 vuoden iässä riippumatta vanhempien koulutustasosta ja perherakenteesta. Suurempi osuus nuorista, joilla oli todettu psykiatrinen tai neuropsykiatrinen häiriö, jätti hakematta toisen asteen opintoihin 1997 syntymäkohortissa kuin 1987 syntymäkohortissa.

Psykiatristen ja neuropsykiatristen häiriöiden hoitoon ja kuntoutukseen panostaminen ja stigman vähentäminen ovat keskeisiä toimia, mikäli halutaan ehkäistä nuorten syrjäytymistä.

AVAINSANAT: Epidemiologia, psykiatria, lapsuus, nuoruus, syrjäytyminen, koulutustaso

ÅBO UNIVERSITET
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SAMMANDRAG

Låg utbildningsnivå och problem med sysselsättning är vanliga bland personer med psykisk sjukdom. Psykiska sjukdomar börjar ofta i barn- eller ungdomen.

Huvudmålsättningen med den här avhandlingen var att ge en översikt av senare utbildningsnivå och sysselsättning för barn och unga med psykiska eller neuropsykiatriska problem.

Vi använde de finländska 1987 och 1997 födelsekohorterna som inkluderar alla som fötts i Finland under de åren. Dessutom använde vi den nationella 1981 födelsekohorten som inkluderar ett representativt sampel på 10 % av dem som föddes det året. Under vart och ett av de här åren föddes cirka 60 000 personer i Finland. I kohortstudierna ingår information from många register. I 1981 studien ingår också data som samlats in via frågeformulär.

Sambandet mellan alla huvudsakliga psykiatriska diagnosgrupper och att vara utanför arbetslivet som ung vuxen var starkt. Det var starkast för psykotiska störningar och neuropsykiatriska funktionsnedsättningar. Inom dessa grupper var en tredjedel utanför studier, praktik och arbetsliv i över fem år när de var mellan 20 och 28 år gamla. Sambanden var oberoende av sociodemografiska faktorer. De som hade blivit diagnosticerade med en psykiatrisk störning eller neuropsykiatrisk funktionsnedsättning som tonåringar och som inte hade slutfört andra stadiets utbildning var extra benägna att vara utanför arbetslivet som unga vuxna.

Psykiska symptom i barndomen hade ett samband med utbildningsnivå då personerna var 35 år gamla oberoende av föräldrarnas utbildningsnivå eller familjestruktur. Andelen av dem som diagnosticerats med en psykiatrisk störning eller neuropsykiatrisk funktionsnedsättning under tidiga tonår och som inte sökte in till andra stadiets utbildning ökade mellan 1987 och 1997 kohorterna.

Det är viktigt att fokusera på psykiatriska störningar och neuropsykiatriska funktionsnedsättningar, erbjuda rehabilitering och att kämpa mot stigma om vi vill förebygga marginalisering av unga.

NYCKELORD: Epidemiologi, psykiatri, barndom, ungdom, marginalisering, utbildningsnivå

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Abbreviations

ADHD	Attention-deficit/hyperactivity disorders
ASD	Autism spectrum disorders
CDI	Children's Depression Inventory
CI	Confidence interval
Eurofound	European Foundation for the Improvement of Living and Working Conditions
EU	European Union
FBC	Finnish Birth Cohort
GDP	Gross Domestic Product
ICD-10	The International Classification of Diseases, 10th Revision
ILO	International Labour Organization
IPS	Individual placement and support
NEET	Not in education, employment, or training
OECD	Organisation for Economic Co-operation and Development
OR	Odds ratio
RERI	Relative excess risk due to interaction
RA2	Rutter's parent questionnaire
RB2	Rutter's teacher-questionnaire
RR	Risk ratio
SD	Standard deviation

List of Original Publications

This thesis is based on the following publications. The Roman numerals refer to the publications in the text.

I Ringbom I, Suvisaari J, Kääriälä A, Sourander A, Gissler M, Ristikari T, Gyllenberg D. Psychiatric disorders diagnosed in adolescence and subsequent long-term exclusion from education, employment or training: longitudinal national birth cohort study. *Br J Psychiatry*. 2022;220(3):148–153.

II Ringbom I, Suvisaari J, Kääriälä A, Sourander A, Gissler M, Kelleher I, Gyllenberg D. Psychotic Disorders in Adolescence and Later Long-term Exclusion from Education and Employment. *Schizophr Bull*. 2023;49(1):90–98.

III Ringbom I, Suvisaari J, Sourander A, Gissler M, Gyllenberg D. Temporal changes in the associations between diagnosed psychiatric disorders and dropping out of school early. *Eur Child Adolesc Psychiatry*. 2024;33(5):1443–1450.

IV Ringbom I, Seittenranta S, Gyllenberg D, Heinonen E, Sourander A. Childhood psychopathology at 8-9 years and educational attainment by 35 years – the Finnish Nationwide 1981 Birth Cohort Study. Manuscript.

1 Introduction

Work and education are central for mental wellbeing (Rinaldi et al., 2010; Edgerton et al., 2011). Many people who have a severe psychiatric disorder want to work, and they feel that they have the capacity to do so (Rinaldi et al., 2010). Despite this, many people with severe psychiatric disorders remain outside of the labour market. Among the most important reasons for this are prejudice, discrimination, and fear of being discriminated against (Hampson et al., 2020).

Psychiatric disorders are common, and they often start in adolescence (OECD, 2012; McGrath et al., 2023). Despite many of the disorders having good prognoses (Patton et al. 2014), they are negatively associated with completing secondary education (Esch et al., 2014; von Simson et al. 2022; Reinholdt Jensen et al. 2023). This is problematic as educational attainment is associated with later labour market outcomes (Zajacova & Lawrence 2018).

The marginalisation of people with psychiatric disorders from the labour market is not only an issue for individuals, but for the whole society. The Organisation for Economic Co-operation and Development (OECD) has identified psychiatric disorders as one of the greatest challenges for social and labour market policies. The International Labor Organisation (ILO) has estimated that they cost 3–4% of the Gross Domestic Product (GDP) in the European Union (EU). Most of this cost comes from loss of potential in the labour market and payments of social security benefits. Health care costs are only a small part (OECD, 2012).

The relationships between psychiatric disorders in childhood and adolescence, education, and employment are complicated and have mostly been studied in pieces. The overreaching goal of this thesis was to study psychiatric problems during development and the various outcomes related to marginalisation. We wanted to give an overview of the associations between psychiatric disorders diagnosed during adolescence and being outside of the labour market in young adulthood. This included investigating risk factors. Another aim was to study the associations between psychiatric symptoms and diagnoses in childhood and adolescence and educational attainment, taking into account parental educational attainment. Temporal changes in these associations were also studied.

2 Review of the Literature

2.1 Field of study

Public health is a field that describes the health of a population and tries to explain why it has developed in a certain way and how it can be improved. Health is studied from a top-down perspective. Public health issues are often complex, and solutions to them come from changes in the culture, society, and the environment. Epidemiology is one of the main fields in the study of public health. Usually, public health is studied on the population level, but laboratory studies and computer simulations are also possible. Teamwork combining expertise from medicine as well as statistics and social and environmental sciences is often needed when examining problems to find solutions.
The aim of epidemiological studies is not only to provide information but to improve the health of people in general (Kauhanen et al., 2018).

The main field of the current study is psychiatric epidemiology. This field has its roots in early 20th-century sociology, and it developed into a distinct field after the Second World War. Early studies focused on social risk factors for disorders. Later focus shifted to exploring the prevalence of psychiatric disorders. These studies showed that psychiatric disorders are more common than people thought. It was soon realised that it was not enough to calculate the frequency of the disorders. Their impact on individuals' quality of life and on society are equally important. These questions became an area of interest for researchers in the 1990s and the early 21st century. The studies have helped raise awareness on the impact of mental disorders on public health (Susser et al., 2006).

Another development in sociology in the middle of the 20th century was the rise of medical sociology. Originally, the aim was to practically improve the lives of citizens in the post-war countries. It then developed into a field that theoretically tries to explain social processes that affect health (Cockerham, 2013). Some of these theories are cited in this thesis as possible explanations to the results.

2.2 Central concepts

2.2.1 Psychiatric and neurodevelopmental disorders

The estimates of the prevalence of psychiatric disorders vary in different studies. It has been calculated that about 60% of the population might meet criteria for a psychiatric disorder by the end of adolescence (Copeland et al., 2011; Caspi et al., 2020). The proportion that seeks treatment and gets diagnosed is significantly smaller (Gyllenberg et al., 2018). An increase in diagnosed psychiatric disorders among adolescents has been reported in many countries (Atladottir et al., 2015). This increase does not necessarily mean and increase in psychiatric morbidity but could be explained by increased awareness, development of psychiatric services, changes in diagnostic practices, and more positive attitudes towards psychiatric treatment. A clear increase in self-reported psychiatric symptoms had not been measured before the COVID-19 pandemic, with the exception of anxiety among girls (Cosma et al., 2021; Kiviruusu et al., 2023).

Anxiety disorders are the most common psychiatric disorders in childhood. The prevalence of psychiatric disorders increases in adolescence, when depressive disorders, eating disorders, conduct disorder, and substance use disorders become more prevalent. Depressive disorders and eating disorders are especially prevalent among teenage girls and conduct disorders among boys. Neurodevelopmental disorders are also common. Around 5% of children have been diagnosed with attention-deficit/hyperactivity disorder (ADHD) and 1% with autism spectrum disorder. Comorbidities are common, and more than half of children and adolescents who have been diagnosed with at least one psychiatric disorder have several diagnoses (Sourander & Marttunen, 2016). Of all psychiatric disorders, half start before the age of 14, and three-quarters by the end of adolescence, before the age of 24. The disorders that begin later are often comorbid conditions (Singh & Tuomainen, 2014).

Based on a model developed by Achenbach in the 1960s, psychiatric problems in childhood and adolescence are often categorised as either internalising or externalising. (Achenbach, 1966). Internalising symptoms include withdrawal, anxiety, depression, and somatic complaints, while externalising symptoms can present as delinquent or aggressive behaviour (Levesque, 2011). There are several risk factors for psychiatric disorders. Genetic factors, sex, events during pregnancy, and environmental factors can all influence the development of psychiatric disorders (Sourander & Marttunen, 2016).

Psychiatric services are often divided into separate clinics for minors and for adults. Transition between these can be problematic. In the United Kingdom, psychiatric service use has been found to decline by over 60% for service users 18

and older. Those who have been placed in out-of-home care have been found to be a particularly vulnerable group, who have less support from their families but more issues with their mental health. They are also at risk for unemployment, homelessness, and crime (Singh & Tuomainen, 2015).

There are efficient treatments for many psychiatric disorders. The cost-effectiveness of the treatment of common psychiatric disorders has been reported to be in the same range as the treatment for type II diabetes (Bhugra et al., 2017). The prognosis of psychiatric disorders in adolescence is generally good (Patton et al., 2014); about half of those with a psychiatric episode in adolescence have no further episodes in young adulthood. Of those who have a second in young adulthood, about half fully recover before their late 20s (Patton et al., 2014). Still, stigmatising attitudes against people with psychiatric disorders are widespread, and this can influence help-seeking (Bhugra et al., 2017).

2.2.2 Marginalisation

Marginalisation of young people is a global concern (Eurofound, 2016) and has been linked to both individual challenges and societal costs. Although the problems related to marginalisation, or social exclusion, are recognised, there are no unique definitions of these concepts. The phrase *social exclusion* was first used in France in the 1970s to describe those who fell through the social insurance system. The meaning of the phrase then expanded to cover different groups of people on the margins of society. In the 1980s and 90s, social exclusion became a politically correct way of speaking about poverty without giving it a definition (Morgan et al., 2007).

The term NEET—not being in education, employment, or training—was first used in the United Kingdom at the end of the 1990s to describe young people outside of the labour market. It was then quickly adopted by organisations across the globe as a measurable way of identifying young people at risk of marginalisation. Although it has been criticised because of its heterogeneity, it is still widely used. Eurofound, an agency of the European Union, tracks NEET levels by measuring the proportion of young people who reply that they are NEET during a particular week of study. Being NEET, according to Eurofound's estimates, is common: 12.0% of 15–24-year-old people in the EU were NEET in 2015 (Eurofound, 2016).

It is of importance to realise that marginalisation is not only a state. To be marginalised also involves someone have the feeling of not belonging to the society in which they live. When talking about marginalised groups, there is a risk for stereotyping. People who might be considered marginalised from the outside might not consider themselves in the same way. The concepts of social exclusion and marginalisation are linked to societal norms, values, and expectations by the society.

Anyone who does not meet these norms can be seen to be marginalised. It is easy to forget that not all share these same values (Mowat, 2015).

Moreover, the term social exclusion has been criticised because it divides society into an included majority and an excluded minority. This impacts how both included and excluded groups are regarded and how we comprehend society (Levitas, 2005).

2.2.2.1 Educational attainment and marginalisation

Educational attainment is related to marginalisation: low educational attainment is associated with low income, poorer health, unemployment, disability, and mortality (Evensen et al., 2016; Zajacova & Lawrence, 2018). Educational attainment is also associated with mental health, well-being, and resilience. (Edgerton et al., 2011).

There are several theories that try to explain the association between high educational attainment and many favourable life outcomes. The first one is the Fundamental Cause Theory, which claims that education in itself is the cause of these outcomes as education gives access to resources. A second theory is the Human Capital Theory, which sees education as an investment that gives returns through better abilities in life. This capital, in addition to knowledge, can be psychological capital, such as self-esteem and self-control, and cultural capital, such as habits and styles. A third theory involves the signalling model. wherein this model, educational credentials act as signals to others about one's skills, values, motivation, or habits. Their reactions, and not the education itself, creates the beneficial outcomes (Edgerton et al., 2011; Zajacova & Lawrence, 2018).

Educational attainment is closely related to social exclusion, not only through labour market outcomes, but also through social mechanisms. Well-educated people report a higher level of social support and are more active in volunteer groups and organised activities. They are also more politically active. Education passes along values, knowledge, and skills that society regards as important. The formal education system trains students in the ways of thinking and behaving that are valued in society (Edgerton et al., 2011).

Educational attainment is an issue of equality as there is a strong intergenerational transmission of education. The possible mechanisms for this include genetic factors, personality traits, nutrition, parenting styles, skills and values, peer influence, social networks, differences between schools, and teacher expectations (d'Addio, 2007; Zajacova & Lawrence, 2018).

Education is one of the routes out of marginalisation, but schools can also contribute to a negative cascade. For example, a curriculum that does not take into account individual needs and has unrealistic standards for pupil behaviour can be part of the path that leads to low educational attainment and marginalisation (Mowat, 2015).

2.2.3 Social selection and causation

There is an ongoing debate on whether low socioeconomical status causes health problems or if people who are ill fall into a low socioeconomic position because of their illness (Hoffmann et al., 2018). Social selection theory, according to which disorders can impact the socioeconomic status of a person (Chen & Kaplan, 2003), could be used to explain the association between psychiatric diagnoses and marginalisation. There are several possible mechanisms for this. It could be directly because of a disorder or the expenses following it. The disorder could also lead to decreased human capital. As mentioned previously, human capital is the skills, knowledge, and capacity a person has. This could be especially important when it comes to disorders during critical developmental periods such as childhood and adolescence (Haas et al., 2011).

The social causation model presents an opposing theory. It states that a low socioeconomic status leads to disadvantage such as poverty. This can then affect the mental health of a person, for example (Hammarström & Janlert, 1997). A third option is that both socioeconomic status and poor health have a common cause. This shared risk factor could be temperament, cognitive factors, neighbourhood adversity, or poor parenting (Moilanen et al., 2010). These three theories are not mutually exclusive, and it is probable that the different factors interact dynamically during development. Cumulative inequality theory describes this possible cascading nature of adverse life events (Mikkonen et al., 2020).

2.2.4 Stigma

A phenomenon that could partly explain the link between psychiatric disorders and marginalisation is stigma. Stigma involves a label, in this context a diagnosis of a psychiatric disorder, that links people to negative stereotypes. These negative associations justify seeing stigmatised people as different and threatening. This leads to discrimination and loss of social capital (Thomas et al., 2015). Stigma has been found to be a problem facing people with psychiatric disorders in all parts of the world (Thornicroft et al., 2009).

Discrimination due to stigma can lead to problems in personal relationships, education, employment, housing, and health care. Many people with psychiatric disorders have described the stigma as worse than the disorders themselves. (Thornicroft et al., 2016)

According to labelling theory, the identity and behaviour of people are strongly influenced by how the wider community describes them. Before ever falling ill, many young people with psychiatric disorders have already internalised stereotypes about people with psychiatric disorders and learned norms about how to behave toward people with psychiatric disorders. Their awareness of these stereotypes and

norms, when falling ill themselves, might lead to negative coping strategies to avoid discrimination (Thomas et al., 2015). Anticipated discrimination has been found to be even more common than discrimination itself (Thornicroft et al., 2009).

When negative stereotypes against people with psychiatric disorders are internalised and applied on oneself, it is called self-stigma. This can be a barrier for recovery. Self-stigma has been associated with feelings of shame, depression, demoralisation, and social exclusion, and it can influence self-esteem, self-efficacy, psychiatric symptoms, and help-seeking behaviours (Thomas et al., 2015). Self-efficacy is a person's confidence in their ability to successfully do something. Low self-efficacy has been associated with problems with employment. The so-called "why try" effect stems from self-stigma, low self-esteem, and low self-efficacy combined with experiences of not achieving one's goals in life (Corrigan et al., 2009).

Stigma affects not only adults but also children and adolescents. It can affect peer support, which is especially important for the outcome of psychiatric disorders in adolescence. Self-stigma might be a bit less common among adolescents than among adults, but it could still be especially harmful to adolescents as it might influence the development of personal identity and autonomy (Kaushik et al., 2016).

2.2.5 The Finnish Welfare state

Soon after the Second World War, the Nordic countries were described as a successful compromise between unregulated capitalism and state socialism. Still today, the idea of a Nordic model of the welfare state exists. Traditionally, the Nordic model has referred to an active state, a large public sector, and a responsibility of the state for the citizens. The Nordic countries have reached relatively high levels of economic and gender equality and social mobility. The model has, on the other hand, been criticised for the negative incentive effects of social benefits (Kautto, 2010). It is probable that the structure of the health and social security systems and how schools support students with special needs affect the social outcomes of children and adolescence with psychiatric or neurodevelopmental problems.

2.2.5.1 Health care system and registers

Finland provides universal public health care. The Finnish Health Care System has been regarded as efficient (OECD, 2021). In additional to public health services, a national health insurance covers part of the costs of pharmaceuticals and some services from the private health care sector (OECD, 2021).

Diagnoses are recorded during visits to inpatient units or outpatient clinics at public hospitals in Finland according to the International Classification of Diseases

ICD-10 and reported to the Care Register for Health Care (Finnish Institute for Health and Welfare).

2.2.5.2 Education system

At the time of the study, education in Finland consisted of nine years of comprehensive basic education, after which studies could be continued in upper secondary school, either resulting in a vocational diploma or concentrating on theoretical subjects. Adolescents would usually finish compulsory education the year they turned 16. At that time, they would apply for and then start their upper secondary education. Almost everyone (99.7%) would complete the basic education syllabus. An extra tenth year would be offered to those who needed support before going on to upper secondary education (Järvinen, 2007). Since the end of the follow-up of these studies, from 2021 onwards, compulsory education has been extended until the age of 18 (Ministry of Education and Culture, 2021).

Education in Finland went through changes during the first decades of the 21st century. The National Core Curriculum from 1994 gave only very broad national guidelines, but the curricular norms were increased at the national level during the period 1998–2003 (Järvinen, 2007). The global economic crisis of 2008 reached Finland a bit later. Significant cuts were made in 2011 in the school budgets because of the crisis (Read et al., 2022). School burnout has increased among students in Finland in their last years of compulsory education since 2006, especially during the second decade of the 21st century (Read et al., 2022).

The education system is based on equality and on the principle of inclusion. Children and adolescents study in heterogeneous groups. All students have the legal right to special needs education and student welfare support if they need it (Järvinen, 2007).

2.2.6 Longitudinal cohort studies

A cohort study is a type of epidemiological study. In these studies, individuals who have been exposed to a hypothetical risk factor are compared to those who have not to see what proportions develop a specific outcome. The aim of cohort studies was originally to determine if there is a causal relationship between an exposure and an outcome, but this kind of relationship is difficult to prove. Longitudinal cohort studies can be either prospective or retrospective (Susser et al., 2006).

In this thesis, a specific kind of cohort—a population cohort—has been used. A population cohort consists of a natural population, for example, people living in a specific place, children attending a certain school, or as in these studies, all or a random sample of those born during a specific year in a defined area. A natural

population is exposed to a large variety of influences, which means that several exposures can be examined within the same cohort (Susser et al., 2006).

The personal identity code assigned to Finnish citizens and permanent residents makes it possible to link information from different public registers such as the previously mentioned Care Register for Health Care. These have been used to study the population cohorts used in this thesis.

Key points

What we know

- An increase in diagnosed psychiatric disorders among adolescents has been reported.
- There is an ongoing debate on whether low socioeconomical status causes health problems or if people who are ill get selected into a low socioeconomic position.

What we do not know

- How has the increase in diagnosed psychiatric disorders affected the association between disorders and educational attainment?
- Are the associations between psychiatric disorders and educational and labour market outcomes independent of sociodemographic factors?

2.3 Previous research central to the topic of the thesis

2.3.1 Employment and psychiatric disorders

Employment is essential for the recovery from psychiatric disorders. A job provides financial independence, but also structure and purpose to an individual's life and a social role free from stigma. Many people with severe psychiatric disorders want to work and believe that they have the capacity to do so. Being employed is one of the most frequently identified treatment goals that people with severe psychiatric disorders set for themselves (Rinaldi et al., 2010).

Psychiatric disorders continue to be identified as one important factor associated with marginalisation (Morgan, 2007). Several markers of difficulties with employment, such as being unemployed, being on long-term sick-leave, or receiving disability pension or welfare support, have separately been linked to psychiatric

disorders. The associations have been studied between these adverse outcomes and mood disorders, anxiety disorders, substance use disorders, neurodevelopmental disorders, conduct disorders, traits of personality disorders, and especially psychotic disorders (Gjerde et al., 2014.; Helgesson, et al., 2018; Holm, et al., 2021; Jonsson, et al., 2014; Löve, et al., 2016; Merikukka et al., 2018; Mykletun et al., 2006; Ostby et al., 2014; Thorlacius et al., 2010; Torvik et al., 2016; Upmark et al., 2001). Up to 50% of new disability benefits in Europe are granted for psychiatric disorders, and among young adults the proportion rises to 50%–80% (Porru et al., 2023) When they are employed, people with psychiatric disorders often have a low-skilled job or a job that does not match their skills (OECD, 2012).

Studies have found associations between both internalising and externalising psychiatric disorders in adolescence and being unemployed. A longer duration of internalising symptoms has been found to have a stronger association with unemployment (de Groot et al., 2021). Although more people with psychiatric disorders have been diagnosed and treated during the last decades, the proportion of people with psychiatric disorders in competitive employment has not risen. It seems that people increasingly think that a psychiatric disorder limits one's ability to work (OECD, 2012). As an example, a nationwide Swedish register study showed that the number of young adults on disability pension because of psychiatric illnesses increased fivefold between 1995 and 2005 (Jonsson et al., 2014).

2.3.1.1 Barriers to employment

There are several possible reasons for the labour market marginalisation of people with psychiatric disorders, such as the young age of onset (Kessler et al., 2007), low educational attainment (Rinaldi et al., 2010), lack of work experience, design of disability benefits, stigma, and factors associated with the disorders themselves (Charette-Dussault & Corbière, 2019). Of these reasons, the most common barrier to employment for people with psychotic disorders is stigma (Hampson et al., 2020).

There is clear evidence of workplace discrimination toward people with severe psychiatric disorders. This is on a spectrum from very subtle behaviours to clear discrimination (Russinova et al., 2011). It is not only employers who have stigmatising attitudes toward people with psychiatric disorders; the attitudes of family members and health care personnel can also influence motivation to seek employment (Charette-Dussault & Corbière, 2019). While stigma is one of the main barriers to employment of people with psychiatric disorders, employment can play an important part in changing attitudes towards people with psychiatric disorders (Hampson et al., 2020).

Self-stigma and the "why try" effect affect the majority of people with schizophrenia and a considerable proportion of people with depression or substance

use when considering applying for a job (Brouwers, 2020). The more barriers a person believes there are, the less likely it is that they try to find employment (Charette-Dussault & Corbière, 2019).

The typical age of onset for many psychiatric disorders is adolescence, and this might also affect the association between disorders and labour market marginalisation (Kessler et al., 2007). Adolescence is a crucial age, being the conventional time for education, training, and becoming a part of the workforce (Rinaldi et al., 2010). Adolescents who develop a disorder typically have not had the opportunity to gain valuable work experience before falling ill (Charette-Dussault & Corbière, 2019). Entering the labour market is difficult for young adults diagnosed with a psychiatric disorder even after completion of upper secondary or tertiary education (Porru et al., 2023).

Factors associated with disorders themselves can, of course, affect a person's ability to work. Personality disorders and disorders that affect cognition can be especially challenging. The fear that stress from work stress could cause a relapse can also be a barrier to applying for jobs (Charette-Dussault & Corbière, 2019). Further, the lack of adequate treatment for disorders can lead to unnecessary disability (OECD, 2012).

2.3.1.2 Rehabilitation

The quality of the work rehabilitation services provided probably affects people with psychiatric disorders in their attempt to find employment (Charette-Dussault & Corbière, 2019). We know that young adults with severe psychiatric disorders often do not benefit from general employment programmes (Scott et al., 2013).

Vocational rehabilitation programmes should be practical and should include training in skills for social interactions, coping, and problem-solving. Employment specialists should have comprehensive training, and they should be able to build relationships with both potential employers and programme participants. The rehabilitation programmes' flexibility should account for varying degrees of disability. They should concentrate on fitting a job to the skill set of the programme participant. Participants do not only need support from an employment specialist but also from psychiatric clinics, their families, and employers (Carmona et al., 2019).

In the individual placement and support (IPS) model used for vocational rehabilitation, the aim is to get people into the labour market fast. The model also helps those with psychiatric disorders in developing coping skills for managing their symptoms at work (Bond et al., 2020). The goal of fast employment is based on the knowledge that the longer an individual is absent from education or employment, the less likely they are to return to the labour market (Pothier et al., 2019). For young adults, the IPS model has been found to give much better results than traditional

rehabilitation programmes, in which participants usually wait for remission of the symptoms before even considering employment (Bond et al., 2020).

Successful vocational rehabilitation is associated with several factors: the relationship with the vocational expert (Charette-Dussault & Corbière, 2019), the educational attainment of the person, the level of functioning before the illness, social skills, and the disorder itself. Generally speaking, the later the onset of the disorder and the shorter the duration of the disorder and being without employment, the better the outcomes of rehabilitation (OECD, 2012).

Key points

What we know

- Psychiatric disorders are associated with labour market marginalisation.
- Associations between both internalising and externalising psychiatric disorders in adolescence and being unemployed have been found.

What we do not know

- Which psychiatric disorders in adolescence are associated with labour market outcomes?
- What is the association between psychiatric disorders in adolescence and being outside of the labour market for a long time?

2.3.2 Educational attainment and psychiatric disorders

Psychiatric problems in adolescence are a well-known risk marker for low educational attainment around the globe (see Table 1 for a summary of the literature). Problems in education could be a result of functional impairment caused by the disorder, but there could be other explanations.

Several studies have shown that externalising disorders probably have a stronger association with educational attainment than internalising disorders (Erskine et al., 2016; Pingault et al., 2011; McLeod et al., 2012; Meißner et al., 2022; Moilanen et al., 2010). This could be explained by theories of noncognitive traits. These traits include aggressiveness, disruptiveness, emotional stability, self-discipline, effort, and self-esteem. The theory is that behaviours that signal a lack of interest or that disturb teaching will lead to a more negative response than internalising (McLeod et al., 2012).

The previously mentioned labelling theory is closely related to the theory of noncognitive traits. It links the social consequences of psychiatric disorder to stigma

and the experience of social rejection (McLeod et al., 2012). It could affect how strongly children and adolescents believe that their lives are in their control. Adolescents with psychiatric disorders, as well as their parents, might reduce their educational goals if they believed that the psychiatric disorder would impact future opportunities. The student might not put in the same effort as they would have otherwise. The parents might also decide that keeping their child healthy is more important than encouraging them to do well in school (Jackson, 2009).

Key Points

What we know

- Psychiatric problems in adolescence are a well-known risk marker for not finishing upper secondary education.
- Parental educational attainment is strongly associated with the educational attainment of the offspring.

What we do not know

- What is the association between psychiatric symptoms in childhood and educational attainment as an adult?
- Is the association between psychiatric disorders and educational attainment independent of parental educational attainment?

Table 1. Summary of literature.

Authors	Year of publication	Age of participants	Outcome	N	Includes parental educational attainment	Source of information	Results, association between psychopathology and educational attainment yes/no
Askeland et al.	2022	16–19 years	Upper secondary school diploma	9,157	Yes	Register	Depressive symptoms - yes
Breslau et al.	2011	Not specified	Upper secondary school diploma	29,662	No	Interview: participants	All studied diagnostic categories (depression, mania, anxiety, ADHD, conduct disorder, substance use) - yes
Doering et al.	2021	15 years	Eligibility for upper secondary school	4,997		Register, questionnaire, interview: parents	Internalising - yes
Duchesne et al.	2008	Primary school	Upper secondary school diploma	1,817	No	Register, questionnaire: parent, teacher	Anxiety - yes
Erskine et al.	2016	<18 years	Upper secondary school diploma	Meta-analysis	No	Previous studies	ADHD and conduct disorder - yes
Esch et al.	2014	Adolescence	Upper secondary school diploma	Review	No	Previous studies	Substance use, conduct disorder - yes, mood and anxiety disorders - no
Evensen et al.	2016	13–19 years	Educational attainment at age 27 years	8,113	Yes	Questionnaire: participants	Externalising disorders - yes, internalising disorders - no
Fletcher	2008	7^{th}–12^{th} grade	Upper secondary school diploma, enrolment in post-secondary education	~13,000	Yes	Interview, questionnaire: participants	Depression for females - yes, males - no

Fletcher	2010	7th–12th grade	Upper secondary school diploma, enrolment in post-secondary education	~13,000	Yes	Interview, questionnaire: participants	Depression - yes
Fletcher & Wolfe	2010	7th–12th grade	Years of education	~13,000	Yes	Interview, questionnaire: participants	ADHD - yes
Holttinen et al.	2023	13–17 years	Educational attainment in 2014	17,112	No	Register	Psychiatric inpatient treatment - yes
Jonsson et al.	2014	16–17 years	University degree at age 30 years	609	Yes	Register	Depression - yes
Leadbeater & Ames	2017	12–18 years	Educational attainment at age 22–29 years	662	No	Interview, questionnaire: participants	Oppositional defiant disorder - yes
Lee et al.	2009	Not specified	Educational attainment	41,688	No	Interview: participants	Anxiety, mood and impulse control disorders, substance use - yes
McLeod & Fettes	2007	6–8 years	Upper secondary school diploma, enrolment in post-secondary education	883	Yes	Questionnaire: mothers, participants	Externalising problems - yes, internalising symptoms - depending on trajectory
McLeod et al.	2012	7th–12th grade	Educational attainment 14 years later	6,315	Yes	Questionnaire, interview: participants, parents	Attention problems, delinquency, substance use - yes, depression- no
Meißner et al.	2022	11–17 years	Educational attainment 6 years later	433	Yes	Questionnaire	Externalising disorders - yes, internalising disorders - no
Melkevik et al.	2016	Not specified	Upper secondary school diploma	Review	No	Previous studies	Internalising disorders - mixed results

Needham	2009	11–21 years	Upper secondary school diploma, post-secondary education enrolment	14,232	Yes	Questionnaire: participants	Depressive symptoms for females - yes, males - no
Pingault et al.	2011	6–12 years	Upper secondary school diploma	2,000	No	Register, assessment of symptoms	Inattention - yes, hyperactivity - no
Rabiner et al.	2016	1st grade	Upper secondary school diploma, years of education	386	No	Questionnaire: teacher, parents, participants, peers, IQ-test	Inattention - yes
Reinholdt Jensen et al.	2023	13–19 years	Upper secondary school diploma	53,187	Yes	Register	Internalising, externalising, substance use - yes
von Simson et al.	2022	15–18 years	Upper secondary school diploma, enrolment in post-secondary education	242,542	Yes	Register	Internalising disorders - yes
Vanzella-Yang et al.	2023	6–8 years	Upper secondary school diploma	2,000	Yes	Register, questionnaire: teachers, IQ-test: participants, interview: parents	Inattention - yes, internalising, externalising, prosocial - no
Vitaro et aL.	2005	Kindergarten	Upper secondary school diploma	4,330	No	Register, questionnaire: parents, teachers	Inattention-hyperactivity - yes, aggressive-oppositional - no
Zbar et al.	2016	4–16 years	Upper secondary school diploma	666	No	Questionnaire: participants, parents	Internalising symptoms in childhood - yes, in adolescence - no, externalising symptoms - no

2.3.3 Gaps in the literature

Many narrow definitions of labour market marginalisation have been associated with psychiatric disorders. These include being NEET, unemployed, on sick-leave, or receiving disability pension or welfare support. Associated disorders include mood disorders, anxiety, psychotic disorders, substance use disorders, neurodevelopmental disorders, conduct disorders, and traits of personality disorders (Gjerde et al., 2014; Helgesson et al., 2018; Holm et al., 2021; Jonsson et al., 2014; Löve et al., 2016; Merikukka et al., 2018; Mykletun et al., 2006; Ostby et al., 2014; Thorlacius et al., 2010; Torvik et al., 2016; Upmark et al., 2001). Most studies on this subject have focussed on associations between psychiatric disorders in adulthood, and only a few have followed adolescents with psychiatric disorders into adulthood (de Groot et al., 2021; Hammarström et al., 1997; Löve et al., 2016; Veldman et al., 2015). In addition, there have not been any follow-up studies on the association between diagnosed psychiatric disorders and not being in education or employment for several years, which we call long-term NEET. Because of this, the association between psychiatric disorders in adolescence and long-term exclusion from the labour market has not been studied. To our knowledge, there have also been no previous studies making a comparison of risk markers for labour market marginalisation in the general population to those with a psychotic disorder diagnosed during adolescence.

Associations between psychiatric problems in adolescence and low educational attainment are well established (see Table 1). Although both mental health and parental education are known to be associated with educational attainment, these characteristics have usually been studied separately. Studies about intergenerational transmission of educational attainment have usually not taken into account psychiatric symptoms (d'Addio, 2007), and studies about psychiatric problems and educational attainment have often not considered parental educational attainment, as shown by a meta-analysis from 2016 (Erskine et al., 2016). Furthermore, studies about associations between psychiatric problems and educational attainment have often measured psychiatric symptoms in adolescence (Askeland et al., 2022; Doering et al., 2021; Esch et al., 2014; Evensen et al., 2016; Fletcher, 2008; 2010; Fletcher & Wolfe, 2008; Leadbeater & Ames, 2017; Jonsson et al., 2010; McLeod et al., 2012; Meißner et al., 2022; Needham, 2009; Reinholdt Jensen et al., 2023; von Simson et al., 2022), which might be different from associations with childhood symptoms. Studies where psychiatric symptoms have been measured in childhood have also often had a short and narrow follow-up, with graduation from upper secondary school and enrolment in post-secondary education as the only outcome measures (Askeland et al., 2022; Duchesne et al., 2008; Fletcher, 2008; 2010; Fletcher & Wolfe, 2008; McLeod & Fettes, 2007: Needham, 2009; Pingault et al., 2011; Reinholdt Jensen et al., 2023; von Simson et al., 2022; Vanzella-Yang et al.,

2023.; Vitaro et al., 2005; Zbar et al., 2016). Studies with the endpoint in young adulthood do not inform about the impact on the highest levels of education, as they usually are achieved later in life, or on problems in education that have appeared even before upper secondary education. Many studies are either based only on interviews or questionnaires with only one informant (Evensen et al., 2016; Fletcher, 2008; 2010; Fletcher & Wolfe, 2008; Leadbeater & Ames, 2017; Meißner et al. 2022; Needham, 2009) or on register information (Askeland et al., 2022; Jonsson et al., 2010; Reinholdt Jensen et al., 2023; von Simson et al., 2022), although there are some multi-informant studies as well (Duchesne et al., 2008; Vitaro et al., 2005; Zbar et al., 2016). There is a lack of studies that consider psychiatric symptoms in childhood and parental educational attainment and include a long-term follow-up extending to middle adulthood, by which most people have reached their ultimate educational attainment.

A further gap in the literature that we wanted to study was whether the associations between psychiatric and neurodevelopmental disorders and educational attainment have changed. This is interesting as an increase in psychiatric diagnoses among adolescents has been reported (Gyllenberg et al., 2018), but the effect of this on educational outcomes has been unknown.

3 Aims of the study

1. The first aim of this study was to give an overview of labour market outcomes of adolescents with psychiatric and neurodevelopmental problems. (Study I)

    - We expected to find strong associations between diagnosed disorders and these outcomes, with an especially strong association between psychosis and labour market marginalisation.

2. The second aim was to identify risk markers for long-term NEET status during young adulthood among those with psychotic disorders during adolescence. (Study II)

    - We expected known risk factors for labour market marginalisation, such as parental socioeconomic position, to be especially important for this vulnerable group.

3. The third aim was to study temporal changes in the association between psychiatric disorders in adolescence and dropping out of school. (Study III)

    - Our hypothesis was that the association between the disorders and dropping out of school would be less because of an increase in the number of diagnosed mild cases.

4. The fourth aim was to study the association between psychiatric symptoms in childhood and educational attainment independent of parental educational attainment.

    - Our hypothesis was that there would be an independent association between psychiatric symptoms and educational attainment.

4 Material and Methods

4.1 Study design

Data collected for the 1987 Finnish Birth Cohort study was used in Studies I–III. In addition to this, we used data from the 1997 Finnish Birth Cohort Study in Study III. These longitudinal studies are managed by the Finnish Institute for Health and Welfare and include data from nationwide registers for everyone born in Finland in 1987 and 1997, respectively. The original cohort data was based on the Medical Birth Register and included information on maternal health and diagnoses as well as interventions during pregnancy and delivery. Information from other registers was later added. The 1987 cohort was funded by the consortium Life-course Determinants of Mental Health, Marginalization and Social Coping through the Academy of Finland's SALVE research programme (Paananen & Gissler, 2012).

Study IV used data from the multicentre Finnish Nationwide 1981 Birth Cohort Study. The study population consists of all children resident in Finland in 1989 who were born in Finland during 1981. A representative sample of 10% was invited to take part in the study in 1989 when the children were 8–9 years old. The sample covered all five university hospital areas in Finland. The communities were selected according to their degree of urbanisation to assure representativeness of the general population. The sample has shown good generalisability regarding the population. The study has previously been detailed (Almqvist et al., 1999).

4.1.1 Participants and setting

The 1987 Finnish Birth Cohort study includes the 59,476 people who were born in Finland and alive after the perinatal period. Of them, 756 (1.3%) died before the end of the follow-up of Studies I and II in 2015. Additionally, 2,913 had emigrated, and 534 had been diagnosed with intellectual disability. A total of 55,273 subjects were included in the analyses in Study I. This was 92.9% of the original birth cohort.

In Study II, we started with the same population as in Study I. A further 117 individuals were excluded because they had been diagnosed with a psychotic disorder during 1998–2003, before the start of the follow-up period. The final number used in the analyses was 55,171 (92.8% of the cohort).

In Study III, we used the same exclusion criteria as in Studies I and II, but the follow-up ended in 2003 for the 1987 cohort and in 2013 for the 1997 cohort. In addition to this, some hospital districts were excluded because of incomparable data across cohorts. In the 1987 birth cohort, this meant an exclusion of 32,760 participants. The final number included in the analyses was 25,421 (53.6% male), which was 42.7% of the original birth cohort. The 1997 cohort includes 58,802 people. Of them, 243 (0.4%) had died before the end of follow-up. Another 1,320 had emigrated and 273 had been diagnosed with intellectual disability. In addition to these, 24,941 were excluded because they had at some point been living in a hospital district with incomparable data. The number included in the final analyses was 32,025 (53.4% male), which was 54.5% of the original birth cohort.

The population of Study IV consisted of all 60,007 children born in Finland during 1981 who were alive in 1989. A representative sample of 6,017 children was invited to take part in the study in 1989 when the children were 8–9 years old. Of the invited participants, 70 children were never reached, and 134 refused to participate. In addition, 397 personal identity codes of the original sample had been either lost or incorrectly documented. Thus, the total sample size in this study was 5,416 (90.0% of the original sample) (see Figure 1).

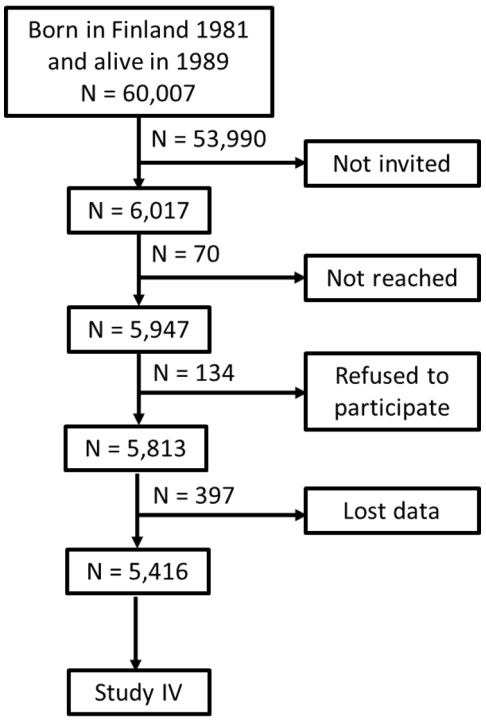

Figure 1. Flowchart showing exclusions in Study IV.

4.1.2 Data sources

Data from different registers were combined using a unique personal identity code that is given to all Finnish citizens and permanent residents by the Digital and Population Data Services Agency (former Central Population Register). Table 2 presents a list of the registers that have been used. These registers have been previously detailed (Sund, 2012).

Diagnoses information was gathered from the Care Register for Health Care. The diagnoses were registered during assessments at public hospitals in Finland, as part of in- or outpatient care. The information is continuously gathered and regularly submitted to the Register by the hospitals. The records include the start and end dates of the visits, a mandatory primary diagnosis, and optional secondary diagnoses. The Register contains inpatient data starting from 1969 and outpatient data starting from 1998. The Care Register for Health Care has been extensively used for epidemiological research (Sund, 2012), and the diagnostic validity of psychiatric and neurodevelopmental disorders in the Register has been studied, for example, for autism (Lampi et al., 2010) and schizophrenia (Pihlajamaa et al., 2008).

In Study IV, register data was combined with questionnaire data. The data collection was organised through teachers in 1989, when the subjects went to the second grade of primary school. The children filled in a questionnaire in school. The teachers then sent another questionnaire to the parents via the child. These questionnaires are described in 4.2.3.

Table 2. Data sources used in each study.

Registers	Data	Study I	Study II	Study III	Study IV
Medical Birth Register	Births	x	x	x	
	Mothers	x	x	x	
Statistics Finland	Deaths	x	x	x	
	Educational attainment	x	x	x	x
	Marriage status		x	x	
Digital and Population Data Services Agency	Fathers	x	x	x	
	Emigration	x	x	x	
Care Register for Health Care	Diagnoses	x	x	x	
	Hospitalisations		x		
The Finnish Institute for Health and Welfare	Welfare benefits	x	x	x	
	Out-of-home placements by the child protection agency		x	x	
The Finnish Centre for Pensions	Salaries	x	x		
	Childcare benefits	x	x		
The Social Insurance Institution of Finland	Student benefits	x	x		
	Rehabilitation		x		
	Medication		x		
The Ministry of Economic Affaires And Employment	Participation in jobseekers' programmes	x	x		
The Joint Application Register	Applications to upper secondary education		x	x	
	School grades		x		
Questionnaires		**Study I**	**Study II**	**Study III**	**Study IV**
Rutter's parent questionnaire					x
Rutter's teacher questionnaire					x
Children's Depression Inventory					x

4.2 Variables

The timeframe for the outcomes, main exposures, and covariates are shown in Figures 2–5.

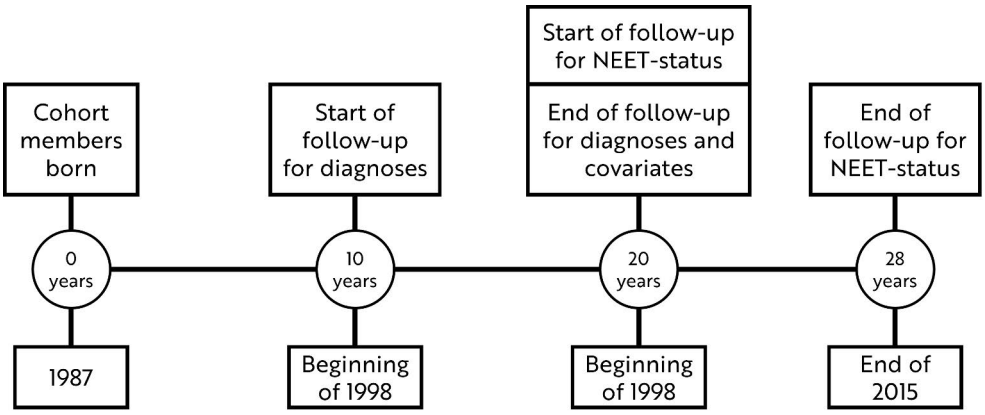

Figure 2. Timeline for Study I.

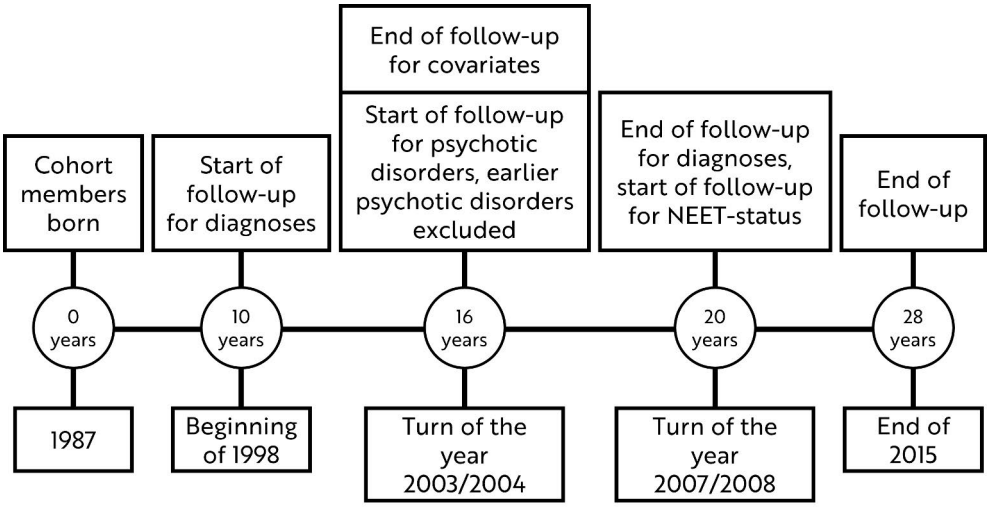

Figure 3. Timeline for Study II.

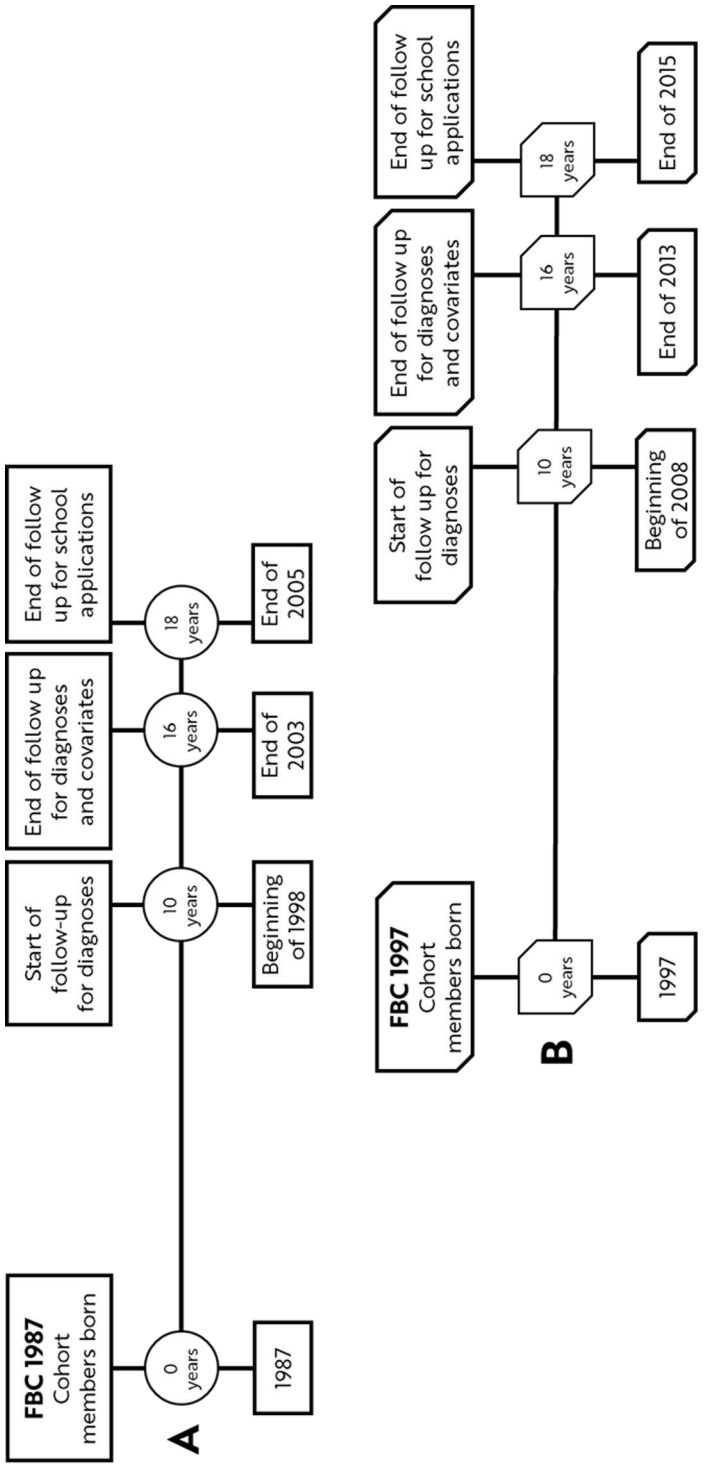

Figure 4. Timeline for Study III. Timeline A describes the 1987 birth cohort and B the 1997 birth cohort.

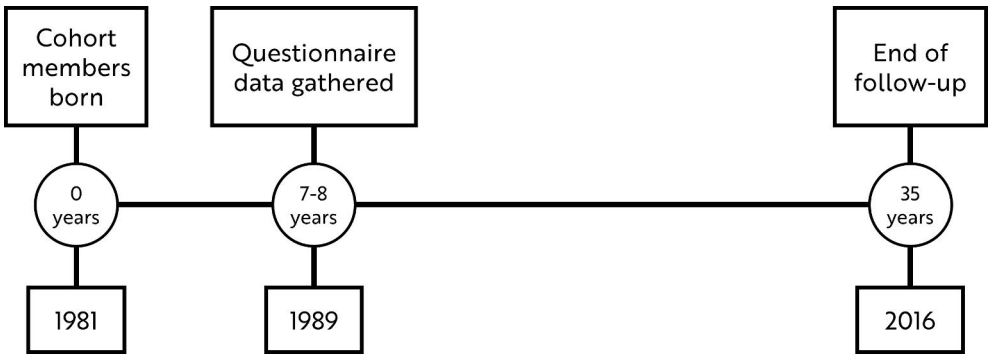

Figure 5. Timeline for Study IV.

4.2.1 Long-term NEET

Although NEET is commonly used as an indicator of young people at risk of labour market marginalisation (Eurofound 2016; Gariepy & Iyer, 2016; Iyer et al., 2018), there have not been any cohort studies on the association between diagnosed psychiatric disorders and being NEET for several years. To study the association between psychiatric disorders and long-term exclusion from the labour market we used a parameter that we call long-term NEET.

Long-term NEET is defined as "when none of these criteria were fulfilled for at least five years between 2008–2015: working, studying, being on parental leave or taking part in jobseekers' programmes" (Study 1). The subjects were 20–28 years old during those years. Working was defined as having a salary that contributed to a pension scheme. This information came from the Earnings Register of the Finnish Centre for Pensions. Studying was defined as receiving student benefits. Being on parental leave was defined as receiving childcare benefits. Long-term NEET was used as the outcome in Studies I and II.

4.2.2 Psychiatric and neurodevelopmental disorders

Diagnoses of psychiatric and neurodevelopmental disorders were recorded during visits to specialised health care services according to the International Classification of Diseases, 10th Revision (ICD-10). They were divided into diagnostic categories, as shown in Table 3. One person could have several diagnoses. Outpatient data existed from 1998 onwards. Only inpatient data could be used before that date. The reporting of outpatient visits was incomplete in 12 of the 21 hospital districts during the first years after the extension. Diagnoses were used as predictors in Studies I (diagnoses recorded during 1998–2007) and III (1998–2003 and 2008–2013) and as terms of categorisation and as covariates in Study II (1998–2003). To make sure that the studied changes in Study III were not biased by incomplete registers in the earlier

cohort, we excluded subjects who lived in the hospital districts with incomparable data.

Table 3. Categorisation of diagnoses.

Label of diagnostic group	More detailed description of diagnostic group	ICD-10 code
Any psychiatric or neurodevelopmental disorder	Intellectual disability excluded, cerebral palsy and impairments of vision or hearing not included	F10-F69 and F80-F99
Substance abuse		F10-F19
Psychosis	Non-affective psychotic disorders	F20-F29
Bipolar disorder	Bipolar disorder and mania	F30-F31
Depressive disorders	Unipolar and unspecified affective disorders	F32-F39
Anxiety disorders	Neurotic, stress-related and somatoform disorders	F40-F48
Eating disorders		F50
Personality disorders		F60-F61
Learning disabilities	Speech, scholastic and coordination disorders	F80-F83
Autism spectrum disorders		F84
ADHD	Attention-deficit/hyperactivity disorders	F90
Conduct disorder	Includes oppositional defiant disorder	F91, F90.1

4.2.2.1 Service use for psychotic disorders

In Study II, a psychotic disorder referred to a diagnosis of a non-affective psychotic disorder from 2004 to 2007, when the subjects were aged 16 to 20. The studied diagnoses were the ICD-10 codes of F20–F29. Both primary and secondary diagnoses made by either specialised inpatient units or outpatient clinics were included.

In the sub-group that had been diagnosed with any psychotic disorder, we analysed relevant clinical characteristics that have previously been associated with adverse labour market outcomes (Holm et al., 2021). We considered the relevant clinical characteristics to be a diagnosis of schizophrenia (ICD-10 F20) or schizoaffective disorder (ICD-10 F25), treated as an inpatient for a psychotic disorder, and having been diagnosed with any psychotic disorder before the end of the year they turned 18.

4.2.2.2 Severe mental illness

A severe mental illness of the parent was defined as inpatient treatment with a psychiatric main diagnosis before the end of follow-up. This was used as a covariate in Studies I and II.

4.2.3 Childhood psychiatric symptoms

Psychiatric symptoms at the age of 8–9 were assessed through questionnaires in Study IV. The parents completed the Rutter's parent questionnaire (RA2) (Rutter et al., 1970), and the teacher completed the Rutter's teacher questionnaire (RB2) (Rutter, 1967). Each questionnaire has three subscales. The conduct scale includes questions about stealing, lying, aggression, and defiance. The hyperactivity scale deals with restlessness, distractibility, and inattention. The emotional scale inquires about shyness, withdrawal, and anxiety. The subjects filled in the Children's Depression Inventory (CDI) themselves. The CDI comprises 27 items and measures depressive symptoms (Kovacs, 1992). The core research committee decided to not use a question concerning suicidal ideation. It was not considered to be ethical to ask 8-year-old children a question about suicidal ideation in a classroom setting without a possibility to discuss it with an adult.

The scores from the parent and teacher subscales were combined and formed the conduct, hyperkinetic, and emotional scales we used. The depressive scale was based on what the child reported. Because the possible scores on the scales were different for the parents and the teachers, the scales were standardised. The final scales gave the same weight to each informant (Gyllenberg et al., 2011). Standardisation was done separately for boys and girls. If information was not available for both a parent and the teacher, the final scale was not generated. To make the scales more easily interpretable, the results were divided into three categories: below the 50^{th} percentile, between the 50^{th} and 90^{th} percentile, and above the 90^{th} percentile. The cut-off points were sex specific.

4.2.4 Educational attainment

The main outcome in Study III was applying for upper secondary education. The cohort members turned 16 in 2003 and 2013, respectively. We counted applications from those years and from the two following years to allow for late starts or finishes of the education. Not having applied for upper secondary education during any of these three years was counted as dropping out from school.

Not getting a diploma from upper secondary education was used as a covariate in Studies I and II. The age for a person to receive a diploma, if they progressed through school at the expected pace, was 18–19 years old. As with the application

for upper secondary education, we took into account graduations until the end of the year the participants turned 21. This was done to allow for slower progressions through education.

In Study IV, educational attainment was summarised into three categories according to the education system described earlier: compulsory education, upper secondary education, and post-secondary education.

4.2.4.1 School grades

In Study II, school grades were used as a covariate. The register only included school grade data for cohort members who had applied for upper secondary education through the National Joint Application Procedure. The grades were registered in 2003, when most cohort members completed their compulsory education. If grades were not registered in 2003, we applied grades from 2004, where available, to compensate for a late start or finish of education. The register includes the average grade of the theoretical school subjects. We coded this average grade into the following groups: 1. average or above average, 2. below average, 3. missing. The grades were counted as below average, if they were -1.5 standard deviations (SD) below the average.

4.2.4.2 Parental education

Parental educational attainment was summarised into three categories according to the education system described earlier: compulsory education, upper secondary education, and post-secondary education. Parental educational attainment was a covariate in all the studies. In Studies I–III, the educational level was based on the parent with the highest level of education, and in Study IV it was presented separately for each parent. Some further analyses were done with only maternal educational level as a variate. This choice was made to increase clarity as the number of variates was so big in the study.

4.2.5 Child protection

Placement in out-of-home care by the child protection agency at the latest during the year the cohort members turned 16 was used as a covariate in Study II and as a secondary predictor in Study III.

4.2.6 Rehabilitation

Study II considered rehabilitation. It was defined as financial rehabilitation support from the Social Insurance Institution of Finland, which has the aim of increasing employability. The type of rehabilitation was specified as either vocational rehabilitation, psychotherapy, or other.

4.2.7 Family structure

Parents were defined as married in Studies II and III if they were in an unbroken marriage for the whole of the follow-up period. Others were considered not married.

In Study IV, family structure was based on with whom the child lived in 1989, when the child was 8–9 years old. It was either with both biological parents or a different constellation.

4.3 Statistical methods

We used R statistical software, version 3.4.0 (R Foundation for Statistical Computing, Vienna, Austria) for the analyses in Studies I–III and SAS 9.4 software in Study IV.

4.3.1 Study I

Logistic regression was used to quantify the association between psychiatric and neurodevelopmental disorders in adolescence and long-term NEET in early adulthood. We first used univariate models to study each predictor separately. Then, we examined the independent effects of the disorders by using multivariate models that included one diagnostic category at a time and the covariates.

4.3.2 Study II

We started by comparing the proportions of different labour market outcomes and the socioeconomic and psychiatric factors. The participants were stratified according to psychosis status.

Due to the binary outcomes, we used logistic regression for the statistical modelling for the association between having been diagnosed with a psychotic disorder and being long-term NEET. We studied one predictor at a time. We calculated the various interactions separately to compare the associations between the covariates and being long-term NEET among those with, and without, a diagnosis of a psychotic disorder. To address multiple testing, we applied the

Bonferroni correction to the results. This meant that we divided the p-value of <0.05 that we had chosen as the limit for significance with the number of tests we did, which was 15. The new limit for significance was then p<0.0033.

4.3.3 Study III

Due to the binary outcomes, we used logistic regression for the statistical modelling of the association between the disorders and educational attainment. First, we studied one predictor at a time in univariate models. Second, we examined the independent effects of the disorders by using multivariate models that included one diagnostic category at a time and the relevant covariates.

To study the change in proportions of dropping-out of school across the cohorts, we calculated the additive interaction. Additive interaction is commonly seen as the most appropriate method of estimating the public health importance of interactions as it can indicate if a risk factor is of more importance in one subpopulation than in another (Knol & VanderWeele, 2012). As a measure of additive interaction, we used the relative excess risk due to interaction, RERI. This is calculated as: $RERI_{RR}=RR_{11}-RR_{10}-RR_{01}+1$. RR stands for risk ratio. RR_{11} is the risk ratio with both risk factors present, RR_{10} the risk ratio with only the first risk factor present, and RR_{01} the risk ratio when only the second factor is present (Zou, 2008).

4.3.4 Study IV

Logistic regression was used to calculate the association between the characteristics and educational attainment. First, we used univariate models to study one predictor at a time. Second, we studied the independent effects of the characteristics through multivariate models that included all the characteristics.

We explored whether psychopathology or low school performance at the age of 8 would be mediators of the association of educational attainment of the mothers and the subjects. This was also done using logistic regression. First, we studied the association between the educational attainment of the mothers and the subjects, then between the educational attainment of the mother and the potential mediators one at a time, and then between the potential mediators and the educational attainment of the subjects. Finally, we used a multivariate model to calculate the association between the educational attainment of the mothers and the subjects with the potential mediators as covariates.

To examine if there was a difference in the associations between the sexes, we calculated the interaction separately for each of the characteristics and the sex.

5 Results

5.1 Sociodemographic characteristics

The sociodemographic characteristics of the cohorts are presented in Table 4. Around half of the participants were male and half female. More than a third of the members of the 1987 and 1997 cohorts had at least one parent who had received welfare support. It was even more common in the 1997 than in the 1987 birth cohort. When we compare the sociodemographic characteristics of the 1997 birth cohort with the earlier cohorts, we can also see that the parents of the 1997 cohort were more highly educated.

5.2 Diagnosed psychiatric and neurodevelopmental disorders and long-term NEET (Study I)

In Study I, one in six of the cohort members had been NEET for at least one year. A smaller group, 1,438 (2.6%), had been outside of the labour market for at least five years (see Figure 6). The proportion of being NEET increased towards the end of the 2008–2015 follow-up.

Of those who were long-term NEET (n=1,438), 65.1% were male and 65.0% had not got a diploma from upper secondary school. On the other hand, of those who had not completed upper secondary education (n=9,339), 10.0% were later long-term NEET. Of the cohort members with long-term NEET status (n=1,435), 13.5% had parents with low educational attainment, 55.4% had parents who had received welfare support, and 21.3% had parents who had been hospitalised for a psychiatric disorder. All associations between the sociodemographic factors and being long-term NEET status were statistically significant ($p<0.001$). Not having finished upper secondary education, with an odds ratio (OR) of 10.1 with a 95% confidence interval (CI) of 9.0–11.2, had the highest effect size.

Of the cohort members, 6,005 (10.9%) had been diagnosed with a psychiatric or neurodevelopmental disorder when they were 10–20 years old during the period 1998–2007. Of these, 43.4% were male. Substance use disorders,

neurodevelopmental disorders, and conduct disorders were more common among male subjects than among females.

Table 4. Sociodemographic characteristics.

	STUDY I N=55,273	STUDY II, NO PSYCHOSIS N=54,883	STUDY III, 1987 N=25,421	STUDY III, 1997 N=32,025	STUDY IV N=5,416
Sociodemographic characteristic	n (%)	n (%)	n (%)	n (%)	n (%)
Male	28,450 (51.5)	28,281 (51.5)	13,620 (53.6)	17,087 (53.4)	2,665 (49.2%)
No upper secondary education diploma	9,339 (16.9)	9,106 (16.6)	NA	NA	483 (8.9)
School grades					
Average or higher	NA	49,109 (89.5)	NA	NA	NA
Low	NA	3,925 (7.2)	NA	NA	NA
Missing	NA	1,849 (3.4)	NA	NA	NA
Out-of-home care by child protection	NA	1,455 (2.7)	538 (2.1)	335 (1.0)	NA
Parent received welfare support	20,386 (36.7)	19,964 (36.4)	9,340 (36.7)	13,283 (41.5)	NA
Parent diagnosed with severe psychiatric illness	6,288 (11.4)	5,847 (10.7)	NA	NA	NA
Parents not married[1]	NA	27,385 (49.9)	12,823 (50.4)	13,603 (42.5)	821 (15.2%)
Parental education[2]					
Compulsory	4,238 (7.7)	4,086 (7.4)	2,188 (8.6)	651 (2.0)	1,453 (26.8%)
Upper secondary	24,107 (43.6)	23,974 (43.7)	10,690 (42.1)	10,285 (32.1)	2,350 (43.4%)
Post-secondary	26,928 (48.7)	26,823 (48.9)	12,543 (49.3)	21,089 (65.9)	1,531 (28.2%)

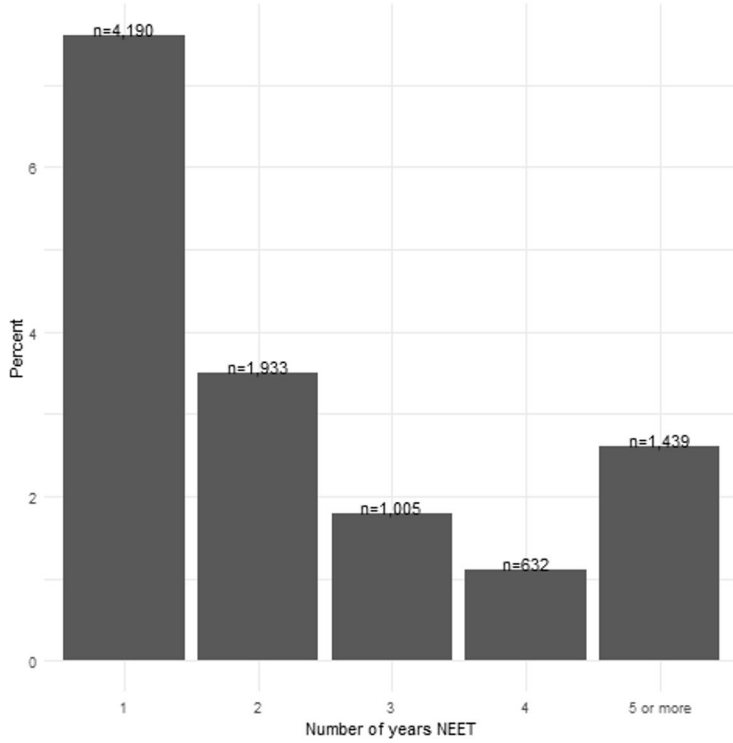

Figure 6. Proportion and number of cohort members outside of education, employment, and training for different various lengths of time when they were 20–28 years old.

Of those who were long-term NEET as young adults (n=1,438), 633 (44.0%) had been diagnosed with a psychiatric or neurodevelopmental disorder in adolescence. The most common diagnoses in this group were depressive disorders (20.1%, n=290) and anxiety disorders (16.6%, n=238). On the other hand, the diagnostic categories with the highest proportion of people with long-term NEET status were autism spectrum disorder (44.0%, 55 out of 125) and psychotic disorder (36.5%, 148 out of 405). This is about 15 times the proportion of the full cohort.

In the univariate analysis, the association between having been diagnosed with any psychiatric or neurodevelopmental disorder in adolescence and being long-term NEET in young adulthood had an odds ratio of 7.1 (95% CI 6.4–7.9). When we included the sociodemographic covariates parental education, welfare support and parental severe mental illness, as well as the subjects' sex, the odds ratio was only slightly moderated to 6.7 (95% CI 6.0–7.5). The highest effect sizes for long-term NEET in the multivariate models were for autism spectrum disorder (OR 27.2, 95% CI 18.7–39.3) and psychotic disorder (OR 22.4, 95% CI 18.0–27.9). The associations were statistically significant for all diagnostic categories ($p<0.001$) (see Figure 7).

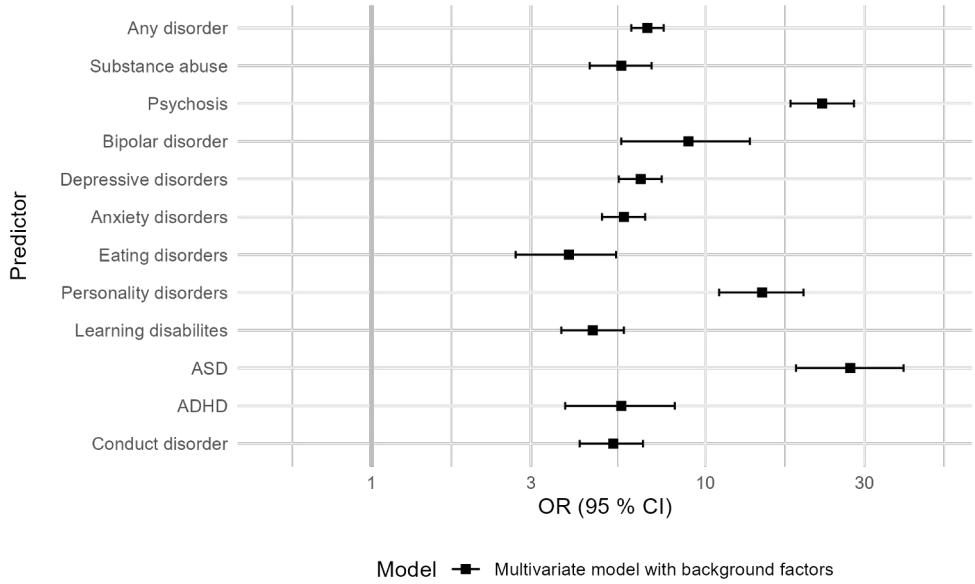

Figure 7. Psychiatric or neurodevelopmental diagnoses in adolescence in relation to long-term NEET status in young adulthood. Results of multivariate analyses with the following factors included as covariates: parental education, parent received welfare support, parent with severe mental illness, and sex. The odds ratios (OR) and 95% confidence intervals (CI) are presented on a logarithmic scale. All associations are statistically significant at p<0.001.

5.3 Psychotic disorders and long-term NEET (Study II)

Being a student, having work, and being on parental leave was less common among those diagnosed with psychotic disorders than among the rest. The 288 cohort members who had been diagnosed with psychotic disorders were more likely to have taken part in jobseekers' programmes (47.9%) than those without a psychotic disorder (36.2%).

Nearly two-thirds (65.6%) of those diagnosed with a psychotic disorder had been NEET for at least one year, and over a third (35.8%) had been NEET for at least five years. The same numbers for those diagnosed with schizophrenia or schizoaffective disorder were 84.9% and 57.0%, respectively. These numbers were much higher than the 16.4% and 2.2% for those cohort members without a diagnosis of a psychotic disorder.

All studied sociodemographic factors, except for male sex, were more common in the group diagnosed with a psychotic disorder than in the rest of the cohort. Of those diagnosed with a psychotic disorder, over half (58,3%) had a parent who had received welfare benefits (see Figure 8). In the group with psychotic disorders who had been long-term NEET, 12.6% had not even applied for upper secondary

education and 78.6% had not finished upper secondary education by the end of 2008, when they were 20–21 years old.

The comorbidities of those diagnosed with a psychotic disorder were substance use disorder (20.4%), depressive disorder (57.3%), learning disability (8.7%), autism spectrum disorder (4.9%), and conduct disorder (11.7%). We found no significant association between these comorbidities and being long-term NEET. Despite the lack of a significant association, those diagnosed with both a psychotic disorder and a learning disability were most likely to be long-term NEET (60.0%).

There was a statistically significant association among those without a diagnosis of psychosis between long-term NEET and all the sociodemographic factors and psychiatric and neurodevelopmental disorders that were studied ($p<0.001$). The variables were chosen from the known risk factors for labour market marginalisation in the general population (Lallukka et al., 2019) or for unfavourable functional outcomes for people with a psychotic disorder (Gardner et al., 2019; Holm et al., 2021; Käkelä et al., 2017; Merikukka et al., 2018; Morgan et al., 2017; Rinaldi et al., 2010).

Among those with a psychotic disorder, the odds ratio for being long-term NEET was 2.7 (95% CI 1.1–6.5, $p<0.05$) for those who had not applied for upper secondary education, 4.0 (95% CI 2.3–7.0, $p<0.001$) for those who did not have a diploma from upper secondary education, and 1.7 (95% CI 1.1–2.8, $p<0.05$) for those with parents on welfare benefits. No significant associations between the other sociodemographic characteristics and being long-term NEET were observed among those with a psychosis diagnosis.

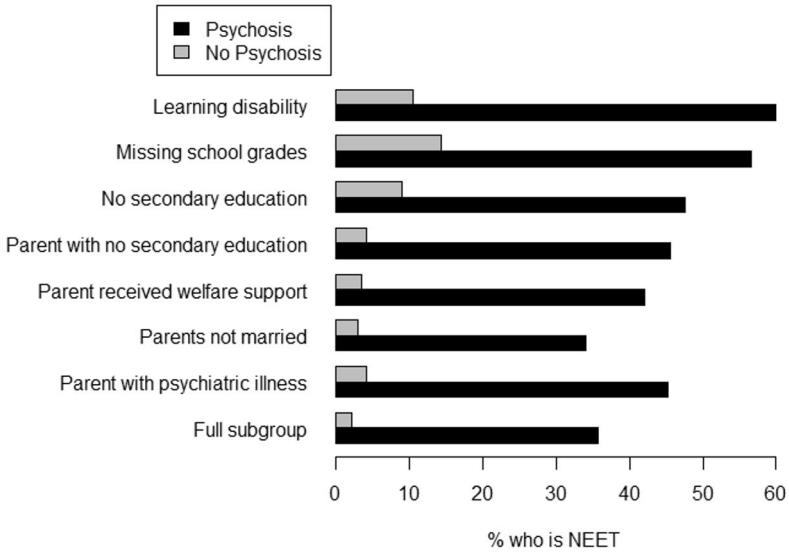

Figure 8. Proportion (%) who were long-term NEET separately for those with and without a history of psychosis.

There was an interaction with $p<0.05$ between having been diagnosed with a psychotic disorder and having been placed in out-of-home care by the child protection agency ($p<0.001$), not having applied for upper secondary education ($p=0.0032$), not having finished upper secondary education ($p=0.0029$), parents not being married ($p=0.01$), and the comorbidities other than eating disorders and learning disabilities. When we applied the Bonferroni correction, only out-of-home care, not having finished education, and the comorbidities were significant. The association between these factors and being long-term NEET were much weaker for those diagnosed with a psychotic disorder than in the rest of the cohort.

We conducted three separate univariate analyses to study the associations between factors and long-term NEET among those diagnosed with psychotic disorders. The odds ratio for long-term NEET was 3.6 (95% CI 2.1–6.2, $p<0.001$) for those with schizophrenia or schizoaffective disorder versus any other diagnosis of non-affective psychosis. The odds ratio was 2.9 (95% CI 1.7–5.0, $p<0.001$) for those who had been treated as inpatients in a psychiatric hospital versus those who had not been hospitalised. There was no statistical difference between those diagnosed in 2004–2005 (age 16–18) and those diagnosed in 2006–2007 (age 18–20).

Only 36.8% of those diagnosed with a psychotic disorder received rehabilitation funded by The Social Insurance Institution of Finland. Vocational rehabilitation was the most common form of funded rehabilitation, provided in 70 (24.3%) of the cases. Only 8.0% received rehabilitative psychotherapy, and 11.8% had received other types of rehabilitation.

5.4 Temporal changes in school dropout (Study III)

The percentage of the cohort members who did not apply for upper secondary education before the end the year they turned 18 was 2.0% (n=511) in the 1987 cohort and 1.6% (n=499) in the 1997 cohort.

We observed that 2,064 (8.1%) of those born in 1987 and 2,440 (7.6%) of those born in 1997 had been diagnosed with a psychiatric or neurodevelopmental disorder when they were 10–16 years old. The most common diagnoses were learning disabilities (n=526) in the 1987 cohort and anxiety disorders (n=738) in the 1997 cohort. Those with autism spectrum disorder was the diagnostic category with the largest change in the number of diagnosed people. More than three times as many diagnoses were made among those in the 1997 cohort than in the 1987 cohort (229 vs. 67).

Of the cohort members who had been diagnosed with a psychiatric or neurodevelopmental disorder, 80 (3.9%) in the 1987 cohort and 116 (4.8%) in the 1997 cohort dropped out of school before the start of upper secondary education.

Among those who had been placed in out-of-home care, 20 dropped out of school in the 1987 cohort and 15 in the 1997 cohort (5.9% vs. 4.5%). The most common diagnoses among those who dropped out were depressive disorders in the 1987 cohort (n=23, 4.5%) and learning disabilities in the 1997 cohort (n=53, 10.6%). In both cohorts, those with autism spectrum disorder was the diagnostic group with the largest proportion of individuals who dropped out of school (13 out of 67, 19.4%, in the 1987 cohort, 37 out of 229, 16.2%, in the 1997 cohort) (see Figure 9).

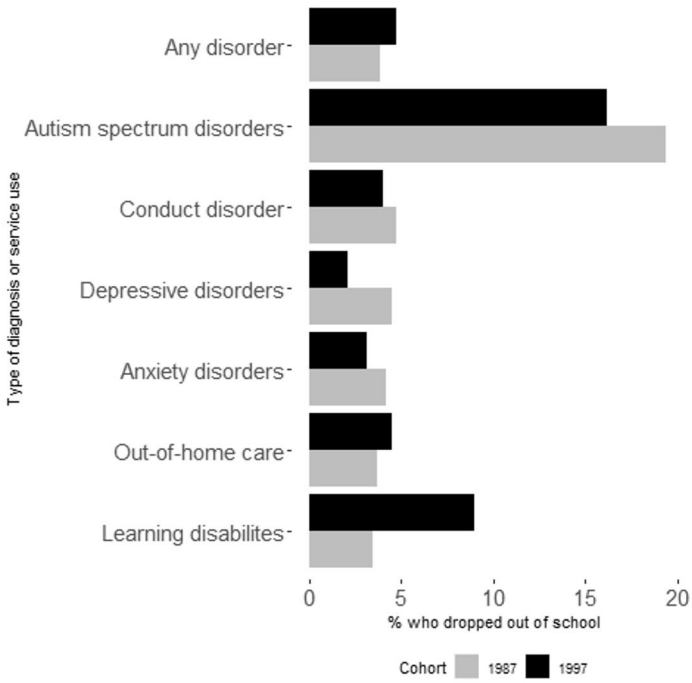

Figure 9. Proportions who dropped out of school of those with a psychiatric diagnosis.

The biggest difference in the number of people who dropped out of school in the two cohorts was among those with learning disabilities. Almost three times as many dropped out of school in the 1997 cohort compared to the 1987 cohort (53 vs. 18), although the number of diagnosed cases only changed slightly (591 vs. 526). The p-value for the relative excess risk due to interaction was <0.001. The only other category where a significant change happened was among those with depression. In this group the number of people who dropped out of school halved between the 1987 and 1997 cohorts (23 vs. 12, 4.5% vs. 2.1%). The p-value for the relative excess risk due to interaction was 0.03.

In the multivariate analyses with sociodemographic characteristics for the 1987 cohort, there was a statistically significant association between all studied psychiatric

or neurodevelopmental diagnoses and dropping out of school. In the 1997 cohort, the associations were significant for all diagnostic categories except depressive disorders. The associations between any psychiatric or neurodevelopmental diagnosis and dropping out of school was stronger in the 1997 cohort (OR 2.2, 95% CI 1.7–2.8, p<0.001 for 1987, OR 3.7 95% CI 2.9–4.5, p<0.001 for 1997 in the multivariate analyses). In both cohorts, the association was strongest between autism spectrum disorder and school dropout (OR 13.5 95% CI 7.0–24.4, p<0.001 for 1987, OR 12.4 95% CI 8.4–17.8, p<0.001 for 1997 in the multivariate analysis).

5.5 Childhood psychiatric symptomatology and educational attainment (Study IV)

At the age of 35 years, 8.9% of the participants in the study had completed primary education, 44.8% had completed upper secondary education, and 44.8% post-secondary education. High educational attainment was more common among female participants than among males.

Of those with a mother with only compulsory education, 14% completed only compulsory education, while 4% completed only compulsory education of those with a mother with a post-secondary degree. The corresponding number for those with fathers with only compulsory education was 14%, and 5% for those with fathers with a post-secondary degree. Of those living with two biological parents, 8% completed only compulsory education compared with 16% of those with another family constellation.

Of those with below average school performance, 19% completed only compulsory education. The corresponding number for those with above average school performance was 5%.

Of those with conduct problems in the highest percentile, 19% completed only compulsory education. This number was similar for hyperactivity: 21%. Of those with emotional or depressive problems in the highest percentile, 14% completed only compulsory education.

All the sociodemographic variables were associated with educational attainment at age 35 in the multivariate analyses. The odds ratio for having finished only compulsory education compared with having a post-secondary degree was 2.9 for males compared to females (95% CI 2.2–3.6, p<0.001).

When having a mother with only compulsory education compared to a mother with a post-secondary degree, the odds ratio for having only compulsory education compared to having a post-secondary degree was 3.0 (95% CI 2.1–4.2, p<0.001). The corresponding number for a father with only compulsory education compared to one with a post-secondary degree was 3.2 (95% CI 2.3–4.5, p<0.001).

For those who performed below average compared to those who performed above average, the odds ratio for having only compulsory education compared to having a post-secondary degree was 5.4 (95% CI 3.7–7.9, p<0.001).

The symptom questionnaire scores in 1989 were all associated with educational attainment at age 35 in the multivariate analyses. The pattern for the emotional scale was different from the rest of the scales, with odds ratios below 1 (see Figure 10).

We compared those with psychiatric symptoms in childhood in the highest decile to those in the lowest half. The odds ratio for having finished only compulsory education compared to having a post-secondary degree was 3.5 (95% CI 2.4–5.3, p<0.001) for those with severe conduct problems, 2.4 (95% CI 1.6–3.6, p<0.001) for those with severe hyperactivity, and 1.6 (95% CI 1.1–2.3, p=0.02) for those with severe depressive symptoms.

There was no significant association when comparing having emotional symptoms in the >90% group or the 0–50% group and education in the highest or lowest category. However, there was a significant association between having symptoms in the highest decile compared to the lowest decile and having a diploma from upper secondary compared to having a post-secondary degree. The odds ratio was 0.7 (95% CI 0.5–0.9, p<0.01).

When estimating potential mediating effects of the association between the educational attainment of the mothers and the subjects, the odds ratios decreased between 1.4 and 6.4% when potential mediators, such as psychopathology and school performance, were added to the model. This suggests no clear mediating effects.

Conduct problems were associated with educational attainment for males on all levels of education. For females, the associations were significant only when comparing some of the subgroups. The odds ratio for having only the lowest level of education compared with the highest for those with scores on the conduct scale in the >90% group compared to those with scores in the 0–50% group was 3.4 (95% CI 1.9–6.2, p<0.001) for males and 3.5 (95% CI 2.0–6.3, p<0.001) for females.

Hyperactivity was associated with educational attainment for males on all levels of education. For females, the association was significant only for those with scores in the highest decile and when comparing having a degree from upper secondary education and a post-secondary degree. The odds ratio for having only the lowest level of education compared to the highest for those with scores in the highest decile compared to those with scores in the lowest half was 3.6 (95% CI 1.9–6.6, p<0.001) for males and 1.6 (95% CI 0.9–2.8, p=0.1) for females.

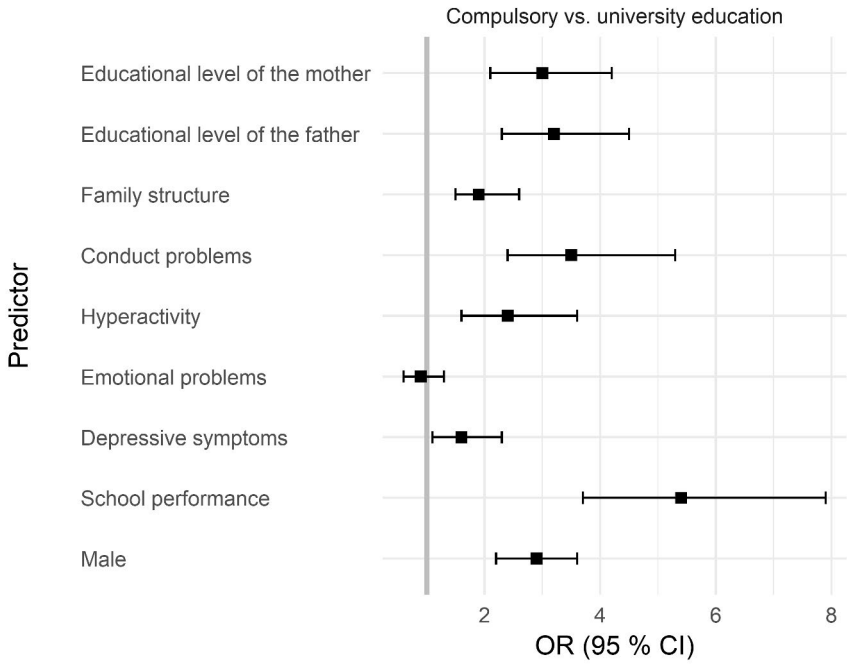

Figure 10. Multivariate analysis showing the association between characteristics at 8–9 years of age and educational level by 35 years of age.

6 Discussion

1. Our main finding was strong associations between all main psychiatric diagnostic categories in adolescence and long-term NEET in young adulthood.

    - The strongest associations were found for psychotic and autism spectrum disorders. In these groups, long-term NEET was around 15 times as prevalent as in the full cohort. More than a third of the cohort members who had been diagnosed with a psychotic disorder in adolescence were long-term NEET in young adulthood.

2. The associations between psychiatric and neurodevelopmental disorders diagnosed in adolescence and long-term NEET status were independent of sociodemographic factors.

3. The proportion of those diagnosed with a psychiatric or neurodevelopmental disorder in early adolescence (age 10–16 years) who dropped out of school before starting upper secondary education increased between the 1987 and 1997 cohorts.

    - In both cohorts as many as one in six of those diagnosed with an autism spectrum disorder did not apply for upper secondary education.

4. Psychiatric symptoms in childhood were associated with lower educational attainment as far in the future as at the age of 35 years.

    - This was independent of the educational attainment of the parents or the family structure. Of the psychiatric symptoms, the association was especially clear for conduct problems among boys.

6.1 Labour market outcomes of adolescents with psychiatric and neurodevelopmental disorders

The findings of strong associations between diagnosed psychiatric and neurodevelopmental disorders in adolescence and long-term NEET status in young adulthood are in line with previous research. They confirm that the well-known association between psychiatric disorders and labour market marginalisation (Gardner et al., 2019; Gjerde et al., 2014; de Groot et al., 2021; Helgesson et al., 2018; Holm et al., 2021; Iyer et al., 2018; Löve et al., 2016; Majuri et al., 2023; Merikukka et al., 2018; Morgan et al., 2017; Mykletun et al., 2006; Ostby et al., 2014; Thorlacius et al., 2010; Torvik et al., 2016; Veldman et al., 2015) can be traced back to adolescence. The novelty of this study is that this association was not studied only for some diagnoses of interest; rather, strong associations were found between being long-term NEET and all major psychiatric diagnostic categories. This shows the significance of both common disorders, such as depressive or anxiety disorders, and of rarer but severe psychiatric disorders, such as psychotic disorders, when discussing labour market marginalisation.

Although the association between diagnosed psychiatric and neurodevelopmental disorders and labour market marginalisation is strong, the majority of those who were long-term NEET in our studies had not been diagnosed with any psychiatric or neurodevelopmental disorder in adolescence. There are of course other factors that are associated with labour market marginalisation besides psychiatric and neurodevelopmental disorders, such educational attainment and parental socioeconomic status (Lallukka et al., 2019). In addition, some might have fallen ill later, and some might have had an undiagnosed or untreated disorder or remained outside the specialised psychiatric system. As more disorders have been diagnosed during recent years (Atladottir et al., 2015), these associations might change.

It is well known that psychotic disorders can have unfavourable labour market outcomes (Gardner et al., 2019; Holm et al., 2021; Käkelä et al., 2017; Merikukka et al., 2018; Morgan et al., 2017; Rinaldi et al., 2010). Specific rehabilitation programmes, such as the IPS, have been developed to tackle this issue, and there is evidence of how they improve the outcomes (Bond et al., 2020). Still, only one in four of those that had been diagnosed with a psychotic disorder had received vocational rehabilitation.

6.1.1 Role of sociodemographic factors and comorbidities

The associations between psychiatric and neurodevelopmental disorders in adolescence and long-term NEET status were surprisingly independent of sociodemographic factors.

Those who had been diagnosed with a psychotic disorder, had learning difficulties, and had not applied for or finished upper secondary education were more often NEET later in life than those with a diagnosis but no recorded problems with education. The association between non-completion of upper secondary education and NEET status of young people with a psychotic disorder has been reported previously (Iyer et al., 2018).

Substance use disorders (Holm et al., 2021), female sex, parental divorce, and parental psychiatric disorder (Merikukka et al., 2018) have previously been associated with poor labour market outcomes for people with schizophrenia, but we could not verify this. The only sociodemographic factor that we studied that was associated with long-term NEET status among people with a psychotic disorder was parental welfare benefits. This association has been found earlier, as well (Merikukka et al., 2018). Psychiatric disorders in adolescence have been found to be a potential partial mediator of intergenerational transmission of social disadvantage, especially need of welfare benefits (Dobewall et al., 2023).

The results of previous studies on the outcomes of early-onset psychosis, that is a first psychosis during adolescence, have been mixed (Majuri et al., 2023). We could not find any difference in the outcomes of psychosis between before and after the age of 18, but people with a diagnosis of a psychotic disorder before the year they turned 16 were excluded.

As the associations that have been found have been independent of sociodemographic factors, the findings support the social selection theory (Chen & Kaplan, 2003). The reason for the association could be that the disorder itself makes studying more difficult and decreases the capacity of the individuals especially during critical developmental periods (Haas et al., 2011). It could also be because of loss of social capital because of stigma—these two theories are not mutually exclusive (Thomas et al., 2015).

6.2 Educational attainment of children and adolescents with psychiatric problems

These findings add to the knowledge of the association between psychiatric problems in childhood and adolescence and educational attainment (see Table 1). As many earlier studies have only looked at the association between psychiatric disorders in adolescence and high school dropout (Askeland et al., 2022; Fletcher, 2008; 2010;

Fletcher & Wolfe, 2008; Needham, 2009; Reinholdt Jensen et al., 2023; von Simson et al., 2022), our findings expand the knowledge both through exploring associations from childhood until middle adulthood and by looking at problems in very early education, before upper secondary school.

Earlier studies have also shown that externalising disorders probably have a stronger association with educational attainment than internalising disorders (Erskine et al., 2016; Pingault et al., 2011; McLeod et al., 2012; Meißner et al., 2022; Moilanen et al., 2010). One previous study reported that the association between attention-deficit/hyperactivity disorder and school dropout could have been due to low academic ability (Esch et al., 2014). In our study, the association between the hyperactivity scale, which included inattention, and educational attainment remained significant when controlling for school performance.

To our knowledge, temporal changes in the association between dropping out from school early and psychiatric and neurodevelopmental disorders have not been studied previously. The increase in the diagnosis of autism spectrum disorder, for example, did not change the proportion who dropped out from school. An increase in labour market marginalisation of young people has not been registered in other studies either (Eurofound, 2016).

6.2.1 Role of sociodemographic factors

The associations that we found between psychiatric symptoms in childhood and later educational attainment were independent of the educational attainment of the parents. This was important as studies about psychiatric problems and educational attainment have often not taken into account parental educational attainment (Erskine et al., 2016).

The association between conduct problems or hyperactivity and educational attainment was especially strong for boys in our study. This was in line with previous studies, which have shown similar gender differences (Esch et al., 2014).

6.3 Methodological considerations

6.3.1 Study design

Birth cohort studies have many strengths. Mainly, registers do not suffer from attrition bias. Finnish national registers have also been shown to cover the population well. The main strengths of the studies in this thesis were the sizes of the cohorts and the length of the follow-up. The large size made it possible to study even rare events. The long follow-up made it possible to study long-lasting courses in life. Another

strength was that we were able to link many registers to the cohorts. As these studies were prospective, there was no recall bias.

In Study IV, we had a rare opportunity to combine data from different sources, both registers and questionnaires. Diagnostic interviews would have given even better information on the disorders of the participants, but using questionnaires made it possible to include a large number of people. We also used three different informants to get a wide view of the challenges of the participants.

Register studies also have methodological weaknesses that need to be considered. Although the registers contained a lot of information, administrative registers only hold certain data, so some aspects related to educational attainment and labour market marginalisation could not be covered. Cognitive capacity, for example, could only be estimated through crude measures such as school performance. Further, epidemiological studies can never explain the reasons for associations or provide definite solutions.

6.3.2 Register data on diagnoses

In Studies I–III, only cases diagnosed by specialist health care services could be analysed. Diagnoses from primary health care, learning difficulties identified by teachers, and undiagnosed psychiatric problems could not be accounted for. This means that the cases analysed here have been moderate to severe. The diagnostic validity of some disorders, such as autism (Lampi et al., 2010) and schizophrenia (Pihlajamaa et al., 2008), in the Care Register for Health Care have been shown to be good, but it has not been studied for all psychiatric disorders. Outpatient data were available from 1998 onwards, which means that childhood diagnoses were missing, and we had to focus on adolescence in Studies I–III. It is also known that the data on diagnoses was incomplete in some health care districts during the first years of the outpatient register. For the time-trends to not be affected in Study III, we excluded the hospital districts with incomplete data.

As diagnoses made in a specialised health care setting have been the main predictors in most studies, results should not be generalised to undiagnosed or mild psychiatric disorders.

One challenge in this thesis is the poor definition of the concept of marginalisation in the literature (Morgan et al., 2007). Because of the register-based method, there was no way of finding out if those who we defined as being “long-term NEET” felt marginalised or not. We constructed our own definition of labour market marginalisation, long-term NEET, which has not been used before. Our decision to count participation in jobseekers’ programmes as training and therefore not being NEET could be questioned. We made this choice as people who took part in these programmes were actively engaged in society and not totally marginalised.

6.3.3 Other considerations

The results in Study IV are based on questionnaires, which is not the same as diagnoseable disorders.

In all the studies, sex was used as a covariate. In Study IV, interactions were calculated separately for each of the characteristics and the sexes. For those characteristics where a difference in the associations between the sexes was found, separate analyses were conducted for girls and boys. These additional analyses were not done in the other studies. Having the sexes pooled together made it possible for us to maximise the study groups and, through that, the statistical power. Not studying the sexes separately could still be considered a weakness as the labour market is segregated by gender in Finland (Teräsaho et al., 2023).

Generalisations to other countries should also be made with caution due to differences in health care and rehabilitation services, social benefits, education systems, and labour markets.

6.4 Ethical considerations

Sustainability is import in science today. Using existing data, as has been done in this thesis, is an economically sustainable way of doing research. Partly due to most of this project having been done during the Covid-19 pandemic, travel has been limited, which is environmentally sustainable. The topic is related to the sustainable development goals of good health and wellbeing, quality education, decent work and economic growth, and reduced inequalities (United Nations, 2015).

Data protection is crucial in all studies with human subjects. In register studies, the data need to be pseudonymised and handled according to data protection legislation and regulations. Informed consent is not required in register studies where the included individuals are not contacted.

When designing studies with questionnaire data, possible reactions of the subjects to the questions should be considered. In Study IV a question about suicidal ideation was excluded from the Children's Depression Inventory. The question was not considered to be to be ethical to ask young children in school without a possibility to discuss it with an adult.

The results in Study III, where we found that more than three times as many were diagnosed with autism spectrum disorder in the 1997 cohort compared to the 1987 cohort, but the proportion who applied for secondary education remained the same, raises a question about ethical diagnostics. Although identification of young people with autism spectrum disorder has improved, rehabilitation has apparently not, at least if the studied outcome is educational attainment. Is it ethical to diagnose disorders if we do not provide treatment or rehabilitation that improve the outcomes

of those diagnosed? How can we make sure that psychiatric and neurodevelopmental disorders are not only diagnosed, but that evidence-based treatment and rehabilitation is available? It would be important to make sure that there are resources for identification, treatment, and rehabilitation of psychiatric and neurodevelopmental disorders because any one of these aspects is not enough by itself.

7 Conclusions

We found clear, independent associations both between psychiatric symptoms in childhood and educational attainment and between the main psychiatric diagnostic categories in adolescence and long-term NEET status in young adulthood. In terms of marginalisation, the impact of sociodemographic factors seems to be smaller among those with a psychotic disorder than in the general population.

We showed that there is a strong association especially between neurodevelopmental disorders and both early school dropout and long-term NEET status in young adulthood. Some findings concerning young people with autism spectrum disorder, are alarming: about one in six did not apply for upper secondary education, and of those who did not finish upper secondary education, more than two out of three were long-term NEET. Unfortunately, the trend was negative when comparing those born in 1987 and 1997.

7.1 Practical implications

These findings show that children and adolescents with psychiatric problems are at risk of low educational attainment and labour market marginalisation. This could help identify young people at risk for marginalisation. Clinicians and teachers need to know that boys with conduct problems, and adolescents with psychosis or a neurodevelopmental disorder are especially vulnerable groups.

Causal relationships or interventions have not been studied. Even so, the findings suggest that high-quality psychiatric services for children and adolescents, including prevention, early intervention, social services, and rehabilitation, should be considered central in the strategy to fight labour market marginalisation. The service system needs to make sure that neurodevelopmental disorders are not only diagnosed, but that children and adolescents with these disorders are supported in schools and through specific rehabilitation to be able to finish their education. A combination of inclusive and targeted strategies could reduce individual problems and the societal costs of marginalisation.

On the individual level, this could mean training teachers on how to support children and adolescents with neurodevelopmental disorders. Early evidence-based

interventions such as parental training programmes (Dretzke et al., 2009) should be used in health care settings. Cooperation between child and adolescent psychiatry, adult psychiatric services, social services, and schools would be useful. Rehabilitation needs to be provided for a larger proportion of those with psychotic disorders. The individual placement and support model for vocational rehabilitation, or aspects of it, might also be useful for adolescents **(**Bond et al., 2020; Charette-Dussault & Corbière, 2019; Ellison et al., 2023).

7.2 Future studies

These studies point out issues around educational and labour market outcomes for young people with psychiatric and neuropsychiatric disorders. Intervention studies to develop evidence-based solutions are needed to provide evidence-based solutions. Both universal and targeted interventions should be studied. Universal interventions could, for example, focus on reducing stigma or creating inclusive learning environments. Targeted interventions could focus on developing psychiatric services, educational support for children and adolescents with psychiatric or neurodevelopmental problems, and rehabilitation. As parental training programmes have been found to be efficient in reducing conduct problems (Dretzke et al., 2009), studying their long-term effects on educational attainment could be a good place to start. The challenge is that the follow-up times in these kinds of studies would need to be several years to measure the outcome of completion of upper secondary education, and even longer if tertiary education or employment needed to be studied. Design and recruitment for this would be challenging.

Future research could investigate possible modifiers of the relationship between psychiatric disorders and educational attainment or employment. Genetic studies could be used to look for a common cause for psychiatric disorders and educational attainment or low socioeconomic position.

Studies in other countries could provide further information about the issue, as societal differences might affect the results.

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