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# Does the timing and duration of mental health problems during childhood and adolescence matter for labour market participation of young adults?

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## ABSTRACT

**Background** Little is known about the timing and duration of mental health problems (MHPs) on young adults' labour market participation (LMP). This life-course study aims to examine whether and how the timing and duration of MHPs between childhood and young adulthood are associated with LMP in young adulthood. **Methods** Logistic regression analyses were performed with data from the Tracking Adolescents' Individual Lives Survey (TRAILS), a Dutch prospective cohort study with 15-year follow-up (N=874). Internalising and externalising problems were measured by the Youth/Adult Self-Report at ages 11, 13, 16, 19 and 22. Labour market participation (having a paid job yes/no) was assessed at age 26.

**Results** Internalising problems at all ages and externalising problems at age 13, 19 and 22 were associated with an increased risk of not having a paid job (internalising problems ORs ranging from 2.24, 95% CI 1.02 to 4.90 at age 11 to OR 6.58, CI 3.14 to 13.80 at age 22; externalising problems ORs from 2.84, CI 1.11 to 7.27 at age 13 to OR 6.36, CI 2.30 to 17.56 at age 22). Especially a long duration of internalising problems increased the risk of not having a paid job in young adulthood.

**Conclusion** The duration of MHPs during childhood and adolescence is strongly associated with not having paid work in young adulthood. This emphasises the necessity of applying a life-course perspective when investigating the effect of MHPs on LMP. Early monitoring, mental healthcare and the (early) provision of employment support may improve young adult's participation in the labour market.

## INTRODUCTION

Approximately 20%–25% of young adults in the Organisation for Economic Co-operation and Development (OECD) countries report mental health problems, such as symptoms of depression and anxiety.<sup>1</sup> Mental health problems can negatively affect educational attainment, the transition into the labour market and the performance at work, and have adverse consequences during the entire working life course and beyond.<sup>2–7</sup> It is estimated that mental health problems in Europe cost 600 billion Euro each year due to lost productivity in terms of sickness absence and work disability.<sup>8</sup>

Mental health problems in childhood, adolescence and young adulthood are negatively associated with labour market participation,<sup>4 5 9–16</sup> but

knowledge about the effects of timing and duration of mental health problems on young adults' labour market participation is scarce.<sup>9 15 16</sup> Previous studies about mental health and work have focused on mental health problems measured at only one or two time points, making it difficult to capture the relevance of timing and duration of mental health problems for work outcomes.<sup>4 5 10–13 15</sup> Adding a life-course perspective with timing and duration as key components is important to improve our understanding of the impact of mental health problems on work outcomes.<sup>17</sup> Also, in-depth research addressing the timing and duration of mental health problems may help to identify entrees for interventions to reduce the negative effects of mental health problems for later life employment.

To date, evidence regarding the effect of timing on labour market participation is inconclusive. Narusyte *et al*<sup>9</sup> showed in a Swedish registry study that anxiety and depression symptoms at age 16–17 and 19–20 but not at age 8–9 and 13–14 were associated with sickness absence at age 27. This may indicate that the consequences of experiencing mental health problems are constrained by time, and can be explained by the recency effect. The recency effect states that more proximal events (ie, mental health problems) are more strongly related to the outcome of interest (ie, labour market participation) than distal events.<sup>18</sup> However, previous research has shown that childhood mental health problems negatively affect labour market participation,<sup>19 20</sup> suggesting that distal mental health problems may also be associated with labour market participation. Furthermore, a longer duration of mental health problems is assumed to affect people's lives more strongly than a shorter duration,<sup>16 21 22</sup> but it remains unclear how long mental health problems need to be present to affect labour market participation. The current study seeks to build on this limited and inconclusive evidence.

This study aims to examine whether and how the timing and duration of mental health problems from childhood to young adulthood are associated with labour market participation in young adulthood. Data from the Tracking Adolescents' Individual Lives Survey (TRAILS) cohort study of Dutch adolescents, including internalising and externalising problem measurements over a 15-year window,<sup>23 24</sup> offer a unique opportunity to answer the research questions.



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## METHODS

## Study design and sample

Data were used from six waves of the TRAILS study, a prospective population-based cohort study.<sup>24</sup> Participant selection was based on children and their parents living in three Northern provinces in the Netherlands. All children and parents provided informed consent and the Dutch Central Committee on Research Involving Human Subjects approved all TRAILS study protocols. TRAILS started in 2001 with N=2230 participants (76.0% response rate of the initial sample) who were on average 11.1 years old (SD=0.55). The five follow-up measurement waves took place at the average ages of 13.5 years (SD=0.53, N=2149, response rate 96.4%), 16.3 years (SD=0.69, N=1816, response rate 81.4%), 19.1 years (SD=0.58, N=1881, response rate 84.3%), 22.3 years (SD=0.65, N=1775, response rate 79.6%) and 25.7 years (SD=0.60, N=1618, response rate 72.6%). More detailed information about the TRAILS study is available elsewhere.<sup>23–26</sup> For the present study, we included participants who were not enrolled in education at age 26, who provided information about their mental health in at least two waves and about their labour market participation at age 26. The final study sample consisted of 874 participants out of 1618 (54%).

## Measures

*Mental health problems* were assessed by means of the Youth Self-Report (YSR) at age 11, 13 and 16, and the Adult Self-Report (ASR) at age 19, 22 and 26. To make the YSR and the ASR comparable, 14 items were removed from the original 126 ASR items. The YSR and ASR are both valid and reliable measures for mental health problems.<sup>27,28</sup> Standardised scale scores were used for internalising (ie, anxious/depressed, withdrawn/depressed and somatic problems) and externalising problems (ie, delinquent and aggressive behaviours). Higher scores indicate higher levels of internalising or externalising problems. The timing of mental health problems was assessed as continuous variable (ie, scale scores per measurement wave) and as dichotomous variable (ie, as no mental health problems or mental health problems correspondingly below and above the 80th percentile<sup>29</sup>). The timing of mental health problems was further specified as the *onset* of mental health problems and was classified as ‘no mental health problems’, ‘early onset’ (ie, mental health problems at age 11 or 13 and not at age 16, 19 or 22) and ‘late onset’ (ie, mental health problems at age 16, 19 or 22 and not at age 11 or 13). The *duration* of mental health problems was classified as no mental health problems, ‘short duration’ (ie, mental health problems one or two times) and ‘long duration’ (ie, mental health problems three or more times). Among the participants with a long duration of mental health problems, N=46 showed a non-consecutive pattern of internalising problems (37.4% out of N=123) and N=32 showed a non-consecutive pattern of externalising problems (27.1% out of N=118).

*Labour market participation* was measured at age 26 with the question ‘Did you have a paid job in the last month?’. The answer categories were: (1) No, never had a paid job, (2) No, not anymore and (3) Yes. The answers were dichotomised into ‘currently having no paid job’ (1 and 2 merged) and ‘currently having a paid job’.

Control variables were selected based on the literature and included sex, age and educational attainment. Participants’ educational attainment was measured at age 26 with the question ‘What is your highest level of education?’. Educational attainment was categorised into: low, medium and high.<sup>30</sup>

## Statistical analyses

We tested the effects of timing and duration of internalising and externalising problems at age 11, 13, 16, 19 and 22—as continuous scale scores per measurement wave and as dichotomous variables capturing the onset and duration—on labour market participation at age 26 using logistic regression analyses. To examine the association between mental health problems and labour market participation, analyses were performed with no mental health problems as reference category. To examine whether the effects differed for young adults with an early or those with a late onset, and for young adults with a short or those with a long duration of mental health problems, analyses were performed with early onset and short duration, respectively, as reference category.

In addition, we tested differences between combinations of onset and duration of internalising and externalising problems (ie, no problems, early onset with a short duration, early onset with a long duration, late onset with a short duration and late onset with a long duration), with, successively ‘no problems’ and ‘early onset with a short duration’ as the reference category. For all analyses, we calculated crude associations (model 1), ORs adjusted for age and sex (model 2) and ORs additionally adjusted for educational attainment (model 3).

## Multiple imputation

Multiple imputation was performed on internalising and externalising problems at all ages to minimise the loss of statistical power. After excluding participants with missing data for internalising or externalising problems on 4 or more waves (N=3), data were missing for 1.4%–12.0% of the participants. The imputations were predicted by both internalising and externalising problems at all ages, educational attainment, sex, age and parental socioeconomic status. Multiple imputation of missing data was performed 35 times.<sup>31</sup> A complete-case analysis was performed to compare the results with the analysis using imputed data, and no differences were observed. All analyses were conducted using SPSS V.26.

## RESULTS

## Sample characteristics

The sample consists of 874 participants (61.8% females). The majority (83.9%) had a paid job; participants worked on average 33.4 hours per week (SD=9.5) (table 1).

## Timing of mental health problems and labour market participation

Internalising problems at all ages were associated with an increased risk of having no paid job at age 26, and these associations became stronger over time (adjusted ORs (adj OR) ranged from 2.24, 95% CI 1.02 to 4.90 at age 11 to adj OR 6.58, 95% CI 3.14 to 13.80 at age 22). Similar associations were found between externalising problems at ages 13, 19 and 22 and an increased risk of having no paid job at age 26. For age 11 and 16, the associations pointed in the same direction but were not significant (table 2).

## Timing and duration of mental health problems and labour market participation

Both an early and a late onset of internalising problems, and problems with a short and a long duration, were associated with an increased risk of having no paid job at age 26 compared with no mental health problems. While we found no significant differences between an early or late onset of internalising problems,

**Table 1** Sample description for the total sample and by labour market participation (N=874)

	Age*	Total sample (N=874)	Labour market participation	
			Paid job (N=733)	No paid job (N=141)
Sex, N (%)	11			
Males		334 (38.2)	278 (37.9)	56 (39.7)
Females		540 (61.8)	455 (62.1)	85 (60.3)
Educational attainment, N (%)	26			
Low		59 (6.8)	30 (4.1)	29 (20.6)
Medium		342 (39.1)	271 (37.0)	71 (50.4)
High		473 (54.1)	432 (58.9)	41 (29.1)
Internalising problems, scale score (mean, SD) Range 0.00–2.00	11	0.37 (0.23)	0.36 (0.23)	0.41 (0.23)
	13	0.35 (0.24)	0.34 (0.24)	0.40 (0.26)
	16	0.33 (0.24)	0.32 (0.24)	0.39 (0.27)
	19	0.25 (0.24)	0.23 (0.22)	0.34 (0.27)
	22	0.27 (0.24)	0.24 (0.22)	0.40 (0.32)
Internalising problems > 80th percentile (N, %)	11	153 (17.5)	121 (16.5)	32 (22.7)
	13	159 (18.2)	128 (17.5)	31 (22.0)
	16	170 (19.5)	139 (19.0)	31 (22.0)
	19	168 (19.2)	115 (15.7)	53 (37.6)
	22	169 (19.3)	116 (15.8)	53 (37.6)
Onset (N, %)				
No internalising problems		489 (55.9)	432 (58.9)	52 (36.9)
Early onset (at age 11 or 13)		247 (28.3)	196 (26.7)	51 (36.2)
Late onset (at age ≥16)		138 (15.8)	105 (14.3)	38 (27.0)
Duration (N, %)				
No internalising problems		489 (55.9)	432 (58.9)	52 (36.9)
Short duration (1 or 2 times)		262 (30.0)	207 (28.2)	53 (37.6)
Long duration (≥3 times)		123 (14.1)	94 (12.8)	36 (25.5)
Externalising problems, scale score (mean, SD) Range 0.00–2.00	11	0.27 (0.19)	0.26 (0.19)	0.29 (0.21)
	13	0.28 (0.19)	0.27 (0.18)	0.33 (0.21)
	16	0.30 (0.20)	0.29 (0.20)	0.35 (0.22)
	19	0.22 (0.19)	0.20 (0.18)	0.29 (0.24)
	22	0.19 (0.17)	0.18 (0.16)	0.27 (0.22)
Externalising problems > 80th percentile (N, %)	11	163 (18.6)	130 (17.7)	33 (23.4)
	13	148 (16.9)	114 (15.6)	34 (24.1)
	16	174 (19.9)	133 (18.1)	41 (29.1)
	19	167 (19.1)	130 (17.7)	37 (26.2)
	22	155 (17.7)	117 (16.0)	38 (27.0)
Onset (N, %)				
No externalising problems		477 (54.6)	418 (57.0)	59 (41.8)
Early onset (at age 11 or 13)		241 (27.6)	190 (25.9)	51 (36.2)
Late onset (at age ≥16)		156 (17.8)	125 (17.1)	31 (22.0)
Duration (N, %)				
No externalising problems		477 (54.6)	418 (57.0)	59 (41.8)
Short duration (1 or 2 times)		279 (31.9)	227 (31.0)	52 (36.9)
Long duration (≥3 times)		118 (13.5)	88 (12.0)	30 (21.3)

\*Age at which variable was measured.

problems with a long duration were associated with a higher risk of having no paid job at age 26 than problems with a short duration (adj OR 1.73 (95% CI 1.01 to 2.95); [table 3](#)).

Both an early and a late onset of externalising problems were associated with an increased risk of having no paid job at age 26 compared with no mental health problems. After full adjustment (model 3), the association between a late onset and having no paid job became non-significant. Likewise, both a short and

long duration of externalising problems were associated with an increased risk of having no paid job at age 26 compared with no externalising problems, but the association of problems with a short duration attenuated after adjustment and became non-significant. With an early onset and a short duration as reference category, no significant differences between an early and a late onset, or between a short and a long duration were found ([table 3](#)).

**Table 2** Logistic regression analyses of internalising and externalising problems from age 11 to 22 and having no paid job at age 26 (N=874)

	Model 1		Model 2		Model 3	
	OR	95% CI	OR	95% CI	OR	95% CI
<b>Internalising problems</b>						
Age 11	2.44*	1.15 to 5.17	2.51*	1.18 to 5.34	2.24*	1.02 to 4.90
Age 13	2.91**	1.45 to 5.84	3.24**	1.56 to 6.70	2.80**	1.31 to 5.98
Age 16	2.95**	1.48 to 5.85	3.62***	1.71 to 7.67	2.82**	1.28 to 6.22
Age 19	5.37***	2.70 to 10.67	5.64***	2.80 to 11.37	3.97***	1.89 to 8.35
Age 22	8.58***	4.42 to 16.67	9.19***	4.60 to 18.36	6.58***	3.14 to 13.80
<b>Externalising problems</b>						
Age 11	2.18	0.90 to 5.28	2.02	0.82 to 4.97	1.86	0.73 to 4.74
Age 13	4.72***	1.95 to 11.42	4.46***	1.83 to 10.87	2.84*	1.11 to 7.27
Age 16	3.76**	1.64 to 8.64	3.46**	1.47 to 8.17	1.95	0.79 to 4.82
Age 19	7.80***	3.40 to 17.91	7.25***	3.10 to 16.94	4.37***	1.77 to 10.78
Age 22	13.27***	5.18 to 33.99	11.41***	4.36 to 29.86	6.36***	2.30 to 17.56

\*\*\*p<0.001; \*\*p<0.01; \*p<0.05.

Model 1: crude | Model 2: adjusted for age and sex | Model 3: Model 2+educational attainment.

### Combined timing and duration of mental health problems and labour market participation

Table 4 shows that, compared with no internalising problems, the combination of an early onset with a long duration or a late onset with a short duration of internalising problems was associated with a significantly increased risk of having no paid job at age 26 (adj OR 3.64 (95% CI 2.01 to 6.58) and 3.69 (95% CI 2.11 to 6.43), respectively). The combination of a late onset with a long duration of internalising problems was associated with an increased risk of having no paid job, but did not reach statistical significance due to low power. When compared with an early onset with a short duration of internalising problems, both an early onset with a long duration and a late onset with a short duration were significantly associated with an increased risk of having no paid job (adj OR 2.98 (1.44 to 6.15) and 2.60 (1.28 to 5.27), respectively).

For externalising problems, an early onset with a long duration, compared with no externalising problems, was associated

with an increased risk of having no paid job at age 26 (adj OR 2.03, (95% CI 1.09 to 3.79)). After full adjustment (model 3), the association between a late onset and a short duration and an increased risk of having no paid job became borderline significant. The combination of a late onset with a long duration was associated with an increased risk of having no paid job, but did not reach statistical significance due to low power. An early onset with a short duration of externalising problems was not significantly associated with an increased risk of having no paid job.

### DISCUSSION

This study investigated whether and how the timing and duration of mental health problems from childhood to young adulthood are associated with labour market participation in young adulthood. Experiencing internalising problems at age 11, 13, 16, 19 and 22 were associated with an increased risk of not having a paid job at age 26. The associations became stronger

**Table 3** Logistic regression analyses of the onset and duration of internalising and externalising problems from age 11 to 22 and having no paid job at age 26 (N=874)

	Reference: no mental health problems						Reference: early onset/short duration					
	Model 1		Model 2		Model 3		Model 1		Model 2		Model 3	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
<b>Internalising problems</b>												
No problems (N=484)	1		1		1		0.48***	0.31 to 0.73	0.42***	0.27 to 0.65	0.48**	0.31 to 0.76
Early onset (N=247)	2.16***	1.42 to 3.30	2.48***	1.60 to 3.86	2.15**	1.36 to 3.41	1		1		1	
Late onset (N=143)	3.01***	1.88 to 4.81	3.35***	2.05 to 5.48	3.08***	1.85 to 5.14	1.36	0.83 to 2.21	1.31	0.79 to 2.16	1.38	0.82 to 2.34
No problems (N=484)	1		1		1		0.51**	0.34 to 0.78	0.46***	0.30 to 0.71	0.51**	0.33 to 0.80
Short duration (N=260)	2.13***	1.40 to 3.23	2.40***	1.55 to 3.71	2.17***	1.38 to 3.41	1		1		1	
Long duration (N=130)	3.18***	1.97 to 5.14	3.72***	2.24 to 6.19	3.20***	1.88 to 5.45	1.71*	1.04 to 2.81	1.79*	1.07 to 2.98	1.73*	1.01 to 2.95
<b>Externalising problems</b>												
No problems (N=477)	1		1		1		0.53**	0.35 to 0.79	0.50**	0.33 to 0.77	0.58*	0.37 to 0.91
Early onset (N=241)	1.90**	1.26 to 2.87	1.99**	1.30 to 3.04	1.72*	1.10 to 2.68	1		1		1	
Late onset (N=156)	1.76*	1.09 to 2.84	1.71*	1.04 to 2.81	1.33	0.79 to 2.23	0.92	0.56 to 1.52	0.86	0.51 to 1.45	0.77	0.45 to 1.33
No problems (N=477)	1		1		1		0.62*	0.41 to 0.93	0.59*	0.39 to 0.89	0.68	0.44 to 1.05
Short duration (N=279)	1.62*	1.08 to 2.44	1.70*	1.12 to 2.57	1.47	0.95 to 2.26	1		1		1	
Long duration (N=118)	2.42***	1.47 to 3.97	2.34***	1.39 to 3.94	1.77*	1.02 to 3.06	1.49	0.89 to 2.48	1.38	0.81 to 2.35	1.20	0.69 to 2.10

\*\*\*p<0.001; \*\*p<0.01; \*p<0.05.

Model 1: crude | Model 2: adjusted for age and sex | Model 3: Model 2 + educational attainment.



**Table 4** Logistic regression analyses of the onset and duration of internalising and externalising problems from age 11 to 22 and having no paid job at age 26 (N=874)

	Reference: no mental health problems						Reference: early onset / short duration					
	Model 1		Model 2		Model 3		Model 1		Model 2		Model 3	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
<b>Internalising problems</b>												
<b>Onset and duration</b>												
No problems (N=484)	1		1		1		0.78	0.45 to 1.37	0.68	0.37 to 1.27	0.80	0.42 to 1.53
Early and short (N=135)	1.36	0.77 to 2.39	1.59	0.85 to 2.97	1.35	0.71 to 2.60	1		1		1	
Early and long (N=112)	<b>3.32***</b>	<b>2.01 to 5.48</b>	<b>4.30***</b>	<b>2.44 to 7.5</b>	<b>3.64***</b>	<b>2.01 to 6.58</b>	<b>2.66**</b>	<b>1.41 to 5.02</b>	<b>2.99**</b>	<b>1.50 to 5.98</b>	<b>2.98**</b>	<b>1.44 to 6.15</b>
Late and short (N=125)	<b>3.10***</b>	<b>1.91 to 5.06</b>	<b>4.01***</b>	<b>2.35 to 6.83</b>	<b>3.69***</b>	<b>2.11 to 6.43</b>	<b>2.22*</b>	<b>1.18 to 4.17</b>	<b>2.44**</b>	<b>1.24 to 4.79</b>	<b>2.60**</b>	<b>1.28 to 5.27</b>
Late and long (N=18)	2.37	0.75 to 7.48	<b>3.38*</b>	<b>1.03 to 11.12</b>	3.04	0.87 to 10.63	2.30	0.66 to 7.96	2.99	0.82 to 10.90	3.34	0.85 to 13.06
<b>Externalising problems</b>												
<b>Onset and duration</b>												
No problems (N=477)	1		1		1		0.67	0.40 to 1.12	0.66	0.38 to 1.15	0.72	0.41 to 1.27
Early and short (N=144)	1.49	0.89 to 2.48	1.51	0.87 to 2.62	1.39	0.79 to 2.46	1		1		1	
Early and long (N=97)	<b>2.59***</b>	<b>1.53 to 4.39</b>	<b>2.65***</b>	<b>1.47 to 4.76</b>	<b>2.03*</b>	<b>1.09 to 3.79</b>	1.74	0.94 to 3.25	1.75	0.89 to 3.46	1.46	0.71 to 3.00
Late and short (N=135)	<b>1.77*</b>	<b>1.07 to 2.93</b>	<b>1.98*</b>	<b>1.15 to 3.42</b>	1.55	0.87 to 2.75	1.19	0.65 to 2.18	1.31	0.68 to 2.52	1.11	0.56 to 2.21
Late and long (N=21)	1.67	0.54 to 5.12	1.48	0.41 to 5.38	1.01	0.26 to 4.00	1.12	0.35 to 3.61	0.98	0.26 to 3.71	0.73	0.18 to 2.99

\*\*\*p&lt;0.001; \*\*p&lt;0.01; \*p&lt;0.05.

Model 1: crude | Model 2: adjusted for age and sex | Model 3: Model 2 + educational attainment.

as the participants aged and transitioned into adulthood. A similar result was found for externalising problems, except for externalising problems at the age of 11 and 16. Furthermore, compared with young adults without internalising problems, both an early and a late onset of internalising problems were associated with an increased risk of having no paid job. Finally, the results showed that both a short and a long duration were associated with an increased risk of having no paid job, but with a significant stronger association for a long duration compared with a short duration. Results for externalising problems were different, as after full adjustment, a late onset and a short duration did not significantly increase the risk of not having a paid job compared with young adults without externalising problems. Combining the onset and duration showed that an early onset with a long duration, and a late onset with a short duration increased the risk of not having a paid job. This was not found for young adults with an early onset and a short duration. To our best knowledge, no previous study has investigated the effects of timing and duration or the combined effect of timing and duration of mental health problems during childhood and adolescence on labour market participation in young adulthood.

With regard to the timing of mental health problems, having internalising or externalising problems in itself during childhood and adolescence increased the risk of not having a paid job in young adulthood. Even though the results suggest that an early or late onset of mental health problems during childhood and adolescence does not seem to matter for labour market participation, the associations between mental health problems and labour market participation became stronger as the participants aged and transitioned into adulthood. These stronger associations over time could be explained by the recency effect, that is, proximal events may more strongly relate to the outcome of interest than distal events.<sup>18</sup> The transition from adolescence to adulthood is characterised by major changes (eg, finishing school and finding a job),<sup>32</sup> suggesting that emerging adulthood could be a sensitive period in which mental health problems have a stronger effect on labour market participation than mental health problems earlier in life. Further research is needed that examines life-course models to determine whether emerging

adulthood is a sensitive period for mental health problems affecting labour market participation. Another explanation for the stronger associations of internalising problems over time may be that internalising problems persist and even accumulate over time. This is supported by our finding of the strong association between the long duration of internalising problems and not having a paid job in young adulthood. It may be that young adults with persistent internalising problems are affected in the development of their cognitive and social skills,<sup>10 22 33</sup> eventually resulting in poor labour market participation. After adjustment of educational attainment, the associations between mental health problems and not having a paid job attenuated. This suggests that educational attainment may play an important role in the pathway between mental health problems and labour market participation. Due to power problems, it was not possible to examine the role of educational attainment in greater detail. Future research with larger samples should explore the role of educational attainment either as a mediating or moderating factor to improve our understanding of the relationship between mental health problems and labour market participation.

The combination of the timing and duration of mental health problems showed that an early onset with a short duration of problems did not affect the labour market participation of young adults. An explanation may be that these participants recovered from mild to moderate mental health problems, allowing that adverse consequences were prevented. Also, a late onset with a long duration of problems was not associated with not having a paid job. This can possibly be explained by power problems, because a late onset with a long duration was experienced by only N=18 young adults with internalising problems and N=21 with externalising problems. Additionally, an early onset with a long duration of mental health problems was associated with not having a paid job. It could be that participants with an early onset and long duration experienced both internalising and externalising problems and this comorbidity might reflect other underlying, more severe, psychiatric disorders.<sup>34</sup> Moreover, participants experiencing both internalising or externalising problems may be even more vulnerable to not having a paid job than participants who only experience internalising or

externalising problems. Further research is needed to investigate the comorbidity of externalising and internalising problems in childhood and adolescence and later life labour market participation in more detail.

A study strength is the longitudinal design of the TRAILS study with comprehensive repeated measures and a low loss to follow-up which allowed detailed analyses of the timing and duration, two life-course principles, of mental health problems and their association with labour market participation in young adulthood. The retention rates of the TRAILS study at the different measurement waves ranged from 72.6% to 96.4%.<sup>24</sup> Moreover, valid and reliable measures were used to assess mental health problems, that is, the YSR and ASR.<sup>27 28</sup> A comparison of the excluded participants with our final sample revealed only minor differences in sociodemographic characteristics and mental health problems, that is, a possible selection bias is unlikely.

A study limitation is that due to power problems it was not possible to disentangle whether the timing and duration of mental health problems accounted equally for the effect on labour market participation. Another limitation is that no sex-stratified analyses were conducted due to sample size issues. Previous research has shown that the level of internalising and externalising problems and labour market participation differs between boys and girls.<sup>35</sup> Future research with larger samples should not only perform sex-stratified analyses, but also include more refined work and labour market outcomes, such as quality of work or work functioning, as 'having a paid job or not' is a rather crude operationalisation of labour market participation.

Given the considerable impact of internalising problems during childhood and adolescence on not having a paid job in young adulthood—and subsequent individual and socio-economic consequences—further research is urgently needed. Specifically, more in-depth research to unravel the underlying mechanisms and pathways of how mental health problems in these life phases affect labour market participation in young

adulthood is warranted. Notably, we should focus our research on whether and how life-course concepts, for example, critical and/or sensitive periods and accumulation,<sup>36</sup> may explain the current findings. Furthermore, our findings provide valuable first insights into the long arm of early mental health problems on labour market participation. Given the prevalence and incidence of mental health problems on one hand and the possible consequences, that is, the social and economic costs for the young adults, employers and the society on the other, the findings underscore the need for preventive measures for mental health problems during childhood and adolescence.

In conclusion, the findings of this prospective, life-course study provide support for the effect of the duration of mental health problems in childhood and adolescence on labour market participation in young adulthood. Especially young adults with a long duration of internalising problems during childhood and adolescence are at increased risk of not having a paid job in young adulthood. Ultimately, early monitoring, mental healthcare and the (early) provision of employment support may improve young adult's labour market participation.

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#### What is already known on this subject

- ▶ Mental health problems negatively influence labour market participation. Little is known about the timing and duration of mental health problems from childhood to young adulthood on labour market participation in young adulthood.

#### What this study adds

- ▶ This study did not simply focus only on the association between mental health problems and labour market participation, but specified the effects of timing and duration of mental health problems. The results show the long-term impact of mental health problems. Especially young adults with a long duration of mental health problems show an increased risk of having no paid job, while young adults with an early onset and a short duration of mental health problems are not affected. The results of this study may provide important entrees for both practice and research, for example, the findings suggest that early monitoring, mental healthcare and the (early) provision of employment support may improve young adult's labour market participation.

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