Mental health trajectories from childhood to young adulthood affect the educational and employment status of young adults: results from the TRAILS study

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ABSTRACT

Background Young adults at work without basic educational level (BEL), and young adults in Neither Employment, Education nor Training (NEET) are at high risk of adverse employment outcomes. Evidence lacks on the impact of mental health problems during childhood, adolescence and young adulthood on employment outcomes of young adults. Therefore, the aims of this study were to (1) identify trajectories of mental health problems from childhood to young adulthood and (2) investigate the relation between these trajectories and the educational or employment status of young adults.

Methods Data were used from the Tracking Adolescents' Individual Lives Survey (TRAILS), a Dutch prospective cohort study with 9-year follow-up. Trajectories of mental health problems measured at ages 11, 13.5, 16 and 19 years were identified in 1711 young adults with latent class growth models.

Results Young adults with high-stable trajectories of total problems, from childhood to young adulthood, were more likely to work without BEL or be in NEET at age 19, than to be at school or to work with BEL (28.0% vs 16.0%, p=0.01). The same was found for externalising problems (35.3% vs 23.2%, p=0.02). For internalising and attention problems, no statistically significant differences were found.

Conclusions Young adults with high-stable trajectories of mental health problems from age 11 to 19, were at risk of adverse employment outcomes. Interventions reducing mental health problems in childhood may improve the educational or employment status of young adults and their chances for successfully entering the labour market.

INTRODUCTION

Mental health problems from childhood to young adulthood may largely affect the educational and employment status of young adults. When looking at the educational or employment status of young adults, they are either at school, at work or in Neither Education, Employment nor Training (NEET). Among young adults at work, two groups can be distinguished: one group with a basic educational level (BEL, ie, finished at least secondary education) and the other without BEL. Achieving a BEL is important for educational attainment and future employment of young adults[1] and is, therefore, a major aim of governmental policies and interventions. Despite this, a recent Organisation for Economic Co-operation and Development (OECD) report[1] showed that among young adults at work, 13.5% left the educational system without BEL. These young adults lack essential skills to be successful at the labour market.[2 3] If they find a job, they more often have insecure and temporary jobs with low wages.[2 3] These disadvantages seem to accumulate over the life course, that is, leaving school without BEL will negatively affect educational and occupational achievement, financial security and social status.[2–4]

Even more at risk for adverse employment outcomes and social exclusion are young adults in NEET, with or without BEL.[5] Young adults in NEET often have a low socioeconomic background, show poor academic performance and low levels of school attendance.[6] A UK survey among 1.004 young adults (age 16–24 years) in NEET, showed that being in NEET negatively influenced their well-being: almost 40% suffered from stress and anxiety, 33% from depression, 37% rarely left the house and 26% was eating unhealthy food.[7]

Yet, longitudinal research linking mental health problems during childhood, adolescence and young adulthood to educational and employment outcomes among young adults is scarce. McLeod and Fettes[8] found that young adults (age 21 years) with decreasing or increasing trajectories of internalising and externalising problems from childhood into adolescence were less likely to complete high school, than young adults with low-stable trajectories. Furthermore, Pingault *et al*[9] showed that high-stable, decreasing and increasing trajectories of inattention in childhood predicted high school dropout (age 22 years). Other studies found that adolescents with psychiatric disorders were less likely to complete high school.[4 10–12]

While all aforementioned studies used early school dropouts as outcome, recent studies also addressed the employment status of young adults (ie, being at work or in NEET). Among adolescents, aged 12–17 years, living in Mexico, Benjet *et al*[13] showed that mental health problems were associated with being at work or in NEET, but not with being at school. Cornaglia *et al*[14] found that mental health problems of adolescent girls in the UK (age 14–15 years) were associated with a higher risk of being in NEET. Research of Fletcher 15 showed that adolescent depression is related to adult labour market outcomes, such as employment and wages.

Almost all prior research has been conducted with cross-sectional data[10 14] or with longitudinal

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data in which mental health problems were measured at only one time point.[4 10 15] Therefore, the aims of this study were (1) to identify trajectories of mental health problems from childhood to young adulthood and (2) to investigate the relation between these trajectories of mental health problems and the educational or employment status of young adults.

METHODS

Study design and sample

The study was conducted in the framework of the TRAILS (TRacking Adolescents' Individual Lives Survey) study. TRAILS is a prospective cohort study of Dutch adolescents examining the aetiology and course of psychopathology.[16 17] In March 2001, 2935 children born between 1 October 1989 and 30 September 1991 were selected. A sample of 2230 children (11.1 years, SD 0.55) was eligible, and both child and parent provided informed consent. Of the baseline participants, 2149 children participated in the second wave (96.4%, 13.5 years, SD 0.53), 1816 in the third wave (81.4%, 16.3 years, SD 0.69) and 1881 in the fourth wave (84.3% of baseline, mean age 19 years, SD 0.58). At baseline, no differences in psychopathology between respondents and non-respondents were observed;[16] also during follow-up no differences in psychopathology between those retained and those who dropped out were found.[18] More detailed information about design, sample, procedures and non-response analysis of the TRAILS study can be found elsewhere.[16 17] The present study used data of 1711 (76.8% of the initial cohort) TRAILS participants, from whom educational or employment status was known at age 19. The Dutch Medical Ethical Committee approved all the protocols of the TRAILS study.

Measures

Mental health problems were assessed using the Dutch version of the Youth Self Report (YSR at age 11, 13.5 and 16) and the Adult Self Report (ASR at age 19). The validity and reliability of both instruments are high.[19 20] From the original ASR with 126 items, 14 items were removed to make it comparable with the 112 item YSR. Participants were asked to answer questions about behavioural and emotional problems in the past 6 months with 0=not true, 1=somewhat or sometimes true or 2=very or often true. The following scales are derived from the YSR and ASR: anxious/depressed, withdrawn/depressed, somatic problems, social problems, thought problems, attention problems, aggressive behaviour and rule-breaking behaviour. All domains were included in a total score. The broad-band scale 'externalising problems' comprises aggressive and rule-breaking behaviour. The broad-band scale 'internalising problems' comprises anxious/depressed, withdrawn/depressed and somatic problems. The subscale 'attention problems' consists of nine items regarding difficulties with concentrating, paying attention for a long time, daydreaming or getting lost in his/her thoughts. Standardised scores of all scales were used.

Educational or employment status was determined at age 19 by asking respondents if they were at school or not. When not at school, participants were asked if they had a job. To determine if they had achieved a BEL, participants were asked if they had finished at least secondary education. Young adults were seen as being in NEET when they were not at school or at work. Participants were categorised into two groups: (1) young adults at school or at work with BEL and (2) young adults at work without BEL or in NEET.

Intelligence was determined at age 11 with the Vocabulary and Block Design subtests of the Revised Wechsler Intelligence Scales for Children (WISC-R)[21] leading to IQ scores.[22 23]

Family composition was measured at age 11 with two questions regarding the number of parents in the household and if biological parents were divorced in the period from birth to age 11.

Parental educational level concerned the highest level of education reached by father or mother. If both levels were known, the highest level of education was used and categorised into: low (primary, lower vocational and lower secondary education), medium (intermediate vocational and intermediate secondary) and high (secondary, higher vocational and university).

Physical health was measured at age 11 with the question: "How was your physical health the last two years?" Participants rated their physical health on a five-point Likert scale (1=very poor, 5=very good).

Data analyses

Descriptive data were presented for all variables by educational or employment status. Differences were tested by χ^2 tests for categorical variables (ie, gender, family composition, parental educational level and physical health) and F-tests in one-way analysis of variance for continuous variables (ie, age and intelligence, mental health problems).

Trajectories of mental health problems were identified based on all four measurement waves with growth mixture models (GMM). GMM identifies differentiated subpopulations (latent classes), each with their specific longitudinal trend.[21 22] We specifically constructed a random intercept model with an unstructured time trend within individuals (discrete time) and with adjustment of the individual problem score for gender, intelligence, family composition, parental educational level and physical health.

The trajectories were predicted by including age categories to avoid making prior assumptions about the way in which mental health scores evolve during ageing. The parameters related to the age variables provide the expected mean of scores per age. The random intercept allows individual trajectories to vary around the mean. The GMM estimates different trajectory patterns in the population defined by latent classes. Each latent class has specific age parameters defining its trajectory. Additionally, the effect of the covariates and the residual variances were estimated differently per class. The GMM also estimates the size of each class.

To set the optimal number of classes, the Bayesian information criterion (BIC) was calculated. BIC is based on the log-likelihood of the model and the number of parameters in the model. Following routine approaches, the model with the lowest BIC was used. To investigate the relationship between class-trajectory membership of mental health problems and educational or employment status, χ^2 tests were performed. The statistical analyses were conducted using SPSS V.20.0 and Mplus V.7.0.

RESULTS

Sample characteristics

The sample consisted of 1711 young adults (54.7% boys), with a mean age of 19 years (SD=0.58), and a mean IQ score of 99.3 (SD=14.6). The majority of the young adults had highly educated parents (44.1%, medium=35.3%, low=20.6%) and were from two parent families (79%). Further characteristics are shown in table 1. Compared to young adults at school or at work with BEL, young adults at work without BEL or in NEET had more often parents with a low educational level (19.1% vs 39.3%) and were more often from one parent families (20.1%

Table 1 Sample characteristics by educational or employment status at age 19

Variables	Age*	Educational or employment status: School/work+BEL	Work-BEL/NEET	p Value†
Gender, N (%)	11			0.58
Boys		869 (54.9)	67 (52.3)	
Girls		714 (45.1)	61 (47.7)	
Age in years, mean (SD)	19	19.0 (0.58)	19.3 (0.61)	<0.001
Parental educational level, N (%)	11			<0.001
Low		301 (19.1)	50 (39.3)	<0.001
Medium		557 (35.4)	43 (33.9)	
High		715 (45.5)	34 (26.8)	
Family composition, N (%)	11			0.002
1 parent		318 (20.1)	41 (32.0)	
2 parents		1265 (79.9)	87 (68.0)	
Intelligence, mean (SD)	11	99.9 (14.3)	90.9 (14.8)	<0.001
Physical health, N (%)	11			0.60
Poor		58 (3.7)	6 (4.8)	
Medium		287 (18.4)	26 (21.0)	
Good		1219 (77.9)	92 (74.2)	
Total problems, mean (SD)				
Self-report (YSR)	11	35.8 (19.6)	37.2 (22.1)	0.46
Self-report (YSR)	13.5	34.3 (18.8)	37.9 (21.5)	0.04
Self-report (YSR)	16	34.2 (18.6)	38.0 (22.5)	0.06
Self-report (ASR)	19	28.8 (21.6)	36.2 (26.5)	<0.001
Externalising problems, mean (SD)				
Self-report (YSR)	11	8.5 (6.0)	8.9 (6.8)	0.54
Self-report (YSR)	13.5	9.0 (6.1)	10.3 (7.0)	0.02
Self-report (YSR)	16	9.8 (6.7)	11.3 (7.3)	0.04
Self-report (ASR)	19	7.2 (6.5)	9.5 (8.5)	<0.001
Internalising problems, mean (SD)				
Self-report (YSR)	11	11.4 (7.3)	11.7 (8.3)	0.68
Self-report (YSR)	13.5	10.4 (7.4)	11.2 (8.7)	0.22
Self-report (YSR)	16	9.8 (7.6)	10.4 (9.2)	0.45
Self-report (ASR)	19	7.7 (7.5)	10.0 (9.2)	<0.001
Attention problems, mean (SD)				
Self-report (YSR)	11	4.4 (2.7)	4.5 (2.8)	0.51
Self-report (YSR)	13.5	5.0 (2.9)	5.4 (3.1)	0.11
Self-report (YSR)	16	5.3 (3.0)	5.7 (3.3)	0.21
Self-report (ASR)	19	4.0 (2.9)	4.5 (3.1)	0.13

*Age at which variable was measured.
†χ^2 Tests are performed for categorical variables and F-tests in one-way analysis of variance for continues variables.
ASR, Adult Self Report; BEL, basic educational level; NEET, Neither Employment, Education nor Training; YSR, Youth Self Report.

vs 32%). The IQ scores of young adults at work without BEL or in NEET were on average lower than the IQ scores of young adults at school or at work with BEL (90.9 vs 99.9).

Trajectories of mental health problems from childhood to young adulthood

The BIC was used to determine the optimal number of classes (table 2). For *total problems*, latent class analyses revealed four trajectories (figure 1A): a high-stable trajectory (16.8% of the study sample), a decreasing trajectory (14.6%), a moderate-stable trajectory (37.2%), and a low-stable trajectory (31.4%). For *externalising problems*, five trajectories were identified (figure 1B): a high-stable trajectory (18.8%), a decreasing trajectory (8.2%), a moderate-high trajectory (36.2%), a moderate-low trajectory (30.2%) and a low-stable trajectory (6.7%). For *internalising problems*, five trajectories were identified (figure 1C): a high-stable trajectory (7.9%), a moderate-high trajectory (35.1%), a decreasing trajectory (9.2%), a moderate-low trajectory (20.8%) and a low-stable trajectory (26.9%). For *attention problems*, three trajectories were identified (figure 1D): a high-stable trajectory (15.1%), a moderate-stable trajectory (64.8%) and a low-stable trajectory (20.1%).

Table 2 Trajectories of mental health problems from ages 11 to 19: fit statistics for latent class growth models with increasing number of classes, per type of problems

	Class	Number of parameters	Log-likelihood	Bayes information criterion*	Entropy
Total problems	3	39	3012.0	−5682.6	0.65
	4	**52**	**3097.5**	**−5739.7**	**0.64**
	5	65	3144.0	−5719.0	0.68
Externalising problems	4	52	2777.5	−5099.3	0.71
	5	**65**	**2850.9**	**−5132.1**	**0.72**
	6	78	2890.1	−5096.7	0.72
Internalising problems	4	52	1710.7	−2965.8	0.70
	5	**65**	**1772.9**	**−2976.2**	**0.69**
	6	78	1819.6	−2955.7	0.74
Attention problems	2	26	−958.2	2144.2	0.54
	3	**39**	**−872.6**	**2087.1**	**0.68**
	4	52	−832.1	2119.9	0.53

*Used model is indicated in bold.

The relationship between trajectories of mental health problems and educational or employment status

Table 3 shows that young adults with high-stable trajectories of total and externalising problems were more likely to be at work without BEL or in NEET, than to be at school or to work with BEL (28% vs 16%, p=0.01; and 29% vs 18%, p=0.03, respectively). For internalising and attention problems, no significant differences were found regarding the distribution of class membership.

DISCUSSION

This study is one of the few prospective studies that assessed trajectories of mental health problems from childhood to young adulthood, and investigated the relationships of these trajectories with the educational or employment status of young adults. We found four trajectories for total problems: high-stable, decreasing, moderate-stable and low-stable. For externalising and internalising problems we found five trajectories: high-stable, decreasing, moderate-high, moderate-low and low-stable. For attention problems three trajectories were identified: high-stable, moderate-stable and low-stable. Young adults with a history of high-stable trajectories of total and externalising problems were more likely to be at work without BEL or to be in NEET.

We identified stable and decreasing trajectories for total, externalising and internalising problems. Prior research on trajectories of mental health problems among children and adolescents showed mixed results, that is, along with stable and decreasing trajectories, increasing trajectories for externalising,

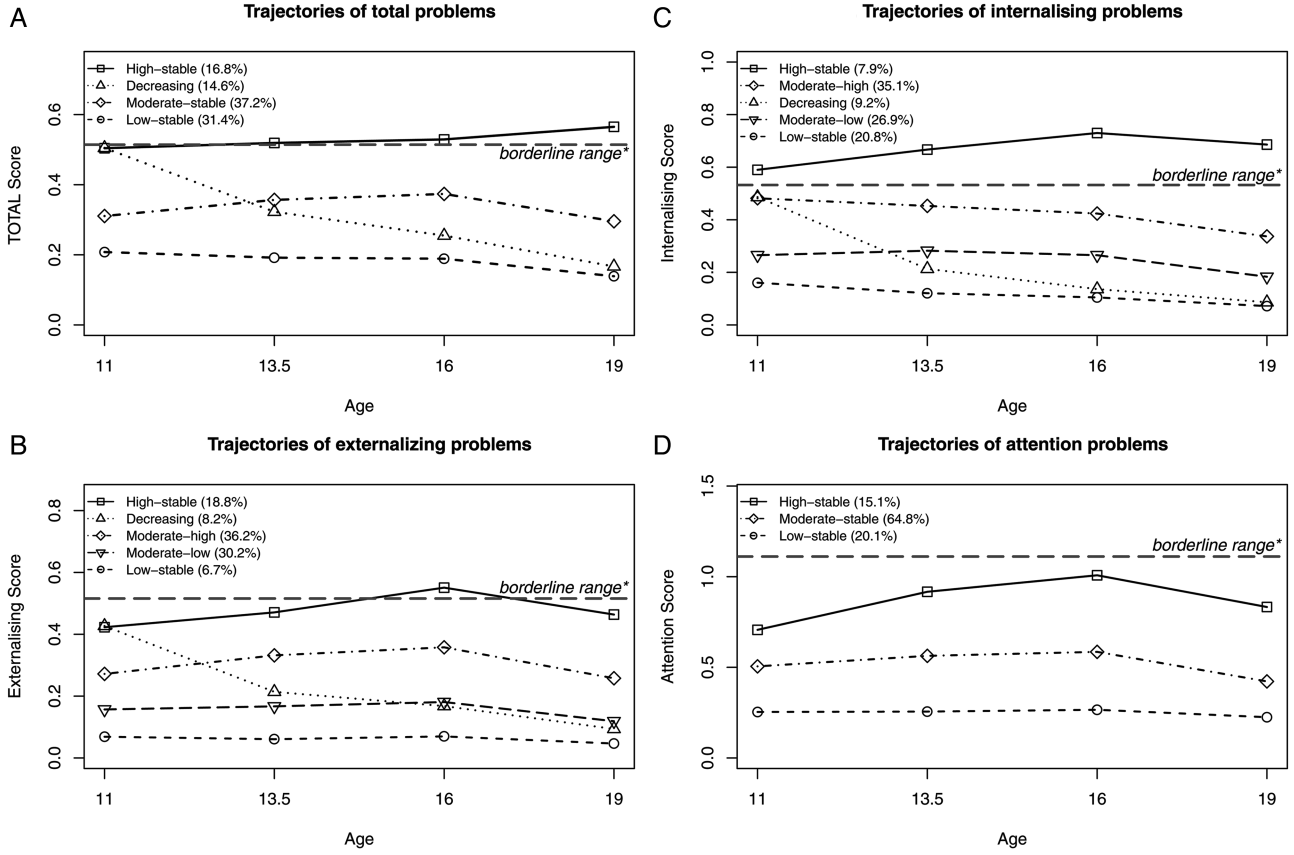

Figure 1 Adolescents categorised according to their trajectory of Youth Self Report/Adult Self Report (YSR/ASR) mental health problems from ages 11 to 19. (Trajectories of total (1A), externalising (1B), internalising (1C), and attention problems (1D)). *Note*: Borderline range is based on ASEBA's cut-off scores for the Netherlands.[27]

internalising[8] and attention problems were found.[9] We cannot exclude that some participants have an increasing trajectory of mental problems, but we were not able to detect them, due to the small number. However, our findings are in line with Tick *et al*[24] who found no increase of externalising, internalising or attention problems over a 10-year period in three cross-sectional samples of Dutch adolescents. This suggests that these trajectories may be generalisable.

Based on the identified trajectories of mental health problems, only a small percentage of the sample may seem to have borderline or clinical mental health problem scores. However, these trajectories represent a group average implying that a considerable number of individual trajectories will be higher.

Our study confirmed that mental health problems affect educational and employment status of young adults in a negative way, despite the different settings in which the studies took place (ie, different cultures and educational systems). Young adults with high-stable trajectories of total and externalising problems were more likely to be at work without BEL or in NEET. Other studies also showed negative associations between externalising problems and educational and employment outcomes. McLeod and Fettes[8] reported that adolescents with

Table 3 Distribution of class membership per educational or employment status (expected numbers and percentages across classes)

	High-stable	Decreasing	Moderate-stable	Moderate-high	Moderate-low	Low-stable	χ^{2*}	df	p Value**
Total problems							11.75	3	**0.01**
School/work+BEL	248 (15.9)	230 (14.8)	581 (37.4)			495 (31.9)			
Work-BEL/NEET	34 (27.8)	15 (12.1)	42 (34.6)			31 (25.4)			
Externalising problems							10.93	4	**0.03**
School/work+BEL	280 (18.0)	128 (8.2)	x	561 (36.1)	479 (30.8)	106 (6.8)			
Work-BEL/NEET	35 (28.9)	9.2 (7.5)	x	45 (36.9)	26 (21.6)	6 (5.1)			
Internalising problems							6.64	4	0.16
School/work+BEL	117 (7.5)	543 (34.9)		543 (34.9)	324 (20.8)	424 (27.3)			
Work-BEL/NEET	16 (13.1)	45 (36.9)		45 (36.9)	26 (21.2)	27 (22.4)			
Attention problems							1.13	2	0.57
School/work+BEL	231 (14.9)	x	1007 (64.8)			316 (20.4)			
Work-BEL/NEET	22 (17.7)	x	79 (64.8)			21 (17.5)			

* X2 test were performed to test for differences between distribution of class membership.
** significant values are indicated in bold.
BEL, basic educational level; NEET, Neither Employment, Education nor Training.

high-stable, decreasing and increasing trajectories of externalising problems were less likely to complete high school and to enter college, compared to adolescents with low-stable trajectories of externalising problems. Benjet *et al*[14] found that adolescents in NEET were at higher risk of substance use and behavioural problems, and that adolescents at work (with or without BEL) were at higher risk of substance use and behavioural problems.

For internalising problems, we did not find differences between young adults at work without BEL and in NEET and others, which is in contrast with the existing literature. McLeod and Fettes[8] found that young adults with increasing and decreasing trajectories of internalising problems were less likely to complete high school and to enter college. Benjet *et al*[14] found that adolescents in NEET are at higher risk of mood disorders. Cornaglia *et al*[15] showed that girls with anxiety and depression, or anhedonia and social dysfunction are at high risk of being in NEET compared with girls without these mental health problems.

For attention problems, no differences were found between the young adults at work without BEL and in NEET and others regarding the distribution among the classes. In contrast, Pingault *et al*[9] found that high-stable, decreasing and increasing trajectories of attention problems in childhood predicted high school dropout. This might be due to the different age span, that is, we assessed trajectories of mental health problems from age 11 to 19 whereas Pingault *et al* have used trajectories from age 6 to 12.

A strength of this study is that we used valid and reliable measures of mental health problems, the YSR and ASR, which are the most commonly used self-report questionnaires in child and adolescent research.[19 20 25] Another strength is the longitudinal nature of the design with low loss to follow-up, that is, the TRAILS study had high retention rates at the different measurement waves, ranging from 81.4% to 96.4%.

The present study also has several limitations. We measured the outcome at the same time point as the end of the trajectory, allowing reverse causation. Therefore, we have re-run the analysis by leaving out mental health problems at age 19, but the results remained the same. We can conclude that the last time point does not change the trend, which started at age 11. In other words, the trend of the trajectories seems to be (more or less) stable over time. Another limitation concerns the limited number of young adults at work without BEL and in NEET, that is, we were not able to distinguish between those groups or to stratify by gender. Furthermore, we used the YSR for the first three measurement waves and the ASR for the fourth measurement wave, which hampered a full comparison.[19 20] Participants with severe mental health problems and/or poor educational or employment outcomes are more likely to dropout. However, previous reports[16 18] showed that TRAILS respondents and non-respondents did not differ regarding mental health problems at age 11, and neither did the dropouts compared with hard-to-recruit retainers.

The majority of the sample (85–90%) had stable trajectories of mental health problems from childhood (ie, age 11) to young adulthood (ie, age 19). These findings suggest that interventions aiming to reduce mental health problems should start in late childhood to prevent children to remain in high-stable trajectories of mental health problems. This is in line with a prior study, in which we found that mental health problems at age 11 predict educational attainment at age 19.[26]

Moreover, we found that young adults with high-stable trajectories of total and externalising problems were more likely to be at work without BEL or to be in NEET. Supporting young adults without BEL to continue education seems beneficial, because a higher educational level increases chances at the labour market.[5 6] Young adults who are in NEET, but who have achieved a BEL, might be helped with extra support in finding and getting a suitable job. Future research should only focus on young adults who are in NEET due to multiple problems and not on young adults who are in NEET because of a transition, for example, they are in between school and further education.

The present study also showed that trajectories of mental health problems from childhood to young adulthood affect the educational and employment status of young adults. From a life course perspective, it would be interesting to follow-up these young adults into employment. Further research is needed to understand the influence of poor mental health trajectories on future employment outcomes.

Mental health problems started in childhood and were stable over time for the majority of our sample. Young adults with a history of high-stable trajectories of total or externalising problems are more likely to be at work without BEL or in NEET. Early detection and early treatment of mental health problems are important to prevent adverse educational and employment outcomes in later life.

What is already known on this subject?

Mental health problems negatively influence educational and employment outcomes of young adults. To date, little is known about the history of mental health problems when looking at educational and employment outcomes.

What this study adds?

We identified trajectories of mental health problems from childhood to young adulthood and linked them to educational and work outcomes of young adults. Our findings clearly show that high-stable trajectories of mental health, which started in childhood, deteriorate young adults' future perspectives with regard to educational and employment outcomes. Early detection and treatment of mental health problems are of utmost importance to ensure a smooth transition into the labour market.

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Contributors KV, UB and SAR conceived the study. KV and JAO analysed the data. FCV supervised the data collection. KV wrote the initial draft. UB and SAR contributed to the conception and design of the initial draft. All authors made substantial contributions to the final draft and approved its submission.

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Competing interests FCV is head of the department of Child and Adolescent Psychiatry at Erasmus MC, which publishes ASEBA materials and from which he receives remuneration.

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Data sharing statement TRAILS data of the T1, T2 and T3 measurement waves are deposited in the Data Archiving and Networked Services of the Royal Dutch Academy of Sciences (DANS-KNAW) and can be accessed at http://www.dans.knaw.nl. The T4 measurement wave will become available in this archive in the first half of 2014.

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