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The role of low educational attainment on the pathway from adolescent internalizing and externalizing problems to early adult labour market disconnection in the Dutch TRAILS cohort

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ABSTRACT

Mental health challenges in adolescence may affect labour market transitions in young adulthood. Policies addressing early labour market disconnection largely focus on early school-leaving and educational attainment; however, the role of low educational attainment on the path from adolescent mental health to labour market disconnection is unclear. Using the TRacking Adolescents' Individual Lives Survey from the Netherlands (n = 1,197), we examined the extent to which achieving a basic educational qualification (by age 22) in the contemporary Dutch education system, mediates the effect of adolescent mental health (age 11–19) on early adult labour market disconnection, defined as 'not in education, employment, or training' (NEET, age 26). We estimated the total effect, the natural direct and indirect effects, and the controlled direct effects of internalizing and externalizing symptoms on NEET by gender. Among young men, clinical levels of adolescent externalizing symptoms were associated with a 0.093 higher probability of NEET compared with no symptoms (95% confidence interval, CI: 0.001, 0.440). The indirect effect through educational attainment accounted for 15.1% of the total effect. No evidence of mediation was observed for the relationship between externalizing symptoms and NEET in young women. No evidence of mediation was observed for the relationship between adolescent internalizing symptoms and NEET in either gender. The findings imply that adolescent externalizing symptoms disrupts the achievement of a basic educational qualification, leading to a higher probability of NEET in young men. This mechanism may play a smaller role in the risk of NEET associated with internalizing symptoms and in young women.

1. Introduction

Young people who are transitioning from school to work face a labour market that has over the last few decades, shifted towards less secure forms of work, making intermittent joblessness and continuing education more likely (Bodin et al., 2020; International Labor Organization, 2020). Those who are excluded from both work and further education are most vulnerable to short- and long-term adverse outcomes. In 2019, between 10 and 15% of young people between the ages 15 to 24 in Europe were not in employment, education, or training (NEET). Joblessness and disconnection from education limits the acquisition of skills and human capital, affecting future job prospects, occupational mobility and lifetime earnings (Schmillin & Umkehrer, 2017); leading to poor health (Norström et al., 2014), substance use (Nagelhout et al., 2017), and higher levels of mortality (Roelfs et al., 2011).

A history of mental health challenges may increase the risk for becoming NEET in early adulthood. Adolescent mental health challenges have been related to both higher incidence and longer duration of unemployment (Butterworth et al., 2012; Mousteri et al., 2019). The barriers to employment that people with mental health challenges face include lower educational attainment, lower job-search intensity amongst those without work, challenges with job performance amongst

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Abbreviations

NEET	Not in education, employment, or training
BQ	Basic qualification certificate
TIE	Total natural indirect effect
PDE	Pure natural direct effect
TE	Total effect
CDE	Controlled direct effect

those with work, and the need for workplace accommodations that employers may not provide (Berndt et al., 2000; Lagerveld et al., 2010; McKee-Ryan et al., 2005).

Gendered dynamics in the relationship between adolescent mental health and NEET are less clear. Due to both developmental sex differences and gendered norms and expectations for behaviour (Martin & Hadwin, 2022), adolescent girls and young women tend to display higher levels of internalizing symptoms (characterized by inwardly focused symptoms like anxiety and depression), and boys and young men tend to display externalizing symptoms (characterized by externally focused behavioural symptoms such as aggression or oppositionality) (Bongers et al., 2003; Rosenfield & Smith, 2010). While some studies have found stronger effects of distress or depression on NEET for boys than girls (Henderson et al., 2017; Veldman et al., 2022), others show stronger effects for girls than boys (Cornaglia et al., 2015). Still others have found evidence of gender-specific patterns, showing that internalizing symptoms are related to a higher likelihood of NEET for girls, whereas externalizing symptoms are more salient for boys (Plenty et al., 2021).

As a key determinant of employment, education has been the target of policy efforts to prevent young people from entering NEET across numerous countries (OECD, 2016). Not only are young people with low education less likely to become employed than their more educated peers (Barham et al., 2009), they are more likely to be become unemployed if working (Schuring et al., 2013). With rising education levels over time, the absence of qualifications has become a greater impediment to employment (Whiteford, 2017). In the Netherlands, education and youth policy to prevent NEET has focused on the achievement of a basic qualification (BQ) certificate (defined as one of several upper secondary school certifications) and reducing early school leaving. Since 2007, all young people under the age of 18 who have not yet obtained a basic qualification certificate are obligated to continue education (van Leeuwen et al., 2008). In 2019, approximately 39% of young people aged 15 to 26 who had dropped out of school without a BQ certificate did not have a job, compared with the roughly 11% who had a BQ certificate (National Youth Monitor of the Netherlands, 2020). For young people who require accommodations, including mental health and behavioural supports, the Dutch educational system has also implemented targeted programs and policies (The Netherlands, 2014). Such supports include school-based programs designed to remove barriers that impede the ability to achieve a BQ certificate. Dedicated Advisory Teams are also implemented in many schools to identify young people at high-risk of early dropout, and to provide counselling and support services (The Netherlands, 2014).

Despite this policy focus, few studies have examined the extent to which the pathway from adolescent mental health problems to NEET may be mitigated by supporting educational attainment. There is some evidence that educational attainment mediates the link between child health to adult labour market outcomes. One study of American young people found an indirect relationship between depression and adult wages due to a lower probability of completing high school (Johar & Truong, 2014). To our knowledge, only two studies examined educational attainment as a mediator of the relationship between adolescent mental health and NEET in early adulthood; these studies used different methods to assess mediation and produced conflicting results. A study of Swedish youth found using a series of multivariable regression models that upper secondary school completion mediated the relationship between internalizing symptoms at age 14–15 and NEET at age 21–22 for females, as well as the relationship between externalizing symptoms and NEET for males (Plenty et al., 2021). A Danish study using effect decomposition to examine the relationship between depressive symptoms and NEET at age 23 did not find evidence of a mediation effect for secondary school completion (Veldman et al., 2022). In both studies, NEET was assessed at an age during which young people only begin to transition out of school. Findings may therefore fail to generalize to older ages during early adulthood characterized by disconnection from educational institutions and reliance on the labour market. Further research may be needed to better understand how and to what extent educational interventions and policies may be used to prevent the risk of NEET that is associated with a history of internalizing and externalizing symptoms, and how gender shapes these relationships.

The present study examines whether and to what extent educational attainment, defined by the achievement of a BQ certificate, mediates the association between mental health in adolescence and NEET status in early adulthood in the context of the 21st century Dutch educational system. To address possible gender experiences in mental health, this study stratifies analyses across internalizing and externalizing symptoms and by gender. It is hypothesized that adolescent internalizing and externalizing symptoms in both young women and men will have a direct effect on NEET status, as well as an indirect effect through failing to achieve a BQ certificate.

2. Material and methods

2.1. Sample

Data from Waves 1–6 of the TRacking Adolescents' Individual Lives Survey (TRAILS) study was used (Huisman et al., 2008). TRAILS is a prospective cohort study of adolescents born between October 1989 and September 1991, selected from five counties in the North of the Netherlands in March 2001 (n = 2,229, mean age = 11.1 years, SD = 0.55). Of the baseline participants, 613 did not participate in wave 6 of the survey (2016; response rate = 72.5%; mean age = 25.6, SD = 0.60). For the present study, we excluded young people who had missing data on the outcome (n = 275). We also excluded those who indicated that they were parents in wave 6 of the study (n = 144) because we anticipated that unlike for non-parents, the need for childcare may be a strong motivator for parents to become NEET irrespective of their mental health (Gutiérrez-García et al., 2018). The final sample size was 1,197. On average, excluded participants had lower internalizing-symptom levels, higher externalizing-symptom levels, and lower parental education than included participants (Appendix Table A1). The Dutch Medical Ethical Committee approved all the protocols of the TRAILS study (Approval number: NL67411.042.18).

2.2. Measures

2.2.1. NEET status

NEET status is an indicator of social exclusion from both the labour market and educational institutions (Elder, 2015). It was ascertained using respondent's self-reported employment and education status at wave 6 (age 26). Employment was self-reported in response to the question, '*Have you had paid work in the past month*'. Education status was self-reported in response to the question, '*Are you currently following education*'. Respondents indicating no to both questions were classified as NEET. Respondents who were working and/or in school were classified as not NEET.

2.2.2. Adolescent mental health

Adolescent mental health were assessed between waves 1–4 (ages

11–19) using the Dutch version of the Youth Self Report (at ages 11, 13.5, and 16; YSR) and the Adult Self Report (at age 19; ASR) (Achenbach & Rescorla, 2001, 2003; Sawyer et al., 2018). Studies show that the YSR and ASR are reliable and valid for use in young people; further, the YSR and ASR have been validated in Dutch (Achenbach & Rescorla, 2003; Ebesutani et al., 2011; Verhulst et al., 1996). To make the ASR comparable with the YSR, 14 items were removed from the original 112-item ASR (Achenbach & Rescorla, 2001, 2003). Participants answered questions about their behavioural and emotional symptoms over the last 6 months, on a 3-point scale (0 = not true, 1 = somewhat or sometimes true, 2 = very or often true). Following prior developmental psychopathology research (Achenbach, 1966; Krueger et al., 1998; Laceulle et al., 2015), two broad-band scales were derived from sub-scales of the YSR/ASR. The 'externalizing symptoms' scale is composed of items in the aggressive and rule-breaking behaviours subscales. The 'internalizing symptoms' scale is comprised of items that indicate anxious/depressed, withdrawn/depressed, and somatic problems subscale. Internal consistency for each scale was good to excellent in each wave ($\alpha_{int1} = 0.87, \alpha_{ext1} = 0.85, \alpha_{int2} = 0.88, \alpha_{ext2} = 0.85, \alpha_{int3} = 0.89, \alpha_{ext3} = 0.87, \alpha_{int4} = 0.93, \alpha_{ext4} = 0.89$). A cut-off for clinical-level symptoms was defined from the upper 10% of separate normative samples of girls and boys (Achenbach & Rescorla, 2001, 2003). For each of the internalizing and externalizing scales, we then classified respondents into two categories: (1) having clinical level symptoms at any point between waves 1 and 4, or (2) never having clinical-level symptoms.

2.2.3. Educational attainment

Educational attainment was self-reported at wave 5 (2012–2013; mean age = 22.2, SD = 0.64), in response to the question, '*What is your highest diploma*'. We categorized respondents into two levels of educational attainment to reflect the emphasis on achieving a BQ certification within the Dutch system: (1) no BQ (i.e. primary or lower secondary education), (2) BQ (higher secondary education achievement or more) (OECD et al., 2015).

2.2.4. Gender

We assessed respondent's gender using their self-reported sex at baseline (girls/women vs. boys/men). Non-binary indicators were not available.

2.2.5. Confounders

We controlled for family- and individual-level sociodemographic predictors of adolescent mental health (McLaughlin et al., 2012) and NEET (Gladwell et al., 2015; Robson & Team, 2008; Zuccotti & O'Reilly, 2019): migrant background (Dutch-born vs. born elsewhere), parental socioeconomic background (highest educational level of the father and/or mother), family household structure (single parent household at baseline) and respondent baseline physical health (parent-reported response to the question, '*What do you think of your child's physical health during the past year*?', scored from 1 = *bad* to 4 = *good*).

2.3. Analyses

The characteristics of all available cases were presented for the overall sample, by NEET status, and by gender. Differences were tested using chi-squared tests for categorical variables, and one-way analysis of variance for continuous variables.

To examine low educational attainment as a mechanism for the effect of adolescent mental health on NEET in early adulthood (Appendix Figure A1), we conducted causal mediation analyses using structural equation modelling (Muthén & Asparouhov, 2015; Vanderweele, 2015). The direct and indirect effects as defined using causal mediation, otherwise known as the potential outcomes approach, contrast two potential outcomes that would have been observed in the same individual under different (possibly counter to fact) exposure and mediator values (Muthén & Asparouhov, 2015; Vanderweele, 2015). Because we wanted to estimate the extent to which adolescent mental health may be associated with NEET through low educational attainment our analyses focused on four causal estimands (Hafeman & Schwartz, 2009): 1) the total natural indirect effect (TIE), 2) the pure natural direct effect (PDE), 5) the controlled direct effect (CDE), and 6) the total direct effect (TE).

For this study, in which the probability of the outcome (i.e., NEET) is compared across mediator levels defined by having achieved BQ (M = 1) or not (M = 0), and across exposure levels defined by having internalizing or externalizing symptoms in adolescence (X = 1) or not (X = 0), the causal estimands may be interpreted as follows. The total natural indirect effect (TIE) expresses how much the probability of the outcome would change on average, if the exposure were held constant at X = 1, but the mediator changed from the value it would have taken at exposure level X = 1 to the value it would have taken at X = 0 (Valeri & Vanderweele, 2013; Vanderweele, 2013). The pure natural direct effect (PDE), by contrast, expresses how much the probability of NEET would change if the exposure changed from X = 1 to X = 0, but the mediators were fixed at the levels they would have taken in the absence of the exposure (Valeri & Vanderweele, 2013; Vanderweele, 2013). Meanwhile, the controlled direct effect (CDE) expresses how much the probability of NEET would change on average were the mediator to be held constant at a predetermined value uniformly across the population, but the exposure changed from X = 1 to X = 0. In this study, we estimated the CDE in a hypothetical situation in which all individuals in the sample achieved BQ. Finally, the total effect (TE) expresses how much the probability of NEET would change if the exposure changed from X = 1 to X = 0; it is the sum of the TIE and the PDE. These effects may be estimated from regression parameters, provided there is no unmeasured confounding of the exposure-outcome relationship, exposure-mediator relationship, or the mediator-outcome relationship, and models are correctly specified.

We fit separate models with a probit link for the internalizing and externalizing symptoms, using the maximum likelihood estimator. Models were adjusted for all baseline covariates to account for confounding of both the exposure-mediator relationship and the mediator-outcome relationship. Models also included an exposure-mediator interaction term, as carrying out mediation analysis while assuming no interaction may result in invalid inferences (Richiardi et al., 2013). Missing data were addressed with the full information maximum likelihood estimation approach. We reported model parameters as well as causal effect estimates expressed as the difference in the predicted probability of NEET (see Table 1 for definitions). We further calculated the 'percentage mediated' defined as the percentage of the overall effect that is accounted for by the total indirect effect, and the 'percentage eliminated' defined as the percentage of the overall effect that would be eliminated if everyone achieved BQ. Because we expected gender differences in the relationship between adolescent mental health, educational attainment, and NEET status, we stratified the analyses by gender. Bootstrapping with 1000 replications was used to calculate 95% confidence intervals (CIs).

Three sensitivity analyses were performed to test the robustness of the findings. First, because the assumption of no unmeasured confounding is not verifiable with data, we examined the sensitivity of

Table 1
Causal estimands and their counterfactual definitions.

Causal estimand	Counterfactual definition (risk difference scale)
Total natural indirect effect (TIE)	$P(Y_{1,M(1)} = 1) - P(Y_{1,M(0)} = 1)$
Pure natural direct effect (PDE)	$P(Y_{1,M(0)} = 1) - P(Y_{0,M(0)} = 1)$
Total effect (TE)	$P(Y_{1,M(1)} = 1) - P(Y_{0,M(0)} = 1)$
Controlled direct effect (CDE)	$P(Y_{1,M=1} = 1) - P(Y_{0,M=1} = 1)$

Notes: Y denotes the outcome NEET in early adulthood, M denotes the mediator educational attainment as defined by achievement of a basic qualification; and, P(Y) denotes the predicted probability of the outcome.

results to a range of plausible values for the conditional prevalence of the unmeasured confounder and their effect on the outcomes, using Vanderweele's bias formulas (VanderWeele, 2010). Second, to compare estimates with cases for which there was no missing data, we conducted an analysis using complete case analysis. Third, because we wanted to examine NEET as a marker of labour market exclusion, we repeated these analyses in a sample that excluded students.

All descriptive analyses were performed using Stata version 16.1. All mediation analyses were performed using the *Model Indirect* command in Mplus 8.4.

3. Results

3.1. Sample characteristics

Over half of the sample identified as female (56%). In early adulthood, most of the sample were working or in school (91.1%); 8.9% were NEET (Table 2). Only 9.1% of the sample did not achieve a BQ certificate. Twenty-nine percent of the sample experienced clinical levels of internalizing symptoms in adolescence, and 16.2% experienced clinical levels of externalizing symptoms.

Rates of mental health symptoms by educational attainment and NEET differed across gender and by symptom type. There were higher rates of externalizing symptoms among young men who did not achieve a BQ certificate (37.8%) compared with those who did (18.5%), and among young men who were NEET (48.9%) compared to those who were not (18.2%), but no differences among young women. No differences in internalizing symptoms by BQ achievement were observed in either young men or women (Appendix Table A2). Higher rates of internalizing symptoms were observed for both young men and women who were NEET compared with those who were not (Table 2).

3.2. Does educational attainment mediate the relationship between adolescent mental health and early adult NEET status?

Path regression coefficients for the overall sample indicated that

Table 2
Distribution of study variables by NEET status (at age 26) and gender (men vs. women).

	Overall sample		Women (n = 673, 56.2%)							Men (n = 524, 43.8%)						
			Total		Not NEET		NEET			Total		Not NEET		NEET		
	N or mean	% or SD	N or mean	% or SD	N or mean	% or SD	N or mean	% or SD		N or mean	% or SD	N or mean	% or SD	N or mean	% or SD	
NEET status (wave 6)																
Working on in school (not NEET)	1,091	91.1														
NEET	106	8.9														
Educational attainment (wave 5)									***							***
No basic qualification certificate (BQ)	105	9.1	71	12.2	38	6.2	14	29.2		89	20.5	36	8.1	17	34.7	
BQ	1,044	90.9	513	87.8	571	93.8	34	70.8		345	79.5	407	91.9	32	65.3	
(Missing n = 48)																
Internalizing symptoms (waves 1–4)									*							**
Any clinical level symptoms	311	29.6	167	28.0	148	26.8	19	43.2		144	31.6	121	29.4	23	52.3	
No	741	70.4	429	72.0	404	73.2	25	56.8		312	68.4	291	70.6	21	47.7	
(Missing n = 145)																
Externalizing symptoms (waves 1–4)																***
Any clinical level symptoms	170	16.2	73	12.3	65	11.8	8	17.8		97	21.2	75	18.2	22	48.9	
No	881	83.8	521	87.7	484	88.2	37	82.2		360	78.8	337	81.8	23	51.1	
(Missing n = 146)																
Parental education									***							***
Lower secondary or less	181	15.4	32	5.6	20	3.2	12	24.0		39	7.4	24	5.1	15	26.8	
Upper secondary	396	33.8	170	29.7	251	40.3	19	38.0		261	49.8	234	50.0	27	48.2	
Senior vocational or university	596	50.8	371	64.7	352	56.5	19	38.0		224	42.7	210	44.9	14	25.0	
(Missing n = 24)																
Country of birth									*							
Neither parent born in a target country (i.e., Dutch)	1,120	93.6	626	93.0	583	93.6	43	86.0		494	94.3	444	94.9	50	89.3	
At least one parent born in a target country	77	6.4	47	7.0	40	6.4	7	14.0		30	5.7	24	5.1	6	10.7	
Single parent home (wave 1)																
No	1,039	87.7	579	86.7	536	86.7	43	86.0		460	89.0	413	89.6	47	83.9	
Yes	146	12.3	89	13.3	82	13.3	7	14.0		57	11.0	48	10.4	9	16.1	
(Missing n = 12)																
Physical health (wave 1)	4.2	0.6	4.2	0.6	4.2	0.6	4.1	0.7		4.2	0.6	4.3	0.6	4.2	0.6	
(Missing n = 61)																

Note: Descriptive results presented for available cases; BQ = basic qualification; NEET = not in employment, education; or training; *t*-test or chi-square test *$p < 0.05$, **<0.01, ***<0.001.

clinical levels of both internalizing and externalizing symptoms in adolescence were negatively related to achieving a BQ certificate after adjustment for confounding, though for internalizing symptoms the 95% confidence interval included the null (Table 3). For both internalizing and externalizing symptoms, achieving a BQ certificate was negatively associated with NEET. Both internalizing and externalizing symptoms were positively related to NEET.

In gender stratified models (Table 3), adolescent internalizing symptoms were associated with NEET among young women but not young men; however, the former estimate included the null. Adolescent externalizing symptoms were negatively related to achieving a BQ certificate, and positively related to NEET, among young men but not young women.

Table 4 describes the estimated total effect, the pure natural direct effect, the total indirect effect, and the controlled direct effect of internalizing symptoms on the probability of NEET for the overall sample, and for the gender-stratified subsamples. In the overall sample, adolescent internalizing symptoms increased the probability of NEET by a total of 0.047 (95%CI: 0.004,0.170) compared to having no internalizing symptoms. Their effect through BQ achievement accounted for a 0.004 (95%CI: −0.002,0.015) increase in the probability of NEET; however, the 95%CI includes the null value. If BQ achievement had been uniform, as indicated by the controlled direct effect, internalizing symptoms would increase the probability of NEET by 0.027 (95%CI: 0.001,0.111) compared with no internalizing symptoms, which corresponds to 42.6% of the total effect eliminated. Externalizing symptoms in adolescence increased the probability of NEET in the overall sample by 0.056 (95% CI: 0.007,0.172) compared with no externalizing symptoms. Their effect through BQ achievement accounted for 0.016 (95%CI: 0.001,0.058) increase in the probability of NEET, which corresponds to 28.6% of the total effect mediated. As suggested by the controlled direct effect, if all participants achieved BQ, externalizing problems would increase the probability of NEET by 0.029 (95%CI: −0.001,0.137) compared with no externalizing problems, which corresponds to 48.2% of the total effect eliminated.

In the gender stratified models, we found gender differences in the relationship between adolescent externalizing symptoms, BQ achievement, and NEET. Externalizing symptoms increased the probability of NEET among young men by a total of 0.093 (95%CI: 0.001,0.440). Their effect through BQ achievement accounted for an increase in the probability of NEET of 0.014 (95%CI: 0.000–0.051), which corresponds to 15.1% of the total effect mediated; however, the 95%CI included the null value. As suggested by the controlled direct effect, if all young men achieved BQ, externalizing symptoms would increase the probability of NEET by 0.071 (95%CI: −0.005,0.222); however, the 95%CI included the null value. No total, direct, or indirect effects were observed for externalizing symptoms on NEET in young women. We did not find sufficient evidence of gender differences in the total, indirect, or direct effects of internalizing symptoms on NEET.

Table 3
Path regression coefficients for structural equation models of adolescent internalizing and externalizing symptoms on NEET status through achievement of a basic qualification (BQ) certificate.

	Internalizing symptoms			Externalizing symptoms		
	Estimate	95% CI		Estimate	95%CI	
Total	**(n = 1,017)**			**(n = 1,018)**		
NEET (wave 6)						
Educational attainment (ref. no BQ)	−0.73	−1.11	−0.28	−0.68	−1.05	−0.25
Clinical level symptoms (ref. no)	0.66	0.09	1.31	0.69	0.12	1.32
Clinical level symptoms x BQ	−0.32	−1.03	0.29	−0.35	−1.06	0.31
BQ achievement (wave 5)						
Clinical level symptoms (ref. no)	−0.11	−0.37	0.17	−0.38	−0.65	−0.08
Women	**(n = 584)**			**(n = 584)**		
NEET (wave 6)						
Educational attainment (ref. no BQ)	−0.71	−1.35	0.16	−0.97	−1.55	−0.32
Clinical level symptoms (ref. no)	0.81	−0.05	1.91	0.28	−3.20	1.45
Clinical level symptoms x BQ	−0.53	−1.76	0.44	−0.10	−1.56	3.33
BQ achievement (wave 5)						
Clinical level symptoms (ref. no)	−0.20	−0.55	0.18	−0.30	−0.73	0.18
Men	**(n = 433)**			**(n = 434)**		
NEET (wave 6)						
Educational attainment (ref. no BQ)	−0.76	−1.34	−0.09	−0.28	−0.87	2.83
Clinical level symptoms (ref. no)	0.57	−0.31	1.62	1.20	0.32	4.39
Clinical level symptoms x BQ	−0.15	−1.24	0.74	−0.78	−4.01	0.22
BQ achievement (wave 5)						
Clinical level symptoms (ref. no)	−0.01	−0.40	0.40	−0.44	−0.84	−0.04

Note: Respondent gender, ethnicity, parental education, single parent household, and respondents' physical health at wave 1 were controlled for.

Table 4
Direct and indirect effects of clinical level internalizing and externalizing symptoms in adolescence on the probability of early adult NEET status, as expressed as a risk difference.

	Internalizing symptoms			Externalizing symptoms		
	Estimate	95% CI		Estimate	95%CI	
Overall sample	(n = 1,017)			(n = 1,018)		
TE	0.047	0.004	0.170	0.055	0.007	0.203
TIE	0.005	−0.010	0.019	0.016	0.001	0.058
PDE	0.042	0.004	0.157	0.040	0.003	0.167
CDE	0.027	0.001	0.111	0.029	−0.001	0.134
Women	**(n = 584)**			**(n = 584)**		
TE	0.041	0.000	0.200	0.020	−0.027	0.163
TIE	0.009	−0.008	0.043	0.007	−0.006	0.051
PDE	0.032	0.000	0.173	0.013	−0.035	0.134
CDE	0.017	−0.006	0.121	0.010	−0.034	0.119
Men	**(n = 433)**			**(n = 434)**		
TE	0.034	0.000	0.183	0.093	0.001	0.440
TIE	0.000	−0.023	0.010	0.014	0.000	0.051
PDE	0.034	0.000	0.185	0.079	0.000	0.422
CDE	0.031	0.000	0.176	0.071	−0.005	0.222

Notes: Estimates were adjusted for respondents' country of birth, physical health, parental education, single parent household at wave 1/baseline. TE = Total Effect, TIE = Total natural indirect effect, PDE=Pure natural direct effect, CDE=Controlled direct effect.

3.3. Sensitivity analyses

Because we observed significant indirect effects of externalizing symptoms on NEET through achievement of a BQ certificate in the overall sample and in young men, we conducted sensitivity analyses to examine the robustness of our estimates to unmeasured mediator-outcome confounding of this relationship. For a between-group difference in the prevalence of an unmeasured confounder between 0.10 and

0.90, conditional on all other covariates, that confounder must change the probability of NEET by between −0.16 and −0.02 in the overall sample and between −0.14 and −0.02 among young men, to fully explain the indirect effect of externalizing symptoms through BQ achievement (see Appendix Figure A2).

We also conducted analyses on a sample using cases without missing data and on a sample without students. These analyses did not result in substantively different conclusions than the main analyses.

4. Discussion and conclusions

This study examined the mediating role of educational attainment in the association between adolescent mental health and NEET status in young adulthood. Specifically, we examined the extent to which failure to achieve a BQ certificate explains the pathway from adolescent internalizing and externalizing symptoms to NEET among young women and men, in context of the 21st century Dutch educational system. Using prospective cohort data spanning the ages 11–26, we found evidence that for young men, adolescent externalizing symptoms were related to subsequent likelihood of NEET; this relationship was partially mediated by failure to achieve a BQ certificate. We did not however, find evidence that BQ achievement mediated the same relationship in young women, nor did we find evidence that BQ achievement mediated the relationship between adolescent internalizing symptoms and NEET in either gender.

Our findings are consistent with previous evidence that low educational attainment, and its role in impeding human capital accumulation and social inclusion, is one pathway through which adolescent externalizing symptoms impact labour market participation in adulthood. An American study showed that educational attainment partially mediates the relationship between depression and wages earned (Johar & Truong, 2014). A Swedish study similarly showed that completion of secondary school partially explains the relationship between adolescent externalizing symptoms and NEET (Plenty et al., 2021). Low education is associated with a higher risk of both difficulty finding jobs and of job loss (Barham et al., 2009; Schuring et al., 2013). Our finding of an indirect effect for externalizing symptoms suggests that adolescent externalizing symptoms may first reduce the probability of completing a BQ certificate, which in turn reduces labour market competitiveness and connection in early adulthood. Externalizing symptoms may impact the ability to attain higher education through a number of mechanisms at an intrapersonal-level, including functional impairments to learning (Duncan et al., 2007), and a greater risk of school absences, truancy, social exclusion, and substance use (Hale & Viner, 2018). At the school level, young people with externalizing symptoms may also experience social stigma from teachers and peers in association with behavioural issues, that may create barriers for educational success (Evensen, 2019). Further, we showed that if a BQ certificate had been universally achieved by participants, a proportion of the risk of NEET would be eliminated. Findings therefore support the need for interventions that promote educational achievement and prevent early school dropout as a means to address NEET in young adulthood.

As in some previous studies, our findings also suggest that externalizing symptoms have a stronger effect on secondary school non-completion than internalizing symptoms. A study of Finnish adolescents found a diagnosis of an externalizing disorder such as attention deficit hyperactive disorder or conduct disorder between age 10–16 had a larger effect on secondary-school non-completion than internalizing disorders such as depression or anxiety (Mikkonen et al., 2020). Similarly, in a study of Norwegian young people, self-reported conduct symptoms had a stronger effect on grade point average, years of schooling, and completion of upper-secondary education, than internalizing symptoms (Evensen, 2019; Evensen et al., 2016). Moreover, Veldman et al. (2022) showed that educational attainment did not mediate the relationship between adolescent depressive symptoms and NEET in early adulthood. The discrepancy between internalizing and externalizing symptoms may in part reflect the different social responses that internalizing and externalizing symptoms are met with in the school setting. Studies show, for example, that schools and teachers respond with greater sanctions to behaviour and attention related problems than to anxious and internalizing symptoms (Evensen, 2019). However, because we observed a direct effect of internalizing symptoms on NEET in young adulthood, our findings suggest that the consequences of internalizing symptoms may change as young people leave the school setting, potentially presenting more risks in the transition into higher education and the labour market.

Our study additionally suggests that there are gendered patterns in the relationships of interest. Specifically, our findings are consistent with evidence that low educational attainment is more salient to the risk of NEET associated with externalizing symptoms in boys than in girls (Plenty et al., 2021). Between adolescence to young adulthood, boys experience many gender-specific vulnerabilities in their school contexts (Heise et al., 2019; Rice et al., 2018). For example, teachers may interpret adolescent behaviours as signals to either open doorways to additional opportunities, or in the case of many boys, to close them (DiPrete & Jennings, 2012). Boys receive harsher discipline, are more likely to be suspended, and more likely to be expelled than girls (Entwisle et al., 2007; Skiba et al., 2014). Further, adolescent boys and young men report both more unmet mental health needs, and lower likelihood of seeking care than girls and young women (Saunders et al., 1994; Wix & Spigt, 2022). Studies that do not examine such gendered social processes may mask their relevance to preventing NEET.

Unlike in other studies (Plenty et al., 2021; Veldman et al., 2022), we did not find evidence that educational attainment mediates the relationship between either internalizing or externalizing symptoms and subsequent likelihood of NEET in young women. Whether this finding reflects a lesser role of BQ achievement in the risk of NEET attributable to adolescent mental health for women is unclear. The small magnitude of the indirect effect estimates coupled with wide confidence intervals suggests that statistical power may be lacking. Future studies may want to replicate the findings with larger samples.

The small size of the indirect effects found in this study, along with the substantial direct effects for both internalizing and externalizing symptoms indicate that other mechanisms beyond the realm of education confer higher risk of NEET for young people with adolescent mental health challenges. While these other mechanisms were not delineated in our research, previous studies have identified potential intrapersonal and structural contributors. Intrapersonal factors such as the continuation of mental health challenges into early adulthood, and poor work-related self-concept have been found to mediate the relationship between adolescent mental health and NEET (Hale & Viner, 2018). Structural features of the transition to work, such as a lack of integrated health and social services, early connection to employment supports, and sustained support over the career trajectory, may also impart a higher risk of NEET (Gmitroski et al., 2018; Goldman-Mellor et al., 2016). Such evidence points to potential levers for preventing NEET amongst young people who deal with mental health challenges.

This study advances knowledge about the role of educational pathways between adolescent mental health and NEET status in early adulthood. This is one of the first studies to use the potential outcomes approach to examine educational attainment as a mediator of this relationship. This technique has several advantages when compared with conventional mediation, such as the ability to estimate mediation effects in the presence of exposure-mediator interaction and flexibility for handling categorical outcomes. Our study made use of a large population cohort with 14 years of follow-up data and high response rates. We also were able to account for key individual- and family-level confounders.

There are a few limitations to our study. First, young people who were lost to follow-up were more likely to come from low-SES backgrounds and themselves have lower educational attainment. Because our study sample uses a relatively higher educated group, our results are therefore likely biased towards the null. Second, our study uses self-

reported measures which may be subject to reporting bias. Our use of well-validated measures may mitigate this bias. Third, our approach to missing data assumes that data are missing at random. Partial non-response that is related to worse mental health, lower education, or NEET status would bias the results towards the null. Fourth, previous studies raised psychometric concerns about the internalizing and externalizing scales, suggesting potential measurement bias (Lambert et al., 2003; O'Keefe et al., 2006). Prior research has found demonstrated a reasonable fit for the dimensional structure of the Internalizing and Externalizing scales of the YSR/ASR (Fonseca-Pedrero et al., 2012); however, future studies may want to confirm the factor structure in their own samples. Finally, results of the sensitivity analyses suggest that our finding of an indirect effect of externalizing symptoms through educational attainment may be sensitive to plausible levels of unmeasured confounding. For example, our study did not adjust for behavioural confounders such as substance use, which are not only predictive of both educational attainment and employment (Chatterji, 2006; Gutiérrez-García et al., 2018), but also found to co-occur with both internalizing and externalizing disorders (Chan et al., 2008). Confounders of the mediator-outcome relationship that are affected by the exposure are a particularly problematic source of bias since our models were unable to account for them (Vansteelandt & Vanderweele, 2012). Our estimates were however, adjusted for baseline demographic and health variables that may mitigate unmeasured confounding.

This study has several implications for future research and practice. First, our study showed that educational attainment partially mediates the effect of externalizing symptoms on the probability of NEET in early adulthood, particularly among young men. This finding encourages school-based programs to target the needs of young people who display externalizing symptoms, and to consider how gendered processes create differences in the mental health and its downstream effects. Second, our findings suggest a need to study the role of educational mechanisms and interventions to prevent school dropout with greater detail. Beyond low educational attainment and dropout, other school-based mechanisms (e.g., academic achievement and engagement) may be important for supporting young people experiencing mental health challenges. Further, future research should replicate this study in other contexts to examine the generalizability of the findings in other educational systems and labour markets. Finally, our findings showed that most of the effect of adolescent mental health on the probability of NEET in early adulthood across both young women and men is not mediated by low educational attainment. Future research should examine the psychosocial, cultural, and institutional links between adolescent mental health and early labour market experiences in young adulthood to identify appropriate foci for policies and programs.

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CRediT authorship contribution statement

Anita Minh: Conceptualization, Methodology, Formal analysis, Writing – original draft, Funding acquisition. **Christopher B. McLeod:** Conceptualization, Writing – review & editing. **Sijmen A. Reijneveld:** Conceptualization, Writing – review & editing. **Karin Veldman:** Conceptualization, Writing – review & editing. **Sander K.R. van Zon:** Conceptualization, Writing – review & editing. **Ute Bültmann:** Conceptualization, Writing – review & editing, Supervision, Funding acquisition.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

Appendix

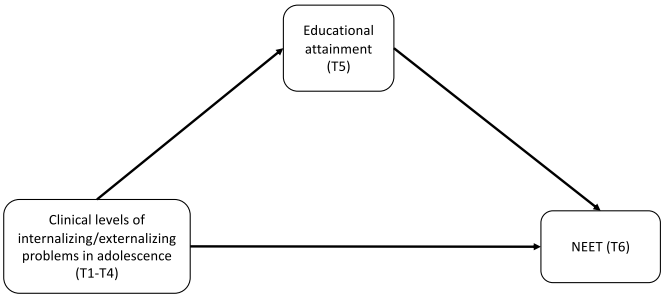

Fig. A 1. Conceptual model of the relationship between adolescent mental health, educational attainment, and NEET status.

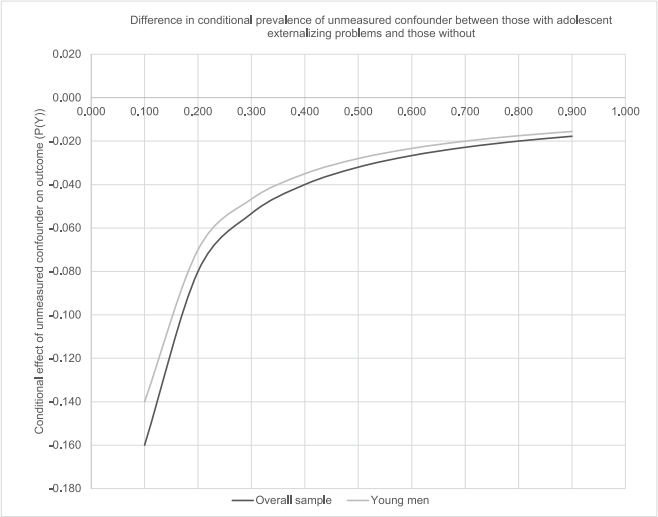

Fig. A2. Values of the conditional effect of an unmeasured confounder, and the difference in prevalence between exposed and unexposed groups, for which the indirect effect would be entirely explained.

Table A 1
Comparison of the characteristics of the analytic sample and those that were excluded based on being lost to follow-up, eligibility, or partial non-response.

	Included		Excluded		p-value
	N or mean	% or SD	N or mean	% or SD	
Internalizing symptoms					
Wave 1 (n = 1,585)	0.37	0.24	0.34	0.23	*
Wave 2 (n = 1,573)	0.34	0.24	0.31	0.23	*
Wave 3 (n = 1,387)	0.32	0.25	0.29	0.24	*
Wave 4 (n = 1,497)	0.25	0.25	0.24	0.25	
Externalizing symptoms					
Wave 1 (n = 1,592)	0.26	0.19	0.28	0.20	
Wave 2 (n = 1,584)	0.27	0.18	0.31	0.21	***
Wave 3 (n = 1,401)	0.28	0.19	0.37	0.24	***
Wave 4 (n = 1,592)	0.22	0.20	0.26	0.22	**
Gender (n = 1,616)					*
Male	524	43.80	211	50.36	
Female	673	56.20	208	49.64	
Parental education (n = 1,579)					***
Lower secondary or less	181	15.40	116	28.57	
Upper secondary	396	33.80	152	37.44	
Senior vocational or university	596	50.80	138	33.99	
Country of birth (n = 1,616)					
Neither parent born in a target country (i.e. Dutch)	1,120	93.60	385	91.89	
At least one parent born in a target country	77	6.40	34	8.11	
Single parent home (wave 1, n = 1,597)					
No	1,039	87.70	347	84.22	
Yes	146	12.30	65	15.78	
Physical health (wave 1, n = 1,530)	4.23	0.63	4.19	0.68	

Notes: p-value for *t*-test with unequal variance, or chi-square test: *p < 0.05, **p < 0.01, ***p < 0.001.

Table A 2
Internalizing and externalizing symptoms by achievement of a basic qualification certificate (BQ) in young women and young men

	Women					Men				
	No BQ		BQ		p-value	No BQ		BQ		p-value
	N or mean	% or SD	N or mean	% or SD		N or mean	% or SD	N or mean	% or SD	
Internalizing symptoms (waves 1–4)										
Any clinical level symptoms	27	62,8	395	73.0		36	63.3	267	69.5	
No	16	37.2	146	27.0		18	36.7	117	30.5	
Externalizing symptoms (waves 1–4)										**
Any clinical level symptoms	32	80.0	481	88.4		28	62.2	317	81.5	
No	8	20.0	63	11.6		17	37.8	72	18.5	

Notes: p-value for chi-square test: *p < 0.05, **p < 0.01, ***p < 0.001.

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