



# Internalising and externalising problems during adolescence and the subsequent likelihood of being Not in Employment, Education or Training (NEET) among males and females: The mediating role of school performance

Stephanie Plenty<sup>a,b,\*</sup>, Charlotta Magnusson<sup>a</sup>, Sara Brodin Låftman<sup>c</sup>

<sup>a</sup> Swedish Institute for Social Research, Stockholm University, 106 91, Sweden

<sup>b</sup> Institute for Futures Studies, Box 591, Stockholm, 101 31, Sweden

<sup>c</sup> Department of Public Health Sciences, Stockholm University, 106 91, Sweden

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## ABSTRACT

Mental health problems are associated with a greater risk of being Not in Employment, Education or Training (NEET) during young adulthood. Yet evidence on the extent to which self-reported mental health problems precede males' and females' NEET status and on the potential pathways linking mental health problems to NEET is lacking. This study examines the longitudinal associations that internalising and externalising problems during adolescence share with the risk of being NEET in young adulthood, with a focus on the mediating role of school performance. Data comes from a representative sample of 4,452 Swedish youth (51% females) who provided information on internalising and externalising problems at age 14–15 years. Information on secondary school grades (age 15–16 years), completion of upper secondary school (age 20–21 years) and NEET status at 21–22 years were drawn from administrative registers. Overall, 6% of participants were NEET at 21–22 years of age and rates were higher for those who had internalising and externalising problems at age 14–15 years. A series of gender-stratified multivariate regression models showed that for both genders, greater internalising and externalising problems predicted lower school grades and a reduced likelihood of upper secondary school completion. However, externalising problems were associated with an increased risk of being NEET for males, while internalising problems were associated with a higher likelihood of being NEET for females. The effects of externalising and internalising problems for males and females, respectively, were partially mediated by school performance. The findings indicate that mental health problems in adolescence are associated with exclusion from the labour market and education in early adulthood, but that internalising and externalising problems represent different risks for males and females. Furthermore, school performance in comprehensive and upper secondary school helps explain links between mental health problems and subsequent NEET status.

## 1. Introduction

Young adulthood is a pivotal phase of life characterised by major transitions as youth enter adulthood through various education and employment pathways. A concerning number of young adults are Not in Employment, Education or Training (NEET), with an OECD average of 15% among 20- to 24-year-olds in 2019 (varying between 6 and 33% across countries) (OECD, 2020a). Many young adults who are NEET are struggling to transition to employment or further education beyond secondary school and are at increased risk of ongoing difficulties in

adulthood (Bäckman & Nilsson, 2016; InternationalLabourOffice, 2015; Ralston et al., 2016). Numerous studies show that NEET youth are more likely to have concurrent mental health problems than youth who are studying or working (e.g., Gariépy & Iyer, 2019; Goldman-Mellor et al., 2016; Henderson et al., 2017). However, the extent to which mental health problems precede NEET status, and the types of mental health problems that present most risk among males and females remains unclear.

Previous research has identified links between mental health problems during adolescence and adverse educational and labour market

\* Corresponding author. Swedish Institute for Social Research, Stockholm University, 106 91, Sweden.

E-mail address: [stephanie.plenty@sofi.su.se](mailto:stephanie.plenty@sofi.su.se) (S. Plenty).

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outcomes in adulthood (for a systematic review and meta-analysis see Hale et al., 2015). For example, poor mental well-being in adolescence is associated with lower educational attainment (Låftman & Magnusson, 2017; Melkevik et al., 2016), lower wages (Evensen et al., 2017), long term welfare benefits (Homlong et al., 2015), sick-leave (De Ridder et al., 2015), and a higher risk of unemployment (Egan et al., 2015). However, little research has investigated the longitudinal associations between mental health problems and NEET status among representative samples of the population. Of those studies that do exist, earlier indicators of poor mental health, such as psychological distress, disruptive behaviour, and illicit substance use do indicate an increased risk of being NEET in early adulthood (Cornaglia et al., 2015; Goldman-Mellor et al., 2016; Hale & Viner, 2018; Rodwell et al., 2018; Veldman et al., 2015).

Mental health problems during adolescence are commonly conceptualised as comprising two dimensions, externalising and internalising problems. Externalising problems refer to symptoms directed outside, towards others in the environment, such as aggressiveness and conduct problems, while internalising symptoms are directed inwards, such as feeling sad or anxious (e.g., Bongers et al., 2003; Leadbeater et al., 1999). Compared to internalising problems, externalising problems have been more strongly linked with educational and employment disadvantage in adulthood (Evensen et al., 2016; Melkevik et al., 2016; Veldman et al., 2015). Moreover, the consequences of internalising problems are not necessarily negative. In a study of Norwegian youth, Evensen et al. (2016) initially found no significant relationship between internalising problems in adolescence and subsequent educational attainment. However, this association became positive after adjusting for conduct and attention problems. Yet other studies have demonstrated negative effects of internalising problems on subsequent education and labour market attachment, beyond the effects of externalising problems (e.g., McLeod & Kaiser, 2004; Rodwell et al., 2018; Veldman et al., 2017).

To our knowledge, only two studies have examined how different mental health problems relate to the subsequent risk of NEET in community samples of young adults. In a Dutch study, Veldman et al. (2015) reported an increased risk of being NEET at age 19 from having high externalising problems across adolescence but no significant effects from trajectories of internalising or attention problems. Rodwell et al. (2018) found that Australian youth who had persistent emotional disorder symptoms or disruptive behaviour from 16 to 17 years of age were at increased risk of being NEET in young adulthood. However, both studies measured NEET status using participants' self-reports at survey completion and controlled for a limited range of self-reported socio-demographic characteristics. Thus, the findings do not differentiate youth in shorter NEET spells from those who are long-term NEET, and may underestimate the effects of earlier sociodemographic disadvantage, not least due to missing data or measurement error from adolescents' self-reports on family socioeconomic positioning (Engzell & Jonsson, 2015).

### 1.1. School performance as a mediating pathway

A better understanding of the mechanisms through which mental health problems may lead to NEET status is also needed. The negative associations between mental health problems and school performance are well-documented (Hale et al., 2015; Mikkonen et al., 2020; Vaezghasemi et al., 2020). However, findings for externalising problems are more consistent than for internalising symptoms (e.g., Evensen et al., 2016). Although the associations may be reciprocal (Lê et al., 2013), internalising and externalising problems could impede students' capability to appropriately engage with school and learning tasks through for example, absenteeism, insufficient planning, persistence or social engagement. Furthermore, NEET status is predicted by lower school performance, in terms of lower school grades (Britton et al., 2011; Duckworth & Schoon, 2012) as well as early school leaving (OECD, 2020b). However, no previous studies have examined low school

performance as a mechanism through which mental health problems translate to a greater risk of being NEET. McLeod and Fettes (2007) found that inverse associations between internalising and externalising problems in early childhood and high school completion were largely due to academic failures in middle and high school. However, the link between externalising problems and subsequent college enrolment was not accounted for by academic failure (McLeod & Fettes, 2007). Yet secondary school grades have been shown to account for associations between psychological complaints and later enrolment in tertiary education (Låftman & Magnusson, 2017), and between concentration difficulties and later occupational prestige (Magnusson & Låftman, 2019). Considering that adolescence is often when mental health problems arise and is also a period when important educational milestones and choices occur, the pathways through which mental health problems may lead to NEET status via educational achievement and attainment require further investigation.

### 1.2. The role of gender in links between mental health problems, school performance and NEET status

On average, internalising problems are more common among females than among males, while males experience externalising problems to a larger extent than females (Bongers et al., 2003; Rosenfield & Smith, 2010). Externalising problems are typically perceived as connected with the male gender role stereotype, and internalising problems with female stereotypes of socially acceptable behaviour. As problems that are less characteristic of one's own gender could be more stigmatising (cf. Rosenfield, 1982), it is possible that externalising problems may be more problematic for females' school performance or NEET status than internalising problems. Likewise, internalising problems may present greater risks for males than externalising problems if characteristics such as being withdrawn or nervous are less socially acceptable for males. However, the role of gender in how different types of mental health problems relate to educational outcomes and labour market attachment have rarely been investigated and existing findings are mixed. Cornaglia et al. (2015) found that among girls, emotional and behavioural problems at age 14–15 years were each associated with poorer grades, while among boys, primarily behavioural problems were associated with school grades. Furthermore, emotional problems at age 14–15 years were associated with girls' but not boys' likelihood of being NEET. However other studies have found that internalising problems were more strongly associated with boys' secondary school incompleteness (McLeod & Kaiser, 2004) and Rodwell et al. (2018) found no significant gender differences in how emotional or behavioural problems during adolescence related to later NEET status.

### 1.3. The current study

An understanding of the extent to which different types of mental health problems precede NEET status among males and females, and of the potentially mediating role of school performance in the pathways from mental health problems to NEET is lacking. Using survey and register data that follows a nationally representative sample of Swedish youth from secondary school to early adulthood, we ask if internalising and externalising problems during adolescence contribute to the likelihood of being NEET in young adulthood. The possibility that different types of mental health problems present different risks among males and females is addressed by examining both internalising and externalising problems and by applying gender stratified analyses. To further understanding of the pathways leading to NEET, we ask if school grades and educational attainment mediate the associations between mental health problems and NEET status. To discern the effects of mental health problems on subsequent NEET status as far as possible from family background and previous performance, confounding due to socio-demographic characteristics and cognitive ability is controlled for. We address the following three research questions:

- 1) Are internalising and externalising problems in adolescence associated with the likelihood of being NEET in early adulthood among males and females?
- 2) Are internalising and externalising problems associated with school performance among males and females?
- 3) If so, are the associations between internalising and externalising problems in adolescence and the subsequent likelihood of being NEET mediated by school performance?

## 2. Material and methods

### 2.1. Participants

Data comes from the Swedish part of the Children of Immigrants Longitudinal Survey in Four European Countries (CILS4EU, [www.cils4.eu](http://www.cils4.eu)). The project is designed with a focus on young people's living conditions that are important for integration and well-being (Kalter et al., 2013). The current study is based on respondents ( $n = 5,025$ , 49% males and 51% females) who participated at wave 1 during the 2010/11 school year while in grade 8 (~14–15 years of age). Students were from 251 classes in 129 schools. We study mental health problems at wave 1, school grades at the completion of grade 9 (~15–16 years of age), completion of upper secondary school by summer 2016 (~20–21 years of age) and NEET status in 2017 (~21–22 years of age). This study thus covers pivotal periods for Swedish youth, as the ninth grade is the final year of comprehensive school and these grades determine eligibility to and choice of upper secondary school. Most students transition to upper secondary school, which typically comprises of three years. If following a "traditional" trajectory, participants would have completed upper secondary school by summer 2015.

Statistics Sweden (the national government statistics agency) collected the wave 1 data using a two-step stratified cluster sampling approach. Schools across Sweden were randomly selected, oversampling immigrant dense schools. Within each school, two randomly drawn classes, and then all students in them, were invited to participate. Official survey weights are used to adjust for sample design and non-response. Over 90% of schools and 86% of students participated.

Data collection was approved by the Regional Ethics Committee of Stockholm, and students and their parents provided informed consent. At wave 1 students completed a self-report questionnaire and a cognitive ability test during lesson time. They were informed that participation was voluntary and that their responses were anonymous. Parents also completed postal questionnaires, which were used to complement student reports on immigrant background. Information on school grades, completion of upper secondary school, as well as study and employment activities were drawn from administrative registers. Register data was also used to generate measures of family sociodemographic background. Survey data is available at [www.gesis.org](http://www.gesis.org) (ZA5353 data file).

### 2.2. Measures

#### 2.2.1. NEET

Participants who were employed or studying according to tax and education registers during 2017 were identified. Participants who received any study allowance during the year or who were enrolled in any type of education at the beginning of the academic year were categorised as studying. To identify employed youth, an income measure was used that represents all employment or entrepreneurial related earnings (including parental leave), excluding income from other sources, such as unemployment or disability benefits. The Swedish government uses a measure called Price Base Amounts (PBA) to calculate benefits for social insurance and PBAs are adjusted to the Consumer Price Index. Consistent with previous studies on NEET (e.g., Bäckman & Nilsson, 2016; Manhica et al., 2018), participants whose registered income was at least a half PBA (22,400 SEK ≈ 2500 USD) were categorised as having had employment. As this amount is well below the lowest

full-time salary in 2017 (240,000 SEK ≈ 29,000 USD), this cut-off minimised the possibility of categorising youth who were precariously employed or temporarily unemployed as NEET. A dichotomous variable was generated to indicate participants who were active in education and/or employment (0) versus those who were neither education or employment, NEET (1).

#### 2.2.2. Mental health problems

The measures of internalising and externalising problems were developed for CILS4EU and are based on commonly used indicators of mental well-being among youth, with good reliability and validity (e.g., Achenbach, 1991; Haugland & Wold, 2001; Ravens-Sieberer et al., 2008). These scales are used to gauge youth's general self-reported well-being and are not intended to identify clinical levels of mental health problems.

**Internalising problems.** Participants indicated how often they experience feeling the following psychological and somatic symptoms: worried, depressed, anxious, worthless, headaches, stomach aches or difficulties falling asleep. Response options were along a 4-point scale ranging from "never" to "often" for the first four symptoms and "never" to "often/every day" for the latter three symptoms (Cronbach's alpha = 0.81). These items fall under a single higher-order factor with excellent model fit ( $\chi^2 = 142.60$ ,  $df = 11$   $p < .05$ ; CFI = 0.99; RMSEA = 0.049; Cronbach's alpha = 0.81) and have been used to measure internalising symptoms in earlier studies (e.g., Alm & Låftman, 2017; Mood et al., 2016). A mean score was calculated for participants who had answered at least four items. To identify varying severity of internalising symptoms, a categorical variable was then generated that represented participants with *low* (lowest quartile), *moderate* (second and third quartiles) and *high symptoms* (highest quartile). The categorical measure is presented in the main analyses and the continuous measure was used in sensitivity tests.

**Externalising problems.** Participants reported how often they had damaged property, stolen from a shop or someone, truanted from school lessons, received school punishments, or argued with the teacher in recent months along a 5-point scale ranging from "never" to "daily". These items show excellent model fit as one latent factor ( $\chi^2 = 92.05$   $df = 5$ ,  $p < .05$ ; CFI = 0.96; RMSEA = 0.059; Cronbach's alpha = 0.69) and have been used to measure externalising symptoms in earlier studies (e.g., Mood et al., 2016; Plenty, 2018). Due to the skewed distribution of responses, for those completing at least three items, a three-category measure of externalising problems was created, indicating (a) none or infrequent involvement, (b) regular involvement (monthly to daily) in one type of behaviour, and (c) regular involvement in two or more types of behaviours.

#### 2.2.3. School performance

**Secondary school grades.** Participants' school grades from the final year of secondary school (9th grade) represented school achievement. In Sweden, these grades are summed to reflect the total of students' 16 best subjects. Scores range from 0 to 320, with higher scores reflecting higher achievement. This measure was standardised across the total sample to ease interpretation of the coefficient.

**Completed upper secondary school.** This variable represented educational attainment, indicating whether participants had yet to complete upper secondary school (0), versus had graduated by summer 2016 (1).

#### 2.2.4. Control variables

Information on all control variables are drawn from wave 1. Gender was coded as male (0) or female (1).

Age represented participants' age in years.

**Cognitive ability** was measured using a timed pattern recognition test (see Weiß, 2006) and scores were standardised across the total sample.

**Immigrant background.** Data came from student-reports, complemented with parent-reports in the case of student nonresponse.

Participants were categorised as having a non-immigrant background if they were the biological or adoptive child of at least one Swedish-born parent, consistent with the definition used by Statistics Sweden. First generation immigrants included youth born abroad to foreign-born parents and second generation immigrants included participants born in Sweden to two foreign-born parents. A three-category measure of immigrant background was created that represented non-immigrant background (0), second generation immigrant (1) and first generation immigrant (2).

*Parental education* indicated the highest level of education attained by participants' registered guardians. Information was drawn from official registers and included seven categories ranging from less than secondary education to doctoral studies.

*Household disposable income* was the total post-tax income of participants' guardians according to tax registers. If guardians lived in different households, the average of their incomes was used. Due to the skewed distribution of incomes, this measure was divided into quintiles.

*Family structure* was a dichotomous variable representing participants who reported living with both parents (0) and those with other living arrangements (e.g., birth parents live separately) (1).

### 2.3. Analytical approach

Stata 16 (Stata Corporation, 2017) was used for all analyses. Register data on school performance, study or employment activities was unavailable for 92 participants. Register data on household income and parental education was missing for a further 47 participants and 434 participants were missing information on at least one self-reported variable (approximately 10% were only missing information on one item). We considered using multiple imputation with chained equations (MICE) to maximise statistical power and limit potential bias from non-response. However, as findings were largely identical, results from the non-imputed data are presented using an analysis sample of  $n = 4452$  (89% of the original sample).

To evaluate the potential mediating role of school performance, we were guided by Baron and Kenny's (1986) recommended steps. First, we identified if there were associations between mental health problems and school performance. We then identified if there were associations between mental health problems and NEET status, then tested if these associations attenuated when including the school performance variables within the same model (indicative of mediation). However, as this approach is not optimal for comparing nested nonlinear probability

models, we also applied the KHB method, which is designed for binary outcomes (Kohler et al., 2011). This enabled us to calculate the proportion of the effects from mental health problems that were mediated by school performance in the full model.

The role of mental health problems in school performance was examined by using OLS regressions for secondary school grades and logistic regressions for upper secondary school completion. Crude (univariate) models tested the unadjusted associations that internalising and externalising problems shared with each indicator of school performance. Model 1 tested the mutually adjusted effects of internalising and externalising problems and all control variables. For upper secondary school completion, Model 2 additionally included school grades.

The role of mental health problems and school performance in NEET status was examined by using logistic regression models. Crude models tested the unadjusted associations that internalising and externalising problems and the school performance variables shared with NEET status. Model 1 examined the effects of internalising problems and all control variables, while Model 2 tested the effects of externalising problems and all control variables. Model 3 tested the mutually adjusted effects of internalising and externalising problems (and all control variables). Model 4 added school grades and completion of upper secondary school (model used in KHB analyses).

All regression models were gender-stratified and used survey weights, with standard errors adjusted for the clustering of participants within wave 1 school classes. The results for logistic regressions are presented in terms of average marginal effects because these are less influenced by omitted variables and unobserved heterogeneity, and can be more intuitively interpreted and compared across models or groups than odds ratios (see Mood, 2010).

## 3. Results

### 3.1. Descriptive statistics

Table 1 shows the descriptives of all variables for the analytical sample. Table 2 shows the (weighted) rates of mental health problems and the school performance variables according to NEET status and gender. Here we see that at age 21–22 years, 5–6% of young adults were NEET during 2017. However, a slightly higher proportion of males than females were NEET. For both males and females, those who had low internalising problems or multiple externalising problems during adolescence had the highest prevalence of NEET status. Particularly

**Table 1**

Descriptive statistics of the analytical sample (unweighted data,  $n = 4,452$ ).

Variable	%	Variable	%
<i>NEET status</i>	5.64	<i>Control variables</i>	
<i>Mental health problems</i>		Gender	
Internalising problems <sup>a</sup>	.77 (.57)	Male	49.06
Low	26.21	Female	50.94
Moderate	52.83	Age <sup>a</sup>	14.03 (.26)
High	20.93	Cognitive ability <sup>a</sup>	17.69 (4.86)
Externalising problems		Immigrant background	
None	74.84	Majority population	67.97
One behaviour	14.42	2 <sup>nd</sup> generation immigrant	20.75
> one behaviour	10.74	1 <sup>st</sup> generation immigrant	11.28
<i>School performance</i>		Parental education <sup>a</sup>	4.34 (1.44)
Secondary school grades <sup>a b</sup>	217.28 (60.16)	Household disposable income	
Completed upper secondary school		Lowest quintile	18.94
No	26.50	Second	19.52
Yes	73.50	Third	20.15
		Fourth	20.24
		Highest quintile	21.16
		Family structure	
		Intact	66.85
		Separated	33.15

Note: <sup>a</sup> Continuous variable – mean and standard deviation presented before standardisation or quartiling.

**Table 2**  
Summary of mental health problems and school performance for NEET status and by gender (weighted data).

	Whole sample (n = 4452)		Males (n = 2184)		Females (n = 2268)	
	Active %	NEET %	Active %	NEET %	Active %	NEET %
NEET status	94.52	5.48	93.97	6.03	95.07	4.93
Internalising problems <sup>a</sup>	.78 (.01)	.88 (.05)	.61 (.50)	.67 (.52)	.93 (.59)	1.10 (.60)
Low	95.13	4.87	94.17	5.83	97.17	2.83
Moderate	94.90	5.10	94.28	5.72	95.54	4.46
High	92.81	7.19	91.99	8.01	93.13	6.87
Externalising problems						
None	95.58	4.42	96.03	3.97	95.17	4.83
One behaviour	92.22	7.78	89.80	10.20	95.32	4.68
> one behaviour	90.10	9.90	87.45	12.55	93.78	6.22
Secondary school grades <sup>a b</sup>	.13 (.91)	-.59 (1.12)	-.04 (.91)	-.78 (1.09)	.30 (.87)	-.36 (1.11)
Completed upper secondary school						
No	85.71	14.29	84.47	15.53	87.24	12.76
Yes	97.16	2.84	97.22	2.78	97.10	2.90

Note: <sup>a</sup> Continuous variable – mean (standard deviation) presented; <sup>b</sup> Standardised values shown.

**Table 3**  
Associations between mental health problems and school performance (weighted data).

	Secondary school grades <sup>a</sup>		Completed upper secondary school <sup>b</sup>		
	Crude	Model 1	Crude	Model 1	Model 2
Males, n = 2184					
Internalising problems					
Low	Ref.	Ref.	Ref.	Ref.	Ref.
Moderate	-.11 (.06)*	-.02 (.04)	-.00 (.02)	.03 (.02)	.04 (.02)
High	-.40 (.10)***	-.20 (.09)*	-.15 (.03)***	-.10 (.04)**	-.06 (.03) <sup>+</sup>
Externalising problems					
None	Ref.	Ref.	Ref.	Ref.	Ref.
One behaviour	-.37 (.06)***	-.22 (.05)***	-.13 (.03)***	-.09 (.03)**	-.05 (.03) <sup>+</sup>
> one behaviour	-.86 (.11)***	-.48 (.08)***	-.27 (.04)***	-.16 (.04)***	-.07 (.04) <sup>+</sup>
School grades	–	–	.20 (.01)***	–	.17 (.01)***
Females, n = 2268					
Internalising problems					
Low	Ref.	Ref.	Ref.	Ref.	Ref.
Moderate	-.01 (.06)	-.04 (.05)***	-.01 (.03)	-.01 (.03)	.01 (.03)
High	-.48 (.07)***	-.29 (.06)***	-.17 (.03)***	-.12 (.03)***	-.07 (.03)*
Externalising problems					
None	Ref.	Ref.	Ref.	Ref.	Ref.
One behaviour	-.48 (.08)***	-.31 (.08)***	-.13 (.04)***	-.08 (.03)*	-.02 (.03)
> one behaviour	-.83 (.08)***	-.51 (.08)***	-.20 (.04)***	-.07 (.03)*	.01 (.03)
School grades	–	–	.18 (.01)***	–	.16 (.01)***

Note: <sup>a</sup> OLS regression coefficients; <sup>b</sup> Average marginal effects based on logistic regressions.

Clustered standard errors presented in parentheses; Crude – Only independent variable; Model 1 - internalising and externalising problems, all control variables; Model 2 - All control variables, internalising and externalising problems and school grades; \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ ; <sup>+</sup> $p < .07$ .

striking, was the difference in rates of NEET between males with one or multiple externalising problems and those with none. For both genders, school grades were lower for NEET than active youth, and NEET status was substantially more prevalent among youth who had not completed upper secondary school than among those who had.

### 3.2. Associations between mental health problems and school performance

As seen in Table 3, the crude analyses show that for males and females, both types of mental health problems were significantly associated with lower school grades and a lower likelihood of completion of upper secondary school. For secondary school grades, although the estimates for internalising and externalising problems reduced after accounting for control variables and mutually adjusting for both types of mental health problems (Model 1), substantial and statistically significant associations remained. Students with high internalising symptoms (in the highest quartile) had school grades that were approximately one-fifth of a standard deviation lower than those with low internalising symptoms (in the lowest quartile), while the school grades of students with two or more externalising problems were half a standard deviation lower than students with no frequent behaviours. After adjusting for the

control variables and both types of mental health problems, males and females with high internalising problems were 10 and 12 percentage-points, respectively, less likely to have completed upper secondary school (Model 1). The risk from having two or more externalising problems for completion of upper secondary school was greater for males than females, 16 compared to 7 percentage-points. Higher school grades predicted a greater likelihood of completing upper secondary school for males and females (Model 2). See Supplementary files Table S1 for estimates for the control variables.

### 3.3. Associations from mental health and school performance to NEET status

As seen in Table 4, the crude analyses for males show that externalising problems but not internalising problems were associated with a greater likelihood of being NEET. Males who reported frequent externalising problems at age 14–15 years had a 6 to 9 percentage-point greater risk of being NEET at age 21–22 years than those who reported none. Higher school grades and the completion of upper secondary school were each associated a lower likelihood of being NEET at the bivariate level. Models 2 and 3 show that externalising problems continued to predict an increased likelihood of being NEET after

**Table 4**  
Associations from mental health and school performance to NEET status (average marginal effects presented). Weighted data.

	Crude	Model 1	Model 2	Model 3	Model 4
<b>Males, n = 2184</b>					
<i>Internalising problems</i>					
Low	Ref.	Ref.		Ref.	Ref.
Moderate	.00 (.01)	-.01 (.01)		-.01 (.01)	-.01 (.01)
High	.02 (.02)	.02 (.02)		.00 (.02)	-.01 (.02)
<i>Externalising problems</i>					
None	Ref.		Ref.	Ref.	Ref.
One behaviour	.06 (.02)*		.05 (.02)*	.05 (.02)*	.04 (.02)
> one behaviour	.09 (.03)**		.06 (.02)**	.06 (.02)*	.04 (.02)
<i>Secondary school grades</i>					
Completed upper secondary school	-.04 (.01)***				-.01 (.01)
Completed upper secondary school	-.09 (.01)***				-.07 (.01)***
<b>Females, n = 2268</b>					
<i>Internalising problems</i>					
Low	Ref.	Ref.		Ref.	
Moderate	.02 (.01)	.02 (.01)		.02 (.01)	.02 (.01)
High	.04 (.01)**	.03 (.02)*		.04 (.02)*	.03 (.01)
<i>Externalising problems</i>					
None	Ref.		Ref.	Ref.	Ref.
One behaviour	-.00 (.01)		-.01 (.01)	-.01 (.01)	-.02 (.01)
> one behaviour	.01 (.02)		-.00 (.02)	-.01 (.02)	-.02 (.01)
<i>Secondary school grades</i>					
Completed upper secondary school	-.03 (.00)***				-.02 (.01)**
Completed upper secondary school	-.10 (.02)***				-.05 (.01)***

Note: Clustered standard errors presented in parentheses; Crude – Only independent variable; Model 1 – Internalising problems and all control variables; Model 2 – Externalising symptoms and all control variables; Model 3 - Internalising and Externalising problems, all control variables; Model 4 - Internalising and externalising symptoms, all control variables, school grades, completion of upper secondary school; \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

adjusting for control variables and internalising problems. In Model 4 we see that having completed upper secondary school corresponds to a 7 percentage-point reduced risk of being NEET. The estimates for externalising problems attenuated (and turned non-significant) in this model, suggesting a mediating role of upper secondary school completion in the association between males' externalising problems and NEET status.

Turning to females, the crude analyses demonstrate that having internalising symptoms in the highest quartile at age 14–15 years corresponds to a 4 percentage-point increased risk of being NEET at age 21–22 years compared to having symptoms in the lowest quartile. The estimate for internalising problems remained largely unchanged when control variables and externalising problems were adjusted for (Models 1 and 3). Model 4 shows that a one-standard deviation increase in school grades corresponds to a 2 percentage-point reduced risk of being NEET and that completion of upper secondary school represents a 5 percentage-point lower risk of being NEET. The reduced estimate and significance for high internalising problems in Model 4 indicates a mediating effect of school performance for females. See Supplementary files [Table S2](#) for estimates for the control variables.

To further understand the findings from Model 4, (gender stratified) mediating analyses were performed using the KHB test. [Table 5](#) shows that for males, completion of upper secondary school mediated 13% and

23% of the effects of having one or more externalising problems, respectively, on NEET status. For females, school grades mediated 16% and completion of upper secondary school accounted for 17% of the effect of high internalising symptoms on NEET status.

### 3.4. Sensitivity analyses

Several sensitivity analyses (available upon request) were performed to ensure robustness of the findings. First, all analyses were re-run using the continuous internalising problems measure, with results similar to those presented. Second, analyses distinguishing between the somatic (e.g., headaches) and psychological symptoms (e.g., worried) showed that it was primarily the somatic symptoms driving the links between females' internalising problems and NEET status, and also the links from males' and females' internalising problems to lower school grades and attainment. Third, to address potential confounding due to unobserved school factors, school fixed effects were examined. These omitted approximately 40% of the analytical sample due to no within school variation in NEET status. Nevertheless, the findings were substantively similar to the ones presented (albeit with slightly stronger estimates for mental health problems).

**Table 5**  
Mediation effects of school performance in associations between mental health problems and NEET status.

Mediator	Secondary school grades			Completed upper secondary school	
	Total effect	Indirect effect	% mediated	Indirect effect	% mediated
<b>Males, n = 2184</b>					
<i>Externalising problems</i>					
None	Ref.	Ref.		Ref.	Ref.
One behaviour	.05 (.02)*	.00 (.01)	5%	.01 (.00)***	13%
> one behaviour	.07 (.02)**	.01 (.00)	9%	.01 (.00)***	23%
<b>Females, n = 2268</b>					
<i>Internalising problems</i>					
Low	Ref.	Ref.	Ref.	Ref.	
Moderate	.02 (.01)	.00 (.00)	2%	.01 (.00)	<1%
High	.04 (.02)*	.01 (.00)**	16%	.01 (.00)**	17%

Note: Clustered standard errors presented in parentheses; \*\* $p < .01$ ; \*\*\* $p < .001$ ; Each model includes internalising and externalising symptoms and all control variables, based on Model 4 in [Table 4](#).

#### 4. Discussion

This study examined if internalising and externalising problems during adolescence precede NEET status in young adulthood, and whether school performance can help explain links between mental health problems and the subsequent risk of being NEET among males and females. Using a nationally representative sample of Swedish youth, we found clear associations between mental health problems at age 14–15 years and the likelihood of being NEET at age 21–22 years. However, important gender differences were observed. For males, externalising problems were associated with the subsequent likelihood of being NEET and this association was mediated by upper secondary school completion. For females, internalising problems were associated with later NEET status, and this association was mediated by secondary school grades and upper secondary school completion.

The findings support prior research suggesting longitudinal associations between mental health problems in adolescence and later NEET status (Baggio et al., 2015; Cornaglia et al., 2015; Hale & Viner, 2018; Rodwell et al., 2018; Veldman et al., 2015). The current study also extends previous research by demonstrating how internalising and externalising problems each relate to NEET status and that patterns of association appear to depend on youth's gender. Although there are reasons to expect problems that are less characteristic of one's gender to be more detrimental than gender typical problems (cf. Rosenfield, 1982), we found that gender consistent mental health problems were associated with a higher risk of being NEET for both males and females. Studies that do not account for this gendered patterning may mask important processes. For both genders, the descriptive analyses showed elevated rates of NEET among both mental health problems. This raises questions about why internalising problems were not associated with NEET status among males and why externalising problems were not associated with NEET status among females in the predictive analyses. Internalising and externalising problems are unevenly distributed across gender (i.e. high internalising problems are less prevalent among males, and externalising problems are less prevalent among females), so the cell sizes were somewhat small, yet the small standard errors indicate that low statistical power is an unlikely explanation for the null findings.

The current findings are also in line with previous research indicating that mental health problems impede students' academic achievement (Hale et al., 2015; Mikkonen et al., 2020; Vaezghasemi et al., 2020). Among females and males alike, internalising and externalising problems were strongly associated with lower secondary school grades and the incompleteness of upper secondary school. However, the estimates for internalising problems were slightly stronger for females than males. Importantly, these associations were beyond those relating to sociodemographic disadvantage and lower cognitive ability. Thus, although reciprocal associations between mental health problems and educational outcomes are possible (Lê et al., 2013), our findings indicate that internalising and externalising problems relate to having poor grades and low educational attainment in the future. Despite previous findings suggesting that internalising problems may promote educational attainment after adjusting for the effects of externalising problems (Evensen et al., 2016), we observed no benefits for either school grades or attainment.

As in previous studies, poor school performance in terms of lower school grades and educational attainment showed strong associations with the subsequent likelihood of being NEET (Britton et al., 2011; Duckworth & Schoon, 2012; OECD, 2020b). However, a major contribution of this study was to examine grades and attainment as explanatory mechanisms through which mental health problems hamper educational and labour market participation. Completion of upper secondary school partially mediated the effect of males' externalising problems, with stronger mediation for multiple behaviours rather than one type. Secondary school grades and completion of upper secondary school partially mediated the effects of females' high internalising problems. Although secondary school grades showed either no (males)

or weak (females) direct associations with NEET status in the fully adjusted models, indirect pathways were observed through upper secondary school completion (results not shown). Thus, males' pathway to NEET status was via low grades and then incompleteness of upper secondary school, while school grades were both directly and indirectly relevant for females' pathway to NEET. These findings indicate that supporting students in their academic achievement already in secondary school is important.

Nevertheless, as a large proportion of the effects of mental health problems remained unaccounted for by grades and attainment, future studies should consider which factors can further explain pathways between mental health problems and NEET status. Perhaps mental health problems are related with other aspects of school functioning that are not adequately captured by grades or completion of upper secondary school, such as literacy difficulties. In addition, weakened goal development, social skills, or social capital in terms of beneficial peer social networks or parental involvement play a role. It is also conceivable that associations between mental health problems and subsequent NEET status differ by youth's social background. For example, studying whether mental health problems are particularly detrimental for youth of immigrant origin or with fewer socioeconomic resources is an important task for future research.

A key strength of the current study is the rich prospective data allowing us to follow youth across key educational transitions and into young adulthood while drawing on information from self-reports, register data and cognitive test scores. Furthermore, the nationally representative sample makes generalisations possible. Despite these strengths, there are also limitations. Firstly, our NEET measure represented youth without registered education or employment activities for the whole of 2017. As some participants classified as "active" may have experienced shorter spells of NEET, the current findings should be followed-up with studies based on shorter or recurring spells of NEET. Nevertheless, we are confident that our operationalisation of NEET targeted genuinely inactive youth, rather than inadvertently including youth in precarious situations who experienced brief periods of inactivity, which is more likely when shorter or undefined periods are used to define NEET. Nevertheless, youth who are studying or working but with weak attachments to their activity (e.g., failing courses, working few hours) tend to have worse concurrent mental well-being than youth in more secure study or work situations (Plenty et al., 2018). Future studies should go beyond the dichotomy of NEET versus "active" to identify if adolescent mental health problems are problematic only for the more extreme problem of inactivity, or also for gradients of success among young adults who are studying or working.

A second limitation is that the prevalence of NEET and selectivity of individuals into NEET is dependent on structural factors such as the school context, education system, employment rate, as well as local training and employment initiatives. Although our sensitivity tests using school fixed effects retained only a portion of the sample, the results were substantively similar to the ones presented. It is nevertheless of interest to test the robustness and broader generalisability of the current findings by examining the role of contextual factors and comparing different cohorts or cross-national samples.

Thirdly, despite the use of longitudinal and multiple-informant data we cannot claim that the observed associations are causal. Although cognitive ability and a range of sociodemographic background characteristics were accounted for, the possibility of omitted variable bias remains. Additionally, there may be mutually reinforcing processes in the relationships between mental health problems, school performance and NEET status. Although the findings point to mental health problems as a risk for NEET status, being NEET may also increase individuals' probability of experiencing mental health problems (e.g., Gariépy & Iyer, 2019; Goldman-Mellor et al., 2016; Henderson et al., 2017). Most likely mental health problems function both as a predictor of and a consequence of being NEET (cf. Power et al., 2015). To further disentangle the temporal ordering of this relationship and potential reciprocal effects, a

more dynamic approach is needed, with information on mental health problems, school performance and NEET status from several waves of data collection.

Finally, the current study examined self-reported mental health problems. While information about clinical diagnoses or treatment was not available, we propose that future longitudinal studies examine mental health diagnoses and the potential role of treatment for improving youth's educational and labour market outcomes.

## 5. Conclusions

The current study illustrates how mental health problems during adolescence may interfere with youth's educational transitions and pathways to secure positions on the labour market. Internalising and externalising problems in adolescence are associated with a greater likelihood of being NEET in the post-secondary school years but with different risks for males and females. Internalising and externalising problems are also associated with proximal (grades) and distal (attainment) school outcomes that can limit youth's future opportunities. To help increase youth's chances of favourable educational and labour-market trajectories, adolescents with mental health problems should be provided support to strengthen their comprehensive school grades and subsequent ability to complete upper secondary school. Although school performance is an important explanatory mechanism, it does not however exhaustively explain how mental health problems contribute to exclusion from education and employment in early adulthood.

## Ethical approval

The Regional Ethical Review Board, in Stockholm approved data collection for the CILS4EU project (Ref number 2010/1557-31/5). Students and their parents provided informed consent. Additional ethics approval for publications by researchers within the project who are approved by the principal investigator is not needed.

## Financial statement

There are no financial relationships between any of the authors and other people or organisations that may bias or influence this work.

## CRediT authorship contribution statement

**Stephanie Plenty:** Conceptualization, Writing – review & editing, Formal analysis, Project administration. **Charlotta Magnusson:** Conceptualization, Writing – review & editing. **Sara Brodin Låftman:** Conceptualization, Writing – review & editing.

## Declaration of competing interest

None.

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## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ssmph.2021.100873>.

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