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Chapter 4. What is the role of low educational attainment on the pathway from adolescent mental health to NEET in early adulthood? A causal mediation analysis in the Dutch TRAILS cohort.

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Abstract

Objective: Mental health problems in adolescence may have far reaching consequences, affecting the life chances of young adults. This examined the extent to which educational attainment mediates the relationship between adolescent mental health problems and early adult labour market participation to inform interventions.

Methods: The Tracking Adolescents' Individual Lives Survey from the Netherlands (n=1,197) was used. Levels of internalizing and externalizing problems were measured between Waves 1 and 4 of the survey (age 10-19). Educational attainment was measured at Wave 5 (age 22), and NEET (not in employment, education, or training) was measured at Wave 6 (age 25). The potential outcomes approach to mediation analysis was used, adjusting for both baseline and intermediate confounders.

Results: On average, high levels of externalizing problems were associated with a 10.7% (95 % confidence interval, CI: 1.5, 20.4) higher probability of NEET after adjustment. The indirect effect through educational attainment accounted for 15.0% of the overall effect. Internalizing problems were associated with a 6.7% higher probability of NEET, but this effect was not mediated by educational level. If everyone in the sample achieved basic qualifications, the total effect of internalizing and externalizing problems would be eliminated by 14.9 and 22.4%.

Conclusions: Educational attainment is critical to the prevention of NEET. Externalizing problems during adolescence may disrupt the achievement of basic qualifications, leading to a higher probability of NEET in young adulthood. This mechanism may play a smaller role in the risk of NEET associated with internalizing problems.

4.1. Background

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 and transformed early working life trajectories, making intermittent joblessness and continuing education more likely.[162 163] Those who are excluded from both work and further education are most vulnerable to both short- and long-term adverse labour market outcomes. In 2019, between 10-15% 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 labour market prospects, occupational mobility and lifetime earnings;[40] leading to poor physical and mental health,[164] substance use,[165] and higher levels of mortality.[166]

A history of mental health problems may increase the risk for becoming NEET in early adulthood. Adolescent mental health problems have been related to a both a higher incidence of unemployment,[53] and a longer duration of unemployment.[167] The barriers to employment that people with mental health problems face include lower educational attainment on average, lower job-search intensity amongst those without work, challenges with job performance amongst those with work, and the need for workplace accommodations that employers may not provide.[37-39]

Education is a key determinant of employment, and has been the target of policy efforts to prevent young people from entering NEET across numerous countries.[168] Not only are young people with low education less likely to become employed than their more educated peers,[131] they are more likely to be become unemployed, if working.[169] As educational levels in the population rise over time, the absence of qualifications is a greater impediment to employment and social inclusion.[170]

In the Netherlands, the prevention of NEET via educational and youth policy has focused on the achievement of a basic qualification (BQ) certificate (defined roughly as one of several upper secondary school certifications), and reducing the number of early school leavers. Since 2007, the obligation to continue education extends to all young people under the age of 18 who have not yet obtained a basic qualification certificate.[171] 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.[172] For young people who require accommodations, including mental health and behavioral supports, the Dutch educational system has also implemented targeted programs and policies.[173] Such governmental supports entail funding for school-based programs designed to remove barriers for young people who face burdens that impede the ability to achieve a BQ certificate. Dedicated Advisory Teams are also in place in many schools to identify young people at high-risk of early dropout, and provide counseling and support services.[173]

Despite this focus in policy, few studies have examined the extent to which the pathway from adolescent mental health to NEET may be mitigated by supporting educational attainment. There is a gap in evidence about how educational attainment mediates the probability of becoming NEET in early adulthood due to mental health problems. While some evidence suggests that education is a key mediator between childhood health more generally and adult labour market outcomes, only one study has examined education as a mediator of the relationship between adolescent mental health problems and early adult labour market outcomes.[174] This study of American young people found an indirect relationship between depression and wages due to a lower probability of completing high school.[174]

The present study examines whether and to what extent educational attainment mediates the association between mental health problems in adolescence and NEET status in the context of the 21st century Dutch educational system. For the present study, it is hypothesized that mental

health problems will have a direct effect on NEET status in early adulthood, as well as an indirect effect through educational attainment.

4.2. Methods

4.2.1. Sample

Data from Waves 1-6 of the TRacking Adolescents' Individual Lives Survey (TRAILS) study was used.[86] TRAILS is a prospective cohort study of adolescents in the Netherlands. Children born between October 1, 1989 and September 1991 were selected for the study in March 2001, of which a sample of 2,229 children (mean age=11.1 years, SD=0.55) were eligible. 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). Those who were lost to follow-up were more likely to be born outside of the Netherlands, to come from single parent homes, and have lower parental SES.[87] For the present study, young people who indicated that they were parents in wave 6 of the study were excluded (n=144), as NEET may be a consequence of becoming parents. The final sample size was 1,197. The Dutch Medical Ethical Committee approved all the protocols of the TRAILS study (Approval number: NL67411.042.18).

4.2.2. Measures

4.2.2.1. NEET status

NEET status is an indicator of social exclusion from both the labour market and educational institutions; it was ascertained using respondent's self-reported employment and education status at wave 6. 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 who indicated no to both questions

were classified as NEET. All other young people in the sample were classified as not NEET (i.e., working and/or in school).

4.2.2.2. Adolescent mental health problems

Mental health problems were assessed between waves 1 and 4 using the Dutch version of the Youth Self Report (at ages 11, 13.5, and 16) and the Adult Self Report (at age 19).[90 91] To make the ASR comparable with the YSR, 14 items were removed from the original 112 item ASR.[90 91] Participants answered questions about their behavioural and emotional problems over the last 6 months, on a 3-point scale (0 = not true, 1 = somewhat or sometimes true, 2 = very or often true). Two broad-band scales were derived from sub-scales of the YSR/ASR. The 'externalizing problems' scale is composed of items in the aggressive and rule-breaking behaviours subscales. The 'internalizing problems' scale is comprised of items that indicate anxious/depressed, withdrawn/depressed, and somatic problems subscale. A cutoff for clinical-level problems was defined from the upper 10% of separate normative samples of girls and boys.[90 91] For each of the internalizing and externalizing scales, respondents were then classified into two categories: (1) having clinical level problems at any point between times 1 and 4, or (2) never having clinical-level problems.

4.2.2.3. 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?'* For this study, respondents were classified 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).[175]

4.2.2.4. Confounders

As baseline confounders, this study assessed respondent gender (male/ female), country of birth (Dutch-born/ born elsewhere), single parent household at baseline, and parental educational attainment (defined as the highest educational level of the father and/or mother). The physical health of the respondent at wave 4 was also assessed as intermediate confounder (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*).

4.2.3. Analyses

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

To examine the extent that educational attainment mediated the effect of mental health problems on NEET in early adulthood, this study conducted mediation analyses using the potential outcomes framework i.e., using causal mediation methods.[96 97] Under this approach, the causal effect of an exposure is defined as the contrast of potential outcomes, or a contrast of outcomes that would be observed under different (possibly counter to fact) exposure and mediator values. This approach accounts for biases that other mediation approach do not, including the ability to account for mediator-outcome confounding, for mediator-outcome confounding affected by the exposure, and for exposure-mediator interaction.[176]

Separate path models with a probit link were fit for the internalizing and externalizing problems, using the maximum likelihood estimator. Models were adjusted to account for confounding of both the exposure-mediator relationship and the mediator-outcome relationship. Models included an exposure-mediator interaction term to account for possible exposure-mediator

interaction. Missing data were addressed with the full information maximum likelihood estimation approach.

Parameter estimates were then used to compute the natural direct and indirect effects as well as the controlled direct effect on a risk difference scale. Natural direct effects express the effect of the exposure on the outcome via pathways that do not involve the mediator, assuming no unmeasured exposure-mediator confounding, no unmeasured mediator-outcome confounding, and no unmeasured mediator-outcome confounding affected by the exposure. Natural indirect effects express the effect of the exposure on the outcome due to the effect of the exposure on the mediator.[176] In this analysis, an overall effect was decomposed into a pure direct effect and a total indirect effect; the total indirect effect captures the exposure-mediator interaction, while the 'pure' in the pure direct effect indicates that the direct effect does not capture the interaction.[177] Further, the percentage mediated was also calculated, defined as the percent of the overall effect that is accounted for by the total indirect effect. The controlled direct effect, on the other hand, expresses the effect of the exposure on the outcome, when the mediator is held constant at a certain value. In this study, the controlled direct effect was estimated for a hypothetical situation in which all individuals in the sample achieved BQ. Further, the percent eliminated was calculated, defined as the percent of the overall effect that would be eliminated if everyone achieved BQ. See Table 4.1 for the definition of these effects. Bootstrapping with 1000 replications was used to calculate 95% confidence intervals (CI) for the resulting estimates.

Table 4.1 Counterfactual definition of effects

Effect	**Counterfactual definition (risk difference scale)**
Overall effect	$P(Y_{1M_1} = 1) - P(Y_{0M_0} = 1)$ x 100%
Pure direct effect	$P(Y_{1M_0} = 1) - P(Y_{0M_0} = 1)$ x 100%
Total indirect effect	$P(Y_{1M_1} = 1) - P(Y_{1M_0} = 1)$ x 100%
Controlled direct effect	$P(Y_{1M=1} = 1) - P(Y_{0M=1} = 1)$ x 100%

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

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, this study tested the sensitivity of 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.[178] Second, an analysis using only cases without missing data was conducted. Third, because this study is concerned with NEET as a marker of labour market exclusion, the mediation analyses were repeated 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.

4.3. Results

4.3.1. Sample characteristics

Table 2 shows the characteristics of the study sample. Over half of the sample identified as female (56%). In early adulthood, the majority of the sample were working or in school (91.1%); 8.9% were NEET (Table 4.2). Only 9.1% of the sample did not achieve a BQ certificate. Twenty-nine percent of the sample experienced clinical levels of internalizing problems, and 16.2% of the sample experienced clinical levels of externalizing problems in adolescence.

Adolescent mental health problems varied by education. A higher proportion of young people without a BQ certificate had clinical levels of internalizing and externalizing problems during adolescence compared with those who had a BQ certificate. Adolescent mental health problems also varied by NEET status in early adulthood. A higher proportion of NEET had clinical levels of internalizing and externalizing problems in adolescence compared to those who were either working or in school.

Table 4.2 Distribution of study variables by NEET status and educational attainment

	Total sample		NEET status					Educational attainment				
			Not NEET		NEET			No BQ		BQ		
	N or mean	% or SD	N or mean	% or SD	N or mean	% or SD	p-value	N or mean	% or SD	N or mean	% or SD	p-value
NEET status (wave 6)												
Working or in school	1,091	91.1										
NEET	106	8.9										
Educational attainment (wave 5)							***					
No basic qualifications certificate (BQ)	105	9.1	74	7.0	31	32.0						
BQ	1,044	90.9	978	93.0	66	68.0						
Internalizing problems (waves 1-4)							***					*
Any clinical level problems	311	29.6	269	27.9	42	47.7		17	30.4	185	26.1	
No	741	70.4	695	72.1	46	52.3		39	69.6	523	73.9	
Externalizing problems (waves 1-4)							***					*
Any clinical level problems	170	16.2	140	14.6	30	33.3		13	25.0	96	13.4	
No	881	83.8	821	85.4	60	66.7		39	75.0	619	86.6	
Gender							*					
Male	524	43.8	468	42.9	50	47.2		53	50.5	439	42.1	
Female	673	56.2	623	57.1	56	52.8		52	49.5	605	57.9	
Parental education							*					
Lower secondary or less	181	15.4	158	14.8	23	21.1		26	25.3	145	14.2	
Upper secondary	396	33.8	357	33.4	39	37.5		54	52.4	324	31.6	
Senior vocational or university	596	50.8	554	51.8	42	40.4		23	22.3	555	54.2	
Country of birth							**					*
Neither parent born in a target country (i.e. Dutch)	1,120	93.6	1,027	94.1	93	87.7		94	89.5	987	94.5	
At least one parent born in a target country	77	6.4	64	5.9	13	12.3		11	10.5	57	5.5	
Single parent home (wave 1)												***
No	1,039	87.7	949	88.0	90	84.9		82	78.1	922	89.3	
Yes	146	12.3	130	12.0	16	15.1		23	21.9	111	10.7	
Physical health (wave 4)	4.0	0.7	4.1	0.7	3.7	0.9	***	3.7	0.8	4.1	0.7	***

Note: Descriptive results presented for available cases only; BQ = basic qualifications, NEET = not in employment, education, or training,
*$p<0.05$, **$p<0.01$, *** $p<0.001$

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

As shown in Figure 4.1, regression coefficients indicated that clinical levels of both internalizing and externalizing problems in adolescence were negatively related to achieving a BQ certificate after adjustment for covariates, though for internalizing problems the 95% confidence interval included the null value (internalizing: β=-0.13, 95%CI: -0.33,0.09; externalizing: β=-0.39, 95%CI: -0.62,-0.14). For both internalizing and externalizing problems, educational attainment was negatively associated with NEET in early adulthood. There was also a positive association with NEET in early adulthood for both internalizing and externalizing problems.

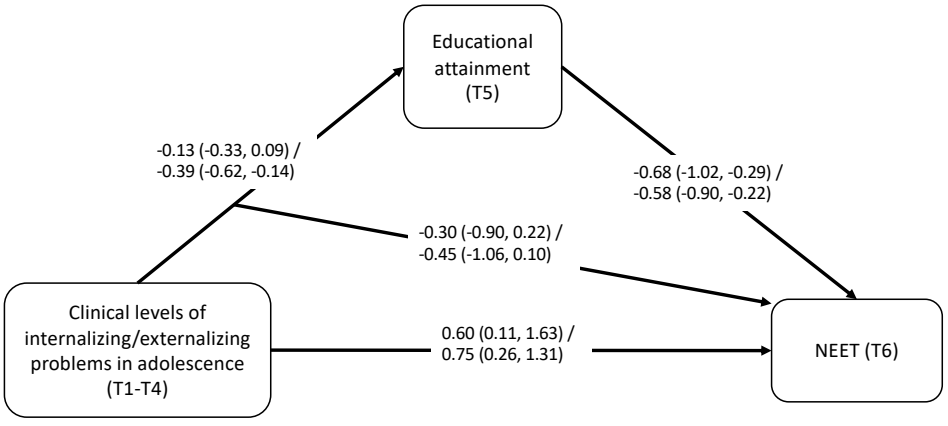

Figure 4.1 Mediation of internalizing and externalizing problems through secondary school completion. Unstandardized parameter estimates and their bootstrapped 95% confidence intervals shown. Parameters for internalizing problems model are on the left, externalizing problems are on the right. Respondent gender, ethnicity, parental education, single parent household at T1, and respondents' physical health at T4 were covariates in the model

As described in Table 4.3, internalizing problems in adolescence were estimated to have an overall effect of increasing the probability of NEET in early adulthood by 6.7% (95%CI: 1.7,14.5%). The total indirect effect through achievement of a BQ certificate was estimated to be a 0.4% increase (-0.2,1.5%) in the probability of NEET, which corresponds to 6.0% of the overall effect. However, the 95%CI includes the null value. The controlled direct effect of internalizing problems, if all participants achieved BQ, was estimated to be a 5.7% increase (95%CI: 1.0,13.0%) in the probability of NEET, which corresponds to 14.9% of the overall effect eliminated.

Externalizing problems in adolescence were estimated to have an overall effect of increasing the probability of NEET by 10.7% (95%CI: 1.5,20.4%). The total indirect effect through achievement of a BQ certificate was estimated to be a 1.6% increase (95%CI: 0.2,3.9%) in the probability of NEET, which corresponds to 15.0% of the overall effect. The controlled direct effect of externalizing problems, if all participants achieved BQ, was estimated to be an 8.3% increase (95%CI: -0.5,17.5%) in the probability of NEET, which corresponds to 22.4% of the overall effect eliminated.

Table 4.3. Direct and indirect effects between clinical level internalizing and externalizing problems in adolescence and early adult NEET status

	Internalizing problems			**Externalizing problems**		
	%	95% CI		%	95%CI	
Overall effect	6.7	1.7	14.5	10.7	1.5	20.4
Pure direct effect	6.3	1.5	14.1	9.1	0.3	18.2
Total indirect effect	0.4	-0.2	1.5	1.6	0.2	3.9
Controlled direct effect	5.7	1.0	13.0	8.3	-0.5	17.5

Notes: Estimates were adjusted for respondents' gender, ethnicity, parental education, single parent household at T1, and respondents' physical health at T4.

4.3.3. Sensitivity analyses

Because there was a significant indirect effect of externalizing problems on NEET through achievement of a BQ certificate, sensitivity analyses were conducted to examine the robustness

of the estimates to unmeasured confounding. As Figure 4.2 illustrates, for a between-group difference in the prevalence of an unmeasured confounder between 0.10 to 0.90, conditional on all other covariates, that confounder must change the probability of NEET by between -0.16 to -0.02, to fully explain the indirect effect of externalizing problems through BQ achievement.

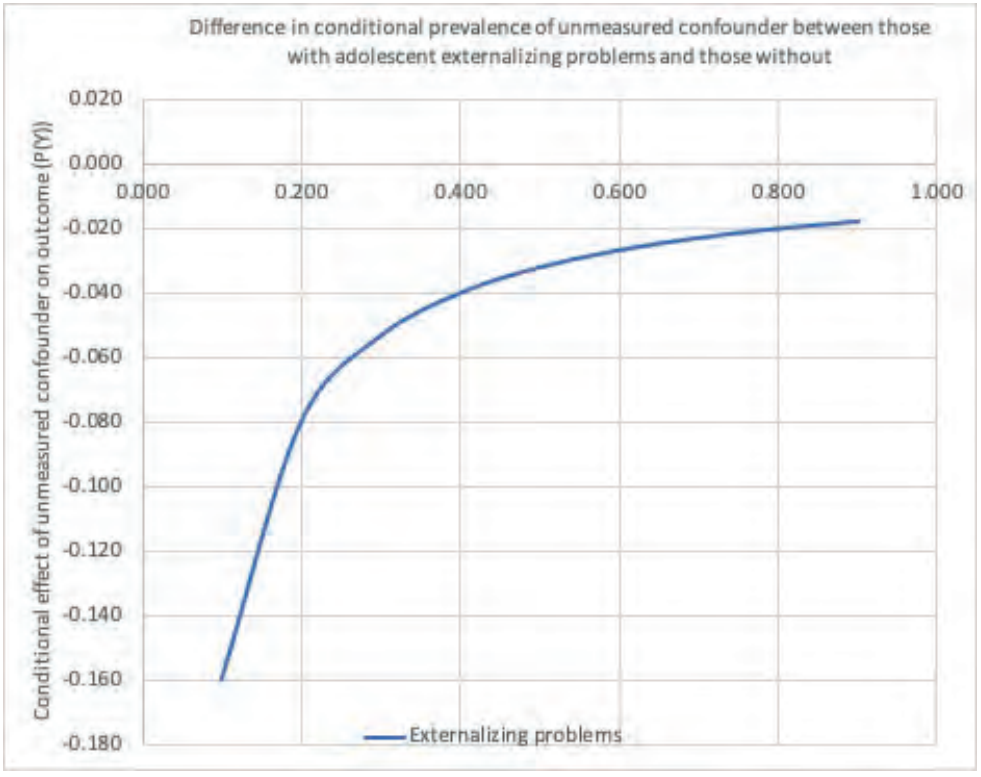

Figure 4.2 Values of the conditional effect of an unmeasured confounder, and the difference in prevalence between exposed and unexposed groups, for which the indirect effect would be entirely explained.

The analyses were also repeated on a sample using cases without missing data, and on a sample without students. The results did not differ from the results obtained from the complete study sample.

4.4. Discussion

This study found that both internalizing and externalizing problems have a direct effect on NEET status. In addition, this study found that for externalizing problems, the achievement of BQ is a key pathway through which it impacts the risk of NEET. Externalizing problems increased the probability of NEET by 10.7% in total, after adjustment. Fifteen percent of the total effect on NEET status was indirect i.e., due to the lower likelihood of attaining a BQ certificate. While estimates are not directly comparable with that of prior studies due to methodological differences, results are consistent with evidence from an American study showing that educational attainment partially mediates the relationship between depression and wages earned.[174] Further, it was estimated that if everyone in the sample achieved a BQ certificate or more, internalizing problems and externalizing problems would lead to an increased probability of NEET by 5.7% and 8.3%, respectively, which would eliminate the overall effect of internalizing and externalizing problems on NEET by 14.9% and 22.4%.

These findings reinforce the importance of education, and its role in human capital accumulation and social inclusion, as pathways to labour market participation in adulthood. Even for those without mental health challenges, low education is associated with a higher risk of both difficulty finding jobs and of job loss.[131 169] The finding of a substantial reduction in the overall effect of adolescent mental health problems on NEET status if everyone had achieved BQ reflects the strong relationship between low-education and NEET status. Moreover, the finding of an indirect effect for externalizing problems supports the interpretation that adolescent externalizing problems may first reduce the probability of completing a basic qualifications certificate, which in turn reduces labour market competitiveness and connection in early adulthood. Externalizing problems may impact the ability to attain basic qualifications through a number of mechanisms at an intrapersonal-level,

including functional impairments to learning,[179] and a greater risk of school absences, truancy, social exclusion, and substance use.[180] At the school level, young people with externalizing problems may also experience social stigma from teachers and peers in association with behavioural issues, that may create barriers for educational success.[181] Young people with a history of externalizing problems may therefore have a higher likelihood of labour market exclusion in early adulthood due to challenges already faced in their school years.

Contrary to the study hypothesis, there was little evidence of an indirect effect of adolescent internalizing problems on NEET in early adulthood through educational attainment. Internalizing problems increased the probability of NEET by 6.7% in total, after adjustment, but the 95%CI contained the null value. These findings align with numerous previous studies which observed that externalizing problems have a stronger effect on secondary school non-completion than internalizing problems. 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.[182] Similarly, in a study of Norwegian young people, self-reported conduct problems had a stronger effect on GPA, years of schooling, and completion of upper-secondary education, than internalizing problems.[181 183] Part of the reason that there is a discrepancy between internalizing and externalizing symptoms may be the social response that individuals with mental health problems are met with. Schools and teachers may respond with greater sanctions to behaviour and attention related problems than to internalizing problems.[181] Findings suggest, however, that the consequences of internalizing problems may vary over the life course, potentially presenting more problems as young people transition into higher education and the labour market.

The substantial direct effects for both internalizing and externalizing problems that were observed indicates that other mechanisms beyond the realm of education confer higher risk of

NEET for young people with adolescent mental health problems. While these other mechanisms were not delineated in this research, previous studies have identified a number of potential intrapersonal and structural contributors. Intrapersonal factors such as the continuation of mental health problems into early adulthood, and poor work-related self-concept have been found to mediate the relationship between adolescent mental health and NEET in early adulthood. 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.[184 185] Such evidence points to key levers that may be specifically important for preventing NEET amongst young people who deal with mental health challenges.

This study advances knowledge about policy-relevant educational pathways between adolescent mental health and NEET status in early adulthood. This is the first study to use the potential outcomes approach to examine educational attainment as a mediator of this relationship. This study made use of a large population cohort with 14 years of follow-up data and high response rates. This study also accounted for key confounders at the individual and family-level, including disadvantage in the family environment.

There are a few limitations to this study. First, young people who were lost to follow-up in this study were more likely to come from low-SES backgrounds and themselves have lower educational attainment. Because the study sample uses a relatively higher educated group, results are likely biased towards the null. Second, this study uses self-reported measures which may be subject to reporting bias. However, the use of well-validated measures may highly mitigate this bias. Third, this study accounted for missing data with the assumption that data are missing at random, which may not be the case. Partial non-response that is related to worse mental health, lower education, or NEET status would bias the results towards the null. Finally, results of the sensitivity analyses suggest that the finding of an indirect effect of externalizing

problems through educational attainment appear to be sensitive to plausible levels of unmeasured confounding. For example, this study did not adjust for behavioural confounders of the mediator-outcome relationship such as substance use, which are not only predictive of both educational attainment and employment,[186 187] but also found to co-occur with both internalizing and externalizing disorders.[188] Models did however, adjust for a variety of demographic and health variables that may mitigate such confounding effects.

This study has several implications for future research and practice. First, this study showed that educational attainment accounts for a considerable proportion of the effect through which externalizing problems affect the probability of NEET in early adulthood. This finding encourages school-based programs to target the needs of young people who display externalizing symptoms. Second, this study suggests a need to study the role of educational systems and interventions with greater detail. Future research should replicate this study in other contexts to examine the generalizability of the findings in other educational systems and labour market contexts. Finally, findings showed that most of the effect of adolescent mental health on the probability of NEET in early adulthood cannot be ascribed to educational attainment. Future research should continue to study and identify policy-relevant mechanisms at the individual and structural level that may be leveraged to best support young people in their early labour market experiences.