Original article

Scand J Work Environ Health. 2017;43(4):316–325. doi:10.5271/sjweh.3651

A life course perspective on mental health problems, employment, and work outcomes

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Veldman K, Reijneveld SA, Verhulst FC, Ortiz JA, Bültmann U. A life course perspective on mental health problems, employment, and work outcomes. *Scand J Work Environ Health.* 2017;43(4):316–325. doi:10.5271/sjweh.3651

Objectives Little is known about how employment and work outcomes among young adults are influenced by their life-course history of mental health problems. Therefore, the aims of this study were to (i) identify trajectories of mental health problems from childhood to young adulthood and (ii) investigate the association between these trajectories and employment and work outcomes among young adults.

Methods Data were used from 360 participants of the Tracking Adolescents' Individual Lives Survey (TRAILS), a Dutch prospective cohort study, with 12-year follow-up. Trajectories of externalizing and internalizing problems were identified with latent class growth models. Employment conditions and work outcomes (ie, psychosocial work characteristics) were measured at age 22. We assessed the association between mental health trajectories and employment conditions and work outcomes.

Results Four trajectories of mental health problems were identified: high-stable, decreasing, moderate-stable and low-stable. Young adults with high-stable trajectories of externalizing problems worked over six hours more [B=6.71, 95% confidence interval (95% CI) 2.82–10.6] and had a higher income [odds ratio (OR) 0.33, 95% CI 0.15–0.71], than young adults with low-stable trajectories. Young adults with high-stable trajectories of internalizing problems worked six hours less per week (B=-6.07, 95% CI -10.1– -2.05) and reported lower income (OR 3.44, 95% CI 1.53–7.74) and poorer psychosocial work characteristics, compared to young adults with low-stable trajectories.

Conclusions Among young adults who had a paid job at the age of 22 (and were not a student or unemployed), those with a history of internalizing problems are less likely to transition successfully into the labor market, compared to other young adults.

Key terms depression; employment condition; externalizing problem; internalizing problem; life course epidemiology; longitudinal study; mood disorder; psychosocial work characteristic; young adult.

Mental health problems are negatively associated with employment outcomes, eg, employment rates and wages (1–6). The burden of mental health problems goes along with enormous costs for individuals, employers and society, due to high unemployment and sickness absence rates, productivity loss at work, and health care utilization. For example, in the Netherlands, the total costs for mental health problems is equal to 3.3% of GDP (7).

About 75% of all mental health problems have their onset in adolescence, and the majority of these problems track into adulthood (8–10). On average, the onset of mental health problems, both mild and severe, is around 14 years of age (11). The onset of mental health disorders varies per type of disorder: 10 years of age for behavioral disorders, 14 years of age for mood disorders, 9 years of age for anxiety disorders (9). Adolescence can be seen as a critical period for later life, characterized by physical, cognitive, psychological and social developmental processes (11). Adopting a life-course perspective is of utmost importance to understand how mental health problems in adolescence are related to adverse labor market and work outcomes later in life (12).

Longitudinal research linking mental health problems from childhood to adolescence to employment

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and work outcomes is scarce. Mental health problems comprise various behavioral and emotional problems, including externalizing and internalizing problems, respectively (8, 9). Externalizing problems are behavioral problems that concern others or the environment, like aggressive and delinquent behavior. Internalizing problems are emotional problems that concern the self, such as anxiety and depression. The available evidence shows that both externalizing and internalizing problems in adolescence are related to a variety of adverse life outcomes, including poor employment conditions (1–6). For example, Wickrama et al (6) found that adolescent conduct disorder, anti-social behavior and depressive symptoms were negatively associated with work stability (ie, full-time job without disruptions in previous year) and economic stability (ie, no financial cutbacks or negative economic events) in adulthood. Fletcher (4) and Johar & Truong (5) found that depression among adolescence is associated with higher unemployment rates, lower wages and receiving social payment in young adulthood. From a prevention perspective, these results suggest that effective policies and interventions aiming at mental health problems in early life may ameliorate the course of working life.

Conclusive inferences on the impact of adolescent mental health on entry of the labor market are limited by a number of methodological weaknesses in the available evidence. First, most studies assessed mental health problems once, while there is variation in the onset and course of mental health problems across childhood and adolescence. Evidence lacks on how different developmental trajectories of mental health problems affect employment outcomes in adulthood. Second, available evidence solely regards global indicators of employment conditions, including working hours, wages and employment rates. Knowledge on how adolescent mental health problems affect young adults' perceptions of their psychosocial work characteristics (eg, meaning of work, decision authority) is lacking. Prior studies have shown that poor perceptions of the psychosocial work environment are associated with adverse labor market and health outcomes in adulthood. (13–16) However, the aforementioned studies were performed among working populations, making it impossible to disentangle whether early mental health problems influence the perception of the psychosocial work environment. Two mechanisms explain the complex association between mental health problems and work outcomes: the drift mechanism and the gloomy perception mechanism (17, 18). The drift mechanism states that employees with (mental) health problems are at a higher risk of adverse work outcomes, because they have higher rates of absenteeism or unemployment. Eventually, these employees drift off to jobs with poor employment conditions. The gloomy perception mechanism suggests that employees with (mental) health problems interpret their work environment more negatively over time. Evidence on the impact of early mental health problems on starters at the labor market, ie, young employees not yet influenced by a work history, may help to better understand if and how young adults are affected by their history of mental health problems regarding employment conditions and psychosocial work characteristics. The longitudinal 12-year follow-up TRacking Adolescents' Individual Lives Survey (TRAILS), covering adolescence and young adulthood with biennial measurements, enabled us to identify trajectories of mental health problems from childhood to young adulthood and examine whether the class membership of mental health trajectories predicted employment condition and psychosocial work characteristics.

Methods

Sample and design

We analyzed the data of TRAILS participants who had a paid job and were not enrolled in academic activities as a student (ie, not following a study leading to a diploma) at age 22 years, and who had data on their mental health status for at least three measurement points. The final study sample consisted of 360 participants out of 2230 (16.1%). Data collection of TRAILS started in March 2001 with a request to five municipalities in the Northern part of the Netherlands, both urban and rural areas, to provide the names and addresses of all children born between 1 October 1989 and 30 September 1991. In total, 2230 children and their parents provided informed consent to participate [mean age 11.1, standard deviation (SD) 0.55 years, response rate 76.0%]. At baseline, no differences in psychopathology between respondents and non-respondents were observed (19). In the second wave, N=2149 children participated [96.4% of baseline, mean age 13.5 (SD 0.53) years], in the third wave N=1816 [81.4% of baseline, mean age 16.3 (SD 0.69) years] in the fourth wave N=1881 [84.3% of baseline, mean age 19.1 (SD 0.58) years], and in the fifth wave N=1775 [79.6% of baseline, mean age 22.3 (SD 0.65) years]. A more detailed description of the study can be found elsewhere (19–21).

To examine the external validity of the study sample, we compared the included with the excluded participants. The results show that included participants were more often female and reported slightly lower intelligence scores, and had more often low-educated parents than excluded participants. Regarding mental health problems at baseline, no significant differences were found (data not shown).

Measures

Predictors. Mental health problems were measured at age 11, 13.5 and 16 years with the Youth Self-Report (YSR) and at age 19 and 22 with the Adult Self-Report (ASR), both valid and reliable measures (22, 23). From the original ASR with 126 items, 14 items were removed to make it comparable with the 112-item YSR. Questions regard externalizing (ie, behavioral) and internalizing (ie, emotional) problems in the past 6 months and can be scored as 0=not true, 1=somewhat or sometimes true, or 2=very true or often true. The scale externalizing problems contains the subscales aggressive behavior and delinquent behavior (α=0.86). The scale internalizing problems contains the subscales anxious/depressed, somatic complaints and withdrawn/depressed (α=0.87). Mean item scores were used (ie, raw sum scores divided by the number of items); higher scores indicate higher levels of externalizing or internalizing problems.

Outcome variables. Employment conditions concerned work hours, type of employment contract and income. Work hours were measured at age 22 years by asking the participants how many hours they worked per week. Type of employment contract was measured at age 22 years by asking the participants whether they had a temporary or permanent contract. Income was measured by asking participants their average personal monthly income (responses dichotomized into <€900 or >€900/month).

Psychosocial work characteristics were measured at age 22 years with six 2-item subscales of the short version of the Copenhagen Psychosocial Questionnaire (COPSOQ, inter-item correlations ranging from 0.32–0.74): quantitative demands, work pace, decision authority, possibilities for development, job satisfaction and meaning of work (24). The items have five response categories (ranging from 0–4). Item scores were summed up with higher scores indicating higher levels of quantitative demands, decision authority, possibilities for development, job satisfaction, meaning of work and work pace.

Confounding variables. Confounding variables concerned gender, intelligence, parental educational level, physical health and negative life events. Gender was assessed at age 11 years with a questionnaire. Intelligence was determined at age 11 years with the Vocabulary and Block Design subtests of the Revised Wechsler Intelligence Scales for Children (WISC-R) (25), leading to IQ scores (26, 27). Parental educational level was measured at age 11 years with a question about the highest level of education of the father or mother. If both levels were known (which was the case in 85% of the parents), the highest level of education was used. Level of education was categorized 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 years with the question: "How was your physical health the last two years?" Participants rated their health on a 5-point Likert-scale, with higher scores indicating better health. Negative life events were assessed at age 11 using 11 items, mostly answered by one of the parents. Items concerned family poverty (ie, monthly net family income of <€1135), divorce of parents, death of parent(s) or sibling(s), serious illness of parent(s) or sibling(s), not living at home for more than three months, hospitalization (more than once), having an injury, serious illness of a friend, being bullied. Being bullied was measured with peer nominations. For all other childhood adversities, response options were yes/no. A sum score was calculated, and categorized into: 0=0 childhood adversities, 1=1–2 childhood adversities, 2=≥3 or more childhood adversities.

Data analysis

First, we assessed the background characteristics of the sample. Second, we identified trajectories of externalizing and internalizing problems, based on all five measurement waves with growth mixture models (GMM). GMM identifies differentiated subpopulations (latent classes), each of them with their specific longitudinal trend (28, 29). Specifically, a random intercept model was constructed with unstructured time trend within individuals (discrete time), in which the individual problems score was adjusted for gender, intelligence, parental educational level, physical health, and negative life events. The time trend effect, residual variances and covariates' parameters varied per class. The selection of the model was based on the optimal combination of model fit indices [ie, log-likelihood and Bayesian Information Criterion (BIC)], entropy (ie, the probability of assignment to the right trajectory), and substantive meaningfulness of classes. Third, we performed linear (for continuous outcomes) and logistic (for categorical outcomes) regression analyses, to examine the associations between class membership of mental health trajectories and employment conditions and psychosocial work characteristics. Analyses of the data showed that all model assumptions of linear regression (ie, linearity, homoscedasticity, normality, independence) were met. All regression analyses were done separately for externalizing and internalizing problems, and adjusted for gender, intelligence, parental educational level, physical health and negative life events, and for comorbidity of mental health problems (ie, for internalizing and for externalizing problems when looking at externalizing and internalizing problems, respectively).

The statistical analyses were conducted using SPSS version 23.0 and Latent GOLD version 4.5 (30, 31).

Results

Sample characteristics

The total sample [mean age of 22.3 (SD 0.69) years] consisted of 155 male (41.4%). Most young adults had a temporary contract (57.8%), and worked on average 29.3 (SD 11.2) hours per week. Further characteristics are presented in tables 1a and b. Data on outcome or confounding variables were missing for 0.3–1.9% of the respondents.

Mental health trajectories

With respect to the log-likelihood and BIC, a three-class model was a better fitting model compared to the four-class model for both externalizing and internalizing problems (table 2). The four-class model was chosen over the three-class model, based on the substantive meaningfulness and the interpretability of classes. In contrast to the three-class model, the four-class model contains a decreasing trajectory, which is perceived to provide meaningful information. In particular, the decreasing trajectory captures young adults with improving mental health, and provides important information for occupational and healthcare practice. Class 1 (high-stable trajectory) represented the highest scores that stayed constant over time; class 2 (decreasing trajectory) had high scores, which decreased over time; class 3 (moderate-stable trajectory) had moderate scores that stayed constant over time and class 4 (low-stable trajectory) represented low scores that stayed constant over time (figure 1a and 1b).

Class membership of mental health trajectories

Young adults with high-stable and moderate trajectories of externalizing problems worked over six hours more per week (B=6.71, 95% CI 2.82–10.6) and were more likely to have an income above social minimum [odds ratio (OR) 0.33, 95% confidence interval (95% CI) 0.15–

Table 1a. Background characteristics for the total sample and by trajectories of externalizing problems (N=360).

Background variables	Age [a]	Total sample (N=360)				Externalizing problems													
						High (N=136)				Decreasing (N=48)				Moderate (N=127)				Low (N=49)			
		N	%	Mean	SD	N	%	Mean	SD	N	%	Mean	SD	N	%	Mean	SD	N	%	Mean	SD
Gender	11																				
Male		151	41.9			60	44.1			24	50.0			52	40.9			15	30.6		
Female		209	58.1			76	55.9			24	50.0			75	59.1			34	69.4		
Age	22			22.3	0.69			22.4	0.68			22.4	0.65			22.3	0.70			22.3	0.64
Parental educational level	11																				
Low		93	25.8			28	20.6			15	31.3			35	27.6			15	30.6		
Medium		153	42.5			69	50.7			14	29.2			49	38.6			21	42.9		
High		114	31.7			39	28.7			19	39.6			43	33.9			13	26.5		
Physical health	11			3.91	0.87			3.73	0.93			3.88	0.79	4.12		4.12	0.72			3.92	0.93
Negative life events	11																				
0		109	30.3			37	27.2			16	33.3			37	29.1			19	38.8		
1–2		188	52.2			76	55.9			26	54.2			65	51.2			21	42.9		
≥3		63	17.5			23	16.9			6	12.5			25	19.7			9	18.4		
Employment conditions																					
Work hours/week	22			29.3	11.2			29.7	11.1			28.6	12.6			30.2	10.3			25.4	11.9
Type of employment contract	22																				
Temporary		210	58.3			69	50.7			35	72.9			75	40.9			31	63.3		
Permanent		150	41.7			67	49.3			13	27.1			52	59.1			18	36.7		
Income/month	22																				
<€900		144	40.9			53	39.8			22	54.2			43	35.0			26	53.1		
>€900		209	58.1			80	60.2			26	45.8			80	65.0			23	46.9		
Psychosocial work characteristics																					
Quantitative demands	22			1.42	1.25			1.57	1.31			1.17	1.19			1.40	1.17			1.24	1.30
Work pace	22			4.52	1.65			4.72	1.70			4.13	1.45			4.34	1.72			4.65	1.48
Decision authority	22			4.22	1.73			4.29	1.74			4.17	1.60			4.07	1.81			4.15	1.66
Possibilities for development	22			4.84	1.90			4.64	2.02			4.75	1.96			5.01	1.84			4.76	1.75
Meaning of work	22			5.69	1.97			5.43	2.00			5.54	2.09			5.83	1.86			6.02	1.95
Job satisfaction	22			2.08	0.69			1.98	0.70			2.02	0.70			2.13	0.67			2.16	0.69

[a] Age at which variable was measured.

Table 1b. Background characteristics by trajectories of internalizing problems (N=360). [SD=standard deviation.]

Background variables	Age [a]	Internalizing problems															
		High (N=63)				Decreasing (N=55)				Moderate (N=171)				Low (N=71)			
		N	%	Mean	SD	N	%	Mean	SD	N	%	Mean	SD	N	%	Mean	SD
Gender	11																
Male		15	23.8			31	56.4			68	39.8			37	52.1		
Female		48	76.2			24	43.6			103	60.2			34	47.9		
Age	22			22.2	0.73			22.4	0.71			22.3	0.66			22.4	0.65
Parental educational level	11																
Low		10	15.9			16	29.1			53	31.0			14	19.7		
Medium		34	54.0			21	38.2			66	38.6			32	45.1		
High		19	30.2			18	32.7			52	30.4			25	35.2		
Physical health	11			3.57	0.89			3.80	0.95			3.98	0.79			4.13	0.81
Negative life events	11																
0		13	20.6			16	29.1			56	32.7			24	33.8		
1–2		40	63.5			26	47.3			85	49.7			37	52.1		
≥3		10	15.9			13	23.6			30	17.5			10	14.1		
Employment conditions																	
Work hours/week	22			26.9	11.8			30.5	11.5			28.8	10.9			30.9	11.1
Type of employment contract	22																
Temporary		33	52.4			37	67.3			98	57.3			42	59.2		
Permanent		30	47.6			18	32.7			73	42.7			29	40.8		
Income/month	22																
<€900		33	52.4			22	40.0			67	40.1			22	31.9		
>€900		29	46.0			33	60.0			100	59.9			47	68.1		
Psychosocial work characteristics																	
Quantitative demands	22			1.94	1.58			1.20	1.30			1.36	1.09			1.24	1.15
Work pace	22			4.68	1.72			4.31	1.62			4.59	1.60			4.24	1.74
Decision authority	22			4.21	1.73			4.27	1.80			4.05	1.73			4.38	1.68
Poss. for development	22			4.42	2.12			5.11	1.86			4.78	1.89			4.94	1.78
Meaning of work	22			5.13	2.06			6.25	1.65			5.54	1.99			5.97	1.91
Job satisfaction	22			2.03	0.63			2.04	0.67			1.96	0.72			2.35	0.61

[a] Age at which variable was measured.

Table 2. Trajectories of mental health problems from ages 11–22 years: fit statistics for latent class growth models with increasing number of classes, per type of problems. **BOLD** denotes the used model. [BIC=Bayes information criterion.]

	Class	Parameters (N)	Log-likelihood	BIC	Entropy
Externalizing problems	3	29	729.8	-1288.9	0.78
	4	**36**	**760.0**	**-1308.2**	**0.78**
	5	43	784.4	-1315.8	0.72
Internalizing problems	3	29	469.1	-767.4	0.77
	4	**36**	**503.6**	**-795.4**	**0.76**
	5	43	526.8	-800.5	0.73

0.71] than young adults with low-stable trajectories of externalizing problems (tables 3 and 4, see supplementary material for models adjusted just for background variables, www.sjweh.fi/index.php?page=data-repository). No significant associations were found for class membership of trajectories of externalizing problems and psychosocial work characteristics. Compared to young adults with low-stable trajectories of internalizing problems, young adults with high-stable trajectories of internalizing problems worked six hours less per week (B= -6.07, 95% CI -10.1– -2.05), were more likely to have an income below social minimum (OR 3.44, 95% CI 1.53–7.74), reported higher levels of quantitative demands (B=0.59, 95% CI 0.14–1.04), and less meaning of work (B= -0.74, 95% CI -1.45– -0.04) and of job satisfaction (B= -0.27, 95% CI 0.52– -0.02) (tables 3 and 4). The reported estimates have been derived from the fully adjusted model, estimates of the crude model were similar but slightly higher.

Regarding comorbidity, having the combination of high externalizing and high internalizing problems was associated with experiencing higher quantitative demands than having only high problems on either one of these. Mean scores were 2.09 [standard error (SE) 1.63], 1.32 (SE 1.05), and 1.56 (SE 1.42), for having the combination, only high externalizing, and only high internalizing problems, respectively (P=0.006; F-test in ANOVA) (data not shown). It did not lead to statistically significant differences for any of the other outcomes, compared to having only high externalizing problems

or only high internalizing problems.

See table 5 for raw and mean scores of externalizing and internalizing problems per measurement point (www.sjweh.fi/index.php?page=data-repository).

Discussion

Among young adults who had a paid job and were not a student, we identified four trajectories of externalizing and internalizing problems from childhood to young adulthood: high-stable, decreasing, moderate-stable and low-stable. For externalizing problems, young adults with high-stable trajectories worked more hours per week, compared to young adults with low-stable trajectories. For internalizing problems, young adults with high-stable trajectories reported more often an income below social minimum and worse psychosocial work characteristics, compared to young adults with low-stable trajectories. Our findings show that adolescence is a critical period for later life employment and work outcomes, as trajectories of internalizing problems from childhood to young adulthood are associated with adverse employment conditions and a poor perception of psychosocial work characteristics.

For the majority of the study population (85–90%), trajectories of mental health problems, from childhood (ie, age 11 years) to young adulthood (ie, age 22 years), were stable (high, moderate or low) over time. This is in line with previous research on trajectories of mental health problems (32, 33), and it is likely that the level of these problems will last into adulthood (8). It suggests that mental health is a rather stable condition in adolescence.

Young adults with high- and moderate-stable trajectories of externalizing problems worked significantly

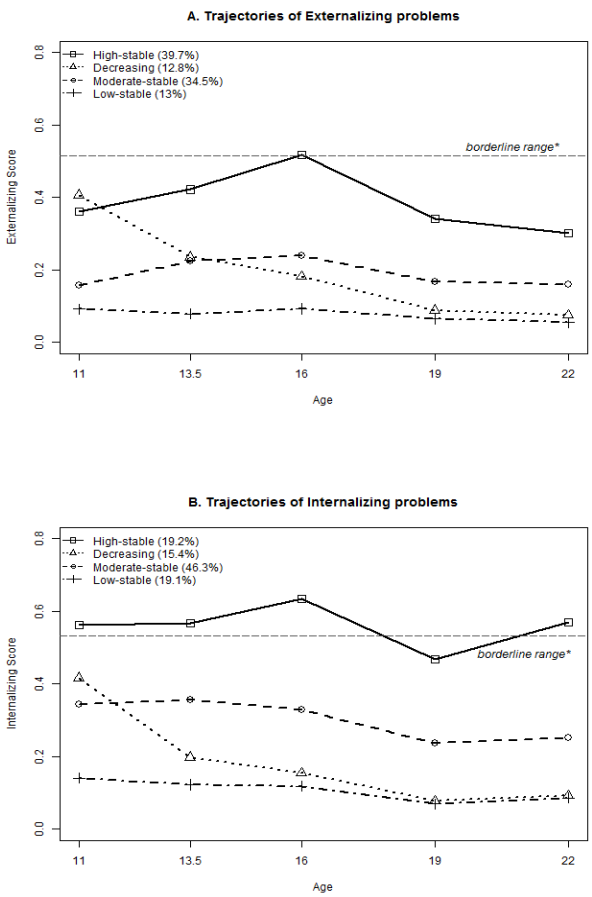

Figure 1a and 1b. Adolescents categorized according to their trajectory of YSR/ASR externalizing and internalizing problems from ages 11 to 22 years. *Scores above the borderline cut-off can be interpreted as subclinical and clinical scores (22, 23).

Table 3a. Model 1: Class membership of mental health trajectories as predictors of employment conditions: results from linear and logistic regression analysis (N=360). **BOLD** denotes significant results. [OR=odds ratio; 95% CI=95% confidence interval.]

Externalizing versus internalizing problems	Model 1 (crude)					
	Working hours		Contract (permanent vs temporary)		Income (low vs. not low)	
	B	95% CI	OR	95% CI	OR	95% CI
Externalizing						
High-stable	**4.24**	**0.59–7.89**	0.60	0.31–1.17	0.59	0.30–1.13
Decreasing	3.13	-1.32–7.58	1.56	0.66–3.70	0.75	0.34–1.66
Moderate-stable	**4.74**	**1.05–8.42**	0.84	0.42–1.65	**0.48**	**0.24–0.93**
Low-stable	0		1		1	
Internalizing						
High-stable	**-4.04**	**-7.84– -0.24**	0.76	0.38–1.51	**2.43**	**1.19–4.95**
Decreasing	-0.44	-4.39–3.50	1.42	0.68–2.96	1.42	0.68–2.99
Moderate-stable	-2.15	-5.25–0.95	0.93	0.53–1.63	1.43	0.79–2.59
Low-stable	0		1		1	

Table 3b. Model 2

Externalizing versus internalizing problems	Model 2 (adjusted for background variables and comorbidity					
	Working hours		Contract (permanent vs. temporary)		Income (low vs. not low)	
	B	95% CI	OR	95% CI	OR	95% CI
Externalizing						
High-stable	**6.71**	**2.82–10.6**	0.67	0.32–1.41	**0.33**	**0.15–0.71**
Decreasing	3.47	-1.02–7.97	1.50	0.60–3.73	0.58	0.25–1.37
Moderate-stable	**6.23**	**2.48–9.98**	0.89	0.43–1.83	**0.34**	**0.16–0.70**
Low-stable	0		1		1	
Internalizing						
High-stable	**-6.07**	**-10.1– -2.05**	0.90	0.42–1.91	**3.44**	**1.53–7.74**
Decreasing	-0.41	-4.4– -3.62	1.28	0.59–2.80	1.33	0.60–2.95
Moderate-stable	**-3.77**	**6.93– -0.62**	1.01	0.55–1.84	1.84	0.96–3.52
Low-stable	0		1		1	

Table 4a. Model 1. Class membership of mental health trajectories as predictors of psychosocial work characteristics (quantitative demands, work pace, decision authority): results from linear regression analysis (N=360). **BOLD** denotes significant results. [95% CI=95% confidence interval.].

Externalizing versus internalizing problems	Model 1 (crude)					
	Quantitative demands		Work pace		Decision authority	
	B	95% CI	B	95% CI	B	95% CI
Externalizing						
High-stable	0.33	-0.08–0.74	0.06	-0.48–0.60	0.14	-0.43–0.72
Decreasing	-0.08	-0.58–0.42	-0.53	-1.19–0.14	0.02	-0.68–0.72
Moderate-stable	0.15	-0.26–0.57	-0.31	-0.86–0.23	-0.08	-0.65–0.50
Low-stable	0		0		0	
Internalizing						
High-stable	**0.70**	**0.28–1.12**	0.44	-0.13–1.00	-0.17	-0.76–0.42
Decreasing	-0.04	-0.47–0.40	0.07	-0.52–0.66	-0.11	-0.72–0.50
Moderate-stable	0.12	-0.22–0.46	0.35	-0.11–0.81	-0.33	-0.81–0.15
Low-stable	0		0		0	

Table 4b. Model 2

Externalizing versus internalizing problems	Model 2 (adjusted for background variables and comorbidity)					
	Quantitative demands		Work pace		Decision authority	
	B	95% CI	B	95% CI	B	95% CI
Externalizing						
High-stable	0.15	-0.28–0.59	-0.09	-0.68–0.50	0.32	-0.31–0.94
Decreasing	-0.13	-0.63–0.37	-0.57	-1.24–0.11	0.07	-0.65–0.79
Moderate-stable	0.13	-0.29–0.55	-0.40	-0.96–0.17	0.11	-0.49–0.71
Low-stable	0		0		0	
Internalizing						
High-stable	**0.59**	**0.14–1.04**	0.30	-0.31–0.91	-0.39	-1.03–0.25
Decreasing	0.03	-0.42–0.48	0.13	-0.48–0.74	-0.13	0.77–0.50
Moderate-stable	0.12	-0.24–0.47	0.36	-0.11–0.84	-0.41	-0.91–0.10
Low-stable	0		0		0	

Table 4c. Class membership of mental health trajectories as predictors of psychosocial work characteristics (possibilities for development, meaning of work, job satisfaction): results from linear regression analysis (N=360). **BOLD** denotes significant results. [95% CI=95% confidence interval.].

Externalizing versus internalizing problems	Model 1 (crude)					
	Possibilities for development		Meaning of work		Job satisfaction	
	B	95% CI	B	95% CI	B	95% CI
Externalizing						
High-stable	-0.12	-0.75–0.51	-0.59	-1.23–0.05	-0.19	-0.41–0.04
Decreasing	-0.01	-0.77–0.76	-0.48	-1.26–0.30	-0.14	-0.42–0.13
Moderate-stable	0.25	-0.38–0.89	-0.19	-0.84–0.45	-0.03	-0.26–0.20
Low-stable	0		0		0	
Internalizing						
High-stable	**-0.52**	**-1.18– 0.13**	**-0.84**	**-1.51– 0.18**	**-0.32**	**-0.55– 0.09**
Decreasing	0.17	-0.51–0.84	0.28	-0.40–0.97	**-0.32**	**-0.55– 0.08**
Moderate-stable	-0.17	-0.70–0.36	-0.43	-0.97–0.11	**-0.39**	**-0.58– 0.20**
Low-stable	0		0		0	

Table 4d. Model 2

Externalizing versus internalizing problems	Model 2 (adjusted for background variables and comorbidity)					
	Possibilities for development		Meaning of work		Job satisfaction	
	B	95% CI	B	95% CI	B	95% CI
Externalizing						
High-stable	0.17	-0.51-0.85	-0.19	-0.87-0.49	-0.08	-0.32-0.16
Decreasing	0.01	-0.77-0.80	-0.43	-1.21-0.36	-0.06	-0.34-0.22
Moderate-stable	0.43	-0.22-1.09	0.02	-0.64-0.67	0.06	-0.17-0.29
Low-stable	0		0		0	
Internalizing						
High-stable	-0.57	-1.27–0.14	**-0.75**	**-1.45– 0.04**	**-0.27**	**-0.52– 0.02**
Decreasing	0.20	-0.51–0.90	0.36	-0.3–-1.06	**-0.30**	**-0.55– 0.05**
Moderate-stable	-0.24	-0.79–0.32	-0.45	-1.01–0.10	**-0.38**	**-0.57– 0.18**
Low-stable	0		0		0	

more hours per week and were more likely to have an income above social minimum than young adults with low-stable trajectories. An explanation may be that these young adults left school early because of a mismatch between their externalizing problems and the educational system, and not because of too few competencies. These young adults may have relatively many competencies given their educational level, and may therefore be appealing for employers. This could result in better employment conditions when entering the labor market, but the sustainability of their employment conditions deserves further research. Another possible explanation is that these young adults received extra support in their transition from school to work. As young adults with externalizing problems have a higher risk of low educational attainment and school dropout (34–37), they are likely to have received support, for example, to achieve a basic educational level or to find a job. This support may have resulted in better employment conditions. We cannot assess this explanation as information on received support is not available.

Our findings regarding more working hours and higher income for young adults with high-stable trajectories of externalizing problems are in contrast with previous studies, ie, other studies found externalizing problems in adolescence to be associated with lower wages and higher unemployment rates (1–3). These contrasting findings may be due to methodological limitations of the aforementioned studies. Previous studies measured externalizing problems only once (2, 3) or did not take time into account (1), whereas in the present study, externalizing problems were measured at

five time points from ages 11–22 years. Trajectories of externalizing problems provide a more accurate representation than externalizing problems measured once. For example, two persons may report the same level of externalizing problems at a given point in time, whereas they are in different trajectories (eg, decreasing and moderate-stable trajectories). Another explanation is that a history of externalizing problems is only detrimental for boys, as is shown by McGee et al (2) and Danielsson et al (3). Unfortunately, our sample was too small to stratify by gender.

Young adults with high-stable trajectories of internalizing problems more frequently reported poor employment conditions and psychosocial work characteristics, ie, had more difficulties when entering the labor market than young adults with lower levels of internalizing problems, with comorbid externalizing problems aggravating this regarding perceived quantitative work demands. Regarding employment conditions, these findings confirm previous research (4, 38). Young adults who faced internalizing problems are more likely to work fewer hours and receive an income below the social minimum. Regarding psychosocial work characteristics, we cannot compare our findings with other studies as we are the first study in this population of young workers. Previous studies have shown that the drift mechanism and the gloomy perceptions mechanism explain the association between mental health problems and work (17, 18) outcomes. However, neither of these mechanisms can explain our findings, ie, as our participants just entered the labor market, refuting the drift mechanism, and they really reported jobs with poorer employment conditions, refuting the gloomy perception mechanism. Our findings suggest that young adults with early mental health problems face a more difficult start in the labor market, compared to healthy young adults. To our best knowledge, this study is the first assessing trajectories of early mental health problems, employment conditions and psychosocial work characteristics. Therefore, further research is needed to confirm our findings and explanations.

Our findings also show the added value of good mental health status: compared to young adults with high levels of mental health problems, young adults with low levels of mental health problems not only got the jobs with better employment conditions, they also perceived their work environment more positive. Young adults with low levels of mental health problems (i) were not smarter or (ii) had higher educated parents than young adults with higher levels of mental health problems, ie, the results were adjusted for intelligence scores and parental educational level.

A strength of this study is that mental health problems were measured over a relatively long period, covering early-to-late adolescence, and before participants entered the labor market. This enhanced the reliability of the data on mental health problems and assures us that the level of mental health problems is not affected by the work environment. Next, we used valid and reliable measures of mental health problems (ie, the YSR and ASR), which are the most commonly used self-report questionnaires in child and adolescent research (22, 23). Another strength is the longitudinal design with low loss-to-follow-up, ie, with high retention rates at the different measurement waves, ranging from 79.6–96.4%, and attrition being independent from mental health status or educational level. In general, participants with severe mental health problems and/or poor educational or employment outcomes are more likely to drop out and be lost to follow-up. However, previous reports (19, 21) showed that TRAILS respondents and non-respondents did not differ regarding mental health problems, which is also the case for drop-outs compared to hard-to-recruit retainers.

A limitation of the present study concerns the assignment of participants to a specific trajectory based on probability. This may have caused a measurement error as the possibility exists that participants belong to a trajectory other than the one to which they were assigned. However, the magnitude of the overall entropy assures us that the majority of the participants are assigned to the correct trajectory. Furthermore, information on job type was lacking, making it impossible to compare young adults with high- and low-stable trajectories of mental health problems holding the same type of job. Another possible limitation is that we measured the outcome variables at the same measurement point as the end of the mental health trajectory, allowing reverse causation. Analyses without mental health problems at age 22 years, however, did not change the results. Last, we have adjusted the analysis for baseline measures (ie, negative life events and physical health), but these measures may have changed over time. For future research, it would be meaningful to take changes in exposures and their consequences on the outcomes into account.

It cannot be excluded that the participants included in this study (ie, having a paid job and not enrolled in academic activities) are more problematic than those still studying. However, regarding mental health problems at baseline we found no significant differences between included and not-included participants. We found that most adolescents have rather stable mental health trajectories, which raises questions about the added value of analyzing multiple measurements. However, we believe that the measurement of mental health problems at different time points is an important strength of this study and improved the reliability of our findings. To our best knowledge, our study is the first linking trajectories of mental health problems from childhood to young adulthood to employment and work outcomes. The conclusion, that the trajectories of mental health problems were

relatively stable over time, could only be drawn from the analysis of multiple measurements. Furthermore, we were able to identify a decreasing trajectory, by using multiple measurements. For (occupational and youth) healthcare practice, this trajectory is very important and informative. Our findings suggest that early detection and treatment of these problems is needed to reduce them and eventually may be beneficial when entering the labor market. With using trajectories of mental health problems from childhood to young adulthood, we measured those problems over a longer time period and more precisely than previous studies (1–3). This underlines the importance of adopting a life-course perspective, which can only be accomplished by keeping critical periods earlier in life in mind. Also other important principles from the life-course approach should be taken into account in further work and health research, such as accumulation of health risk and advantage or transitions (12). For example, future research should account for transitions in and out of work (eg, due to maternity leave or traveling) or length of employment.

In sum, the results suggest that young adults with a history of mental health problems are less likely to transition successfully into the labor market compared to other young adults. Therefore, early detection and treatment of mental health problems are of utmost importance.

Acknowledgements

This research is part of TRAILS. Participating centers of TRAILS include various departments of the University Medical Center and University of Groningen, the Erasmus University Medical Center Rotterdam, the University of Utrecht, the Radboud Medical Center Nijmegen, and the Parnassia Bavo group, all in the Netherlands. The authors are grateful to all adolescents, their parents, and teachers who participated in this research, and to everyone who worked on this project and made it possible. TRAILS has been financially supported by various grants from the Netherlands Organization for Scientific Research NWO (Medical Research Council program grant GB–MW 940–38–011; ZonMW Brainpower grant 100–001–004; ZonMw Risk Behavior and Dependence grants 60–60600–97–118; ZonMw Culture and Health grant 261–98–710; Social Sciences Council medium–sized investment grants GBMaGW 480–01–006 and GB–MaGW 480–07–001; Social Sciences Council project grants GB–MaGW 452–04–314 and GB–MaGW 452–06–004; NWO large–sized investment grant 175.010.2003.005; NWO Longitudinal Survey and Panel Funding 481–08–013), the Dutch Ministry of Justice (WODC), the European Science Foundation (EuroSTRESS project FP–006), Biobanking and Biomolecular Resources Research Infrastructure BBMRI–NL (CP 32), and the participating universities.

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Received for publication: 11 November 2016