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Educational level, underachievement and general mental health problems in 10 866 adolescents

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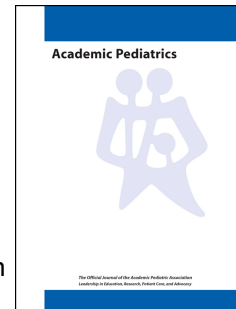
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Educational level, underachievement and general mental health problems in 10 866 adolescents.

Running title: underachievement at school and adolescent mental health

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Objective

Previous research suggests that cognitive functioning is associated with the risk of several adult psychiatric disorders. This study investigates whether adolescents who perform worse than expected at secondary school are at a higher risk for general mental health problems.

Methods

In a cross-sectional survey comprising 10 866 Dutch adolescents aged 13-16 years, underachievement at secondary school was defined as the discrepancy between predicted school grade and actual grade one or three years later. Mental health problems were assessed with the Strengths and Difficulties Questionnaire (SDQ). We investigated the association of underachievement with mental health problems using logistic regression, adjusting for potential confounders.

Results

Underachievement was associated with general psychopathology in pupils aged 13-14 (OR: 1.86, 95% CI 1.47-2.37) and in pupils aged 15-16 (OR: 2.05, 95% CI 1.67-2.52) in a multivariate analysis including sociodemographic factors. The association between underachievement and mental health problems was attenuated when school factors such as teacher advice and interaction between underachievement and teacher advice were added, but underachievement remained significantly associated with mental health problems in adolescents in the higher educational tracks (pupils aged 13-14 OR: 2.22, 95% CI 1.07-4.60

and OR: 2.41, 95% CI 1.10-5.30, age 15-16 OR 2.63, 95% CI 1.38-5.03). This association was most pronounced for the hyperactivity subscale of the SDQ.

Conclusions

Underachievement at secondary school is associated with general mental health problems, especially with hyperactivity symptoms, in pupils who started at high educational tracks.

What's New

Whereas a higher risk for mental disorders in adolescents with poor educational performance is well established, we focus on the reciprocal relationship by showing that underachievement acts as an indicator of common mental health problems, and does so more strongly for adolescents initially placed into higher education tracks than for those placed into lower or medium level educational tracks.

Introduction

Adolescence is a highly important phase in the aetiology of psychiatric disorders. Incidence rates of mental health problems show a marked increase during this period of the life course and studies show that many adult mental disorders commence with early symptoms during childhood or adolescence.¹

Cognitive development is central to the changes that occur during adolescence.² It is well known from previous studies that abnormalities in cognitive development often precede the development of severe mental disorders.³ Such cognitive deficits can be detected during adolescence using cognitive tests or scholastic performance.⁴ For instance studies of premorbid low intelligence⁵, poor school performance⁴ and a decline in cognitive functioning⁶ show a relationship with the development of schizophrenia. Severe depression and anxiety disorder are also associated with cognitive deficits.^{7,8}

Several studies show associations between poor scholastic achievement and mental disorders during adolescence or adulthood.⁹⁻¹³ A systematic review by Esch et al reported on the bidirectional associations between psychopathology and school dropout. Externalizing disorders and substance use disorders were strongly related to school dropout, especially when the disorders developed at early age.^{12,13} It seemed that internalizing disorders such as depression did not have a direct effect on early school leaving, but occurred after school dropout.¹² Breslau et al reported that mental disorders were significantly related to early termination of education and showed that 10% of high school termination was attributable to mental disorders.⁹ Furthermore, educational problems and specifically lower grade point average (GPA) are associated with depression in adolescents.^{10,11} Several studies have shown that Attention-deficit/hyperactivity disorder (ADHD) is associated with poorer

educational outcomes, for instance poor grades, poor reading and math standardized test scores, increased grade retention and relatively low rates of high school graduation.^{14, 15}

Less is known about the relationship between cognitive performance and common mental health disorders in adolescence. It remains unclear whether a decline in scholastic or cognitive performance is related exclusively to certain disorders, or also to common mental health problems in the population. We therefore investigated the relationship between common mental health problems and a broad measure of cognitive performance in a large adolescent population at secondary school. We used educational level as a proxy for general intellectual functioning, and underachievement at secondary school, compared to predicted grades, as a proxy for decline in cognitive performance. We hypothesized that a decline in cognitive performance would be associated with general mental health problems.

Methods

Study population

The community health services in the Netherlands conduct regular cross-sectional surveys at secondary schools to investigate general wellbeing of adolescents.¹⁶ In the area of the Utrecht province, secondary schools are invited to cooperate every four years. The schools are located in a region that contains both urban and rural areas; approximately 34% of the participants live in an urban area. Sociodemographic characteristics were compared with a large national cohort study in Dutch adolescents at secondary schools.¹⁷

The current cross-sectional population-based sample is obtained in the 2011-2012 wave of this ongoing survey. In the beginning of the 2011-2012 school year, 63 schools were invited to take part in this research project and ultimately 41 schools agreed to participate. The

reasons for schools not to participate included busy schedules and involvement in other research projects.

Adolescents in the second year (age 13-14) and fourth year (age 15-16) at secondary school and their parents were asked to participate in an opt-out procedure. Over 99% of the approached adolescents consented. Pupils who agreed to participate filled in a digital, anonymous questionnaire in the classroom. This assessment included questions about psychosocial functioning, lifestyle, health, stressful events and school-related factors. The average response of the pupils at school was 77%, non-response mostly due to absence of pupils because of illness or truancy, and at one school an IT failure prevented some pupils from filling in the questionnaires. The total sample included 10,803 adolescents.

Measurements

Underachievement

The Dutch education system consists of eight years of primary education, four to six years of secondary education and two to six years of higher education. Education is compulsory until the age of 16 in the Netherlands (figure 1) and state schools provide almost all primary and secondary education. In primary school (age 4-12), all children are educated at the same level. In secondary school (starting at age 12), children can attend four different tracks of education (apart from special education): low, medium and high prevocational and pre-university education.¹⁸ These tracks are associated with general intelligence: the mean IQ among pupils in the low prevocational track is 92.0 (SD 11.7), medium prevocational: 98.1 (SD 9.2), high prevocational track: 106.9 (SD 10.6) and preparatory university: 115.6 (SD 11.8).¹⁹

At the end of primary school, all pupils take a standardized national exam to test their aptitude at age 11-12 years. Their primary school teacher refers them to their starting track (low, medium, high prevocational or pre-university) at secondary school based on their results on the exam and the child's entire primary school record.¹⁸ Some teachers recommend a pupil to two alternative tracks at once, to provide the opportunity for pupils to experience both tracks when there is doubt about the appropriate educational level. These pupils are then taught in a 'combination class' in which students from two adjacent tracks are grouped together. During their school career all pupils can either downgrade or upgrade according to their actual performance at school. At the end of secondary school, all pupils take national state exams at their respective level and can enter further education in the three follow-up tracks: vocational education (54% of all pupils), polytechnics (28% of all pupils) or university (18% of all pupils).²⁰

Scholastic underachievement is generally described as lower scholastic performance than expected.²¹ This expectation can be based on various previous measurements, for example prior attainment or aptitude tests.²² In our study, underachievement was defined as a downgrade in the pupil's educational track, for example: a student started secondary school in the medium track, but attended the low track in the second or fourth year. This decline in educational track was classified as underachievement. Pupils who were recommended to two consecutive tracks, were only defined as underachievers when they attended an entire track below that recommended by their teachers.

Mental Health

Psychosocial functioning was measured with the Strengths and Difficulties Questionnaire (SDQ).²³ The SDQ is a brief screening questionnaire that focuses on common forms of

psychopathology in adolescents aged 11 to 16 years. The SDQ has a specificity of 94.6% (95% CI 94.1-95.1) and a sensitivity of 63.3% (95% CI 59.7-66.9) to identify adolescents with a psychiatric disorder.²⁴ The Dutch translation of the self-reported SDQ has been validated.²⁵

The SDQ consists of 25 items on psychological attributes, scoring on a 3-point Likert scale (not true/somewhat true/certainly true). The scale is subdivided into 5 scales of 5 items: emotional symptoms, conduct problems, hyperactivity / inattention, peer relationship problem and pro-social behaviour. The scores on all subscales but pro-social behaviour are summed to generate a total difficulties score (0-40). The self-reported total difficulties score can be divided in a normal (0 to 15), borderline (16 to 19) and clinical score (20 to 40). Scores in borderline and clinical range were taken together as deviant SDQ scores.²³ The Dutch translation of the self-reported SDQ is validated and the internal consistencies of the total difficulties score (Cronbach's alpha: 0.70) and three of the separate subscales were found to be reasonable (Cronbach's alpha: emotional symptoms scale: 0.63; hyperactivity-inattention: 0.66; prosocial behaviour: 0.60), the internal consistencies of the conduct problems (Cronbach's alpha: 0.47) and peer problems scale (Cronbach's alpha: 0.39) were below acceptable limits.²⁵

Time line

Although the survey data is cross-sectional in nature, part of the data is historic, providing a temporal dimension to this study. The school advice by the teacher of the primary school take place in the last year of primary school. The downgrading takes place between the date of advice, and the second respectively fourth year of secondary school (Appendix Figure).

Socio-demographic factors

Information on age (in years), gender, ethnicity, household composition and family affluence was collected in the self-report questionnaire. We categorized ethnicity as native or non-native based on the country of birth of the parents. Participants were considered non-native when one or more parents were born abroad. Household composition was divided into living with both biological parents versus one or none of them. Socio economic status was measured with the Family Affluence Scale (FAS) which is a validated measure of family wealth developed for adolescent responders.²⁶

Data analysis

Missing data

There were 313 missing values (2.8%) for current educational track, 19 incomplete SDQ questionnaires (0.2%) and 2 missing values for grade (0.0%); listwise exclusion was applied. Since pupils with the lowest teacher advice could not be classified as underachievers, we excluded 1 641 (14.7%) cases from our analyses, resulting in 9 225 cases for analysis. Pupils were either in the second or the fourth year of secondary school. Analyses are reported separately by school year.

Statistical analyses

Analyses were carried out with the statistical package for the social sciences (SPSS 20.0 for Windows). First, baseline characteristics were summarised using descriptive statistics. Bivariate non-parametric correlations between independent variables were performed to investigate potential multicollinearity (Kendall's $\tau > 0.8$). To examine whether underachievement was related to general mental health we used logistic regression analyses yielding odds ratios (OR) with 95% confidence intervals (95% CI). We then conducted a

multivariate analysis in which sociodemographic variables were added to the model. Finally, we analysed a multivariate model containing all covariates, teacher advice dummy variables, and the interaction term of underachievement and teacher advice. Teacher advice was categorized according to the different tracks (including combination class). Post-hoc, we entered school as a random factor to provide for multilevel analysis for the 41 schools and analysed the association between underachievement and the three valid subscales of the SDQ.

Results

The baseline characteristics of the participants are presented in table 1. The sample comprised 5 784 pupils in second and 5 082 in fourth school year. Mean age was 13.3 in year 2 with 68.2% of the pupils aged 13 and 27.7% aged 14. Mean age was 15.5 in year 4 with 55.9% of the pupils aged 15 and 36.1% aged 16 years. Gender was equally distributed. Most participants were Dutch, of high affluence and living with both parents. Compared with pupils in a large national population sample survey (WHO-Health Behaviour in School-aged Children: HBSC, 2009), our study sample was comparable regarding gender (50.6% female in our study versus 49% in HBSC), ethnicity (83.4% Dutch ethnicity versus 80% in HBSC) and household composition (83.3% were living with both parents versus 79.8% in HBSC) (Table 1).¹⁷ Our study sample contained relatively less lower educated pupils: pupils in low prevocational level: 15.4% in our study sample versus 20% in HBSC, intermediate prevocational level: 26.9% versus 33%, high prevocational level 33.2% versus 23% and pre-university level 24.5% versus 24% (Table 1).¹⁷ Furthermore, fewer adolescents were living in large cities and fewer pupils were living in families of low affluence: 2.1% of pupils were in low socio economic class, 22.7% in middle and 75.2% in high, whereas in a large general

population study 4.5% of pupils classified in low, 31.1% in middle and 64.4% in high socio economic class.¹⁷ Table 1 shows 566 pupils classified as underachievers at age 13-14 (21.2% started in medium level, 9.9% in medium/ high, 29.2% in high, 21.9% in high/ pre-university and 17.8% in pre-university level). There were 773 underachievers at age 15-16 (19.1% started in medium level, 11.6% in medium/ high, 24.2% in high, 18.5% in high/ pre-university and 26.5% in pre-university level). Most underachievers downgraded one track; 77.2% of the underachievers at age 13-14 and 73.0% of the underachievers at age 15-16 attended exactly one track below that recommended by their teachers. The proportion of downgrading in our sample was 10% after two years and 15% in four years (Table 1), this is comparable with results in a national cohort study of school progression at secondary school: 12% of the pupils downgraded in five years to a lower educational track than they had started in the beginning of secondary school.²⁷ Over 85% of the pupils scored in the normal range of the SDQ in both age groups. (Table 1) The mean SDQ score was low: mean score in age group 13-14 was 9.5 in boys and 9.7 in girls compared to mean SDQ score of 13.9 in boys and 13.4 in girls in HBSC study in 14-year old pupils in the Netherlands in 2009 (Table 1).¹⁷ In the older age group our mean total score was also lower: 9.6 in boys and 10.4 in girls compared with 14.9 in 16-year old boys and 18.6 in 16-year old girls (Table 1).¹⁷ These contrasts are probably due to differences in the sociodemographic characteristics of this population sample since the pupils in our sample were predominantly of middle/high social economic class and Dutch nationality.

Table 2 presents the results of our analyses. The univariate and multivariate analysis after adjustment for socio-demographic variables of the association of mental health problems with underachievement showed that the odds for reaching the threshold of deviant SDQ score are increased for pupils with underachievement in both age groups (age 13-14: OR

1.98, 95% 1.57-2.50; OR 1.86, 95% 1.47-2.37 and age 15-16: OR 2.08, 95% 1.70-2.55; OR 2.05, 95% 1.67-2.52). In the multivariate analysis including teacher advice and the interaction between underachievement and teacher advice, underachievement was significantly related to psychopathology in the older age group (OR 1.65, 95% 1.06-2.60). A significant interaction effect between underachievement and teacher advice occurred in both age groups in the higher tracks (age 13-14 OR: 2.22, 95% CI 1.07-4.60 and OR: 2.41, 95% CI 1.10-5.30 and age 15-16 OR 2.63, 95% CI 1.38-5.03). In addition, teacher advice itself was significantly and inversely associated with psychosocial problems in the two highest tracks (age 13-14: OR: 0.61, 95% CI 0.45-0.82; OR: 0.48, 95% CI 0.35-0.67, age 15-16: OR: 0.63, 95% CI 0.46-0.86; OR: 0.33, 95% CI 0.22-0.50).

Living separated from one or both parents was related to a deviant SDQ score in the younger age group, female gender and low affluence were related to a deviant SDQ score in the older age group (Table 2).

Post-hoc analyses on the three valid subscales of the SDQ (significance level set at $p < 0.01$ to correct for multiple testing) showed that underachievement was significantly associated with deviant scores on the hyperactivity subscale and not with the emotional problems or pro-social subscale (age 13-14: OR: 1.94, 95% CI 1.57-2.40, $p < 0.001$, Age 15-16: OR: 1.82, 95% CI 1.51-2.19, $p < 0.001$) (Appendix Table). Gender differences between normal and deviant scores on SDQ subscale hyperactivity were not significant.

We tested for an additional effect of separate schools in a mixed model analysis with underachievement, mental health problems and sociodemographic factors as indicators and school entered as a random factor to provide for multilevel analysis for the 41 schools.

Results were not modified by this inclusion of school as random effect (results not shown).

Furthermore, using an alternative cut-off of the SDQ such as computing the 15% highest scorers did not change the main results of our study.

Discussion

In this large population-based cross-sectional study we investigated the relationship between scholastic performance and mental health in adolescents. First, we found evidence that underachievement at secondary school was associated with adolescent mental health problems. Second, we found that pupils with underachievement who started in higher tracks of education had larger odds for deviant SDQ scores than those who started out in medium tracks. Furthermore, post-hoc analysis showed that underachievement was particularly related to symptoms of hyperactivity.

Our finding that downgrading in educational tracks at secondary school is associated with adolescent mental health problems is in line with previous research^{9, 10, 28}. Our results add to the existing evidence that not only school drop-out²⁸, lower results on educational tests^{4, 9, 11, 14} and grade retention⁴ are related to psychopathology but also decline in educational track is included in this 'underachievement'. Furthermore, our results indicate different associations between mental health problems and underachievement at various tracks of education. Pupils who underachieved and started at a higher track, had higher odds for deviant SDQ scores, although pupils in higher educational tracks had lower risks of psychopathology compared with low educational tracks. This difference may be partially explained by the lower levels of psychosocial problems in higher tracks of education. The increase in psychosocial problems will therefore constitute a larger proportional increment in the higher levels compared to the lower levels. This finding is in line with literature showing that pupils at low educational levels experience more deviant SDQ scores.¹⁷ Also, a

significant amount of the variation in school performance at Dutch secondary schools and educational achievement is explained by intelligence^{19, 29}, and lower childhood IQ is related to an increased risk of several psychiatric disorders.⁷ Another explanation for the difference found between pupils in higher and lower educational tracks might be that pupils in higher streams more often experience subclinical (or undiagnosed) ADHD symptoms. Bussing et al showed that graduation rates were lower for students with subthreshold ADHD than for students diagnosed with ADHD.³⁰

Lastly, we showed that underachievement was particularly related to symptoms of hyperactivity. This is consistent with previous studies showing that the association with educational attainment is specific for various mental health disorders.²⁸ Hyperactivity and attention problems especially predict negative academic outcomes after adjustment for IQ or prior school difficulties.⁹

Strengths and limitations

The main strengths of this study are the large population-based sample of adolescents. Participants were predominantly from Dutch origin, high affluence and living with both parents, which is representative of Dutch adolescents outside the large cities. We were able to investigate the effect of underachievement in different tracks next to the effect of other important variables such as sociodemographic factors. Furthermore, we looked at current mental health and both early and late underachievement, which gave us the opportunity to obtain a longitudinal perspective in a retrospective cross-sectional study.

This study should be viewed in the light of its limitations. First, this study is limited by its cross-sectional design. The association between low educational attainment and psychopathology is bidirectional; educational problems may both result from

psychopathology or lead to psychopathology during childhood.⁹ Several prospective studies have shown that psychiatric problems predict educational underachievement³¹ and also problems in educational attainment or cognitive deficits predict later development of psychiatric disorders.⁷ In our study, underachievement and mental health problems were measured at the same moment, thus we cannot rule out that mental health problems could have preceded scholastic underachievement. Second, scholastic underachievement is only measured in the time-span from the start of secondary until the second or fourth year at secondary school. This might be too short or too early to adequately assess all underachievers. Furthermore, we caused a bias of higher socio economic class by not including the low level underachievers. Of note is that this study was conducted in an affluent western country and the results may not generalise to other populations. Fourth, in the multivariate analysis, we added information on important variables such as gender, ethnicity, affluence and household composition to adjust for potential confounding. Other, unmeasured confounding factors and residual confounding cannot be ruled out. A further limitation is that the self-reported SDQ is not as reliable in measuring psychosocial functioning as the multiple source version with information from parents and teachers. However, validity and reliability improve by administering the questionnaires in school classes and by assuring anonymity.³²

Despite these limitations, the present study adds to the current discussion on cognitive development and psychopathology that a decline in scholastic achievement may be investigated as a marker for general psychosocial problems, especially in pupils who started at high track of education. Although this type of underachievement; downgrading in tracks, has not been investigated as much as educational test scores or school drop-out, it is very informative since it directly results in less education which may have life-long consequences

for the affected individuals.³³ This adverse outcome emphasizes the need for early detection in adolescents to avoid development of severe mental health problems or educational attainment, which are both important for well-being during adulthood.^{28, 31} Previous research showed that school personnel played an important role in both detection and the referral for help in childhood psychopathology.³⁴ For instance systematic screening, school monitoring with training of teachers and other school personnel to identify children at risk and school-based health promotion programmes may be useful in daily practice of schools.³⁵ It is then possible to investigate whether children in various tracks or types of education benefit differently from these interventions.

Conclusion

Underachievement at secondary school is associated with general mental health in pupils who started at a high educational level, especially with hyperactivity symptoms.

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Conflict of interest

None.

Ethical standards

The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki declaration of 1975, as revised in 2008.

ACCEPTED MANUSCRIPT

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Table 1. Characteristics of study population

		age 13-14		age 15-16	
Full sample	N	5784		5082	
		mean	s.d.	mean	s.d.
Age		13.3	0.55	15.46	0.65
		N	%	N	%
Gender	Female	2918	50.4	2569	50.6
	Male	2866	49.6	2513	49.4
Ethnicity	Dutch	4819	83.3	4236	83.4
	Surinamese, Caribbean	110	1.9	129	2.6
	Turkish	100	1.7	66	1.3
	Moroccan	161	2.8	115	2.3
	Other	594	10.3	536	10.5
Family Affluence Scale	Low	119	2.1	110	2.2
	Middle	1246	21.5	1221	24
	High	4419	76.4	3751	73.8
Household composition	Lives with both parents	4888	84.5	4235	83.3
	Lives separated from one or both parents	896	15.5	844	16.6
	missing	0		3	0.1
SDQ	Normal	5066	87.6	4378	86.1
	Borderline	467	8.1	450	8.9
	Clinical	251	4.3	254	5
Teacher advise	Low (1)	843	14.6	798	15.7
	Medium (2)	731	12.6	642	12.6
	Medium / high (2/3)	971	16.8	883	17.4
	High (3)	793	13.7	640	12.6
	High / pre-university (3/4)	1359	23.5	1213	23.9
	Pre-university (4)	1087	18.8	906	17.8
Underachievement	No underachievement	5218	90.2	4309	84.8
	Underachievement	566	9.8	773	15.2

Table 2. Associations with deviant SDQ (odds ratio, 95% confidence intervals CI)

Predictor	Age 13-14		Age 15-16	
	OR	95 % CI	OR	95 % CI
Univariate analysis				
Underachievement	1.98	1.57-2.50**	2.08	1.70-2.55**
Multivariate analysis (1)				
Underachievement	1.86	1.47-2.37**	2.05	1.67-2.52**
Female gender	1.03	0.86-1.23	1.31	1.09-1.56*
Non-Dutch ethnicity	0.92	0.71-1.17	1.28	1.02-1.62*
Low affluence	1.29	0.72-2.33	1.85	1.09-3.12*
Separated from one or both parents	2.00	1.61-2.47**	1.23	0.98-1.55
Multivariate analysis (2)				
Underachievement	1.04	0.60-1.80	1.65	1.06-2.60*
Female gender	1.02	0.86-1.23	1.26	1.05-1.51*
Non-Dutch ethnicity	0.88	0.69-1.13	0.08	0.98-1.57
Low affluence	1.26	0.70-2.29	1.75	1.03-2.96*
Separated from one or both parents	1.96	1.58-2.43**	1.20	0.95-1.52
<i>Teacher advice</i> *				
Medium	Reference category		Reference category	
Medium / high	0.81	0.60-1.10	0.88	0.65-1.21
High	0.79	0.56-1.10	0.83	0.58-1.20
High / pre-university	0.61	0.45-0.82*	0.63	0.46-0.86*
Pre-university	0.48	0.35-0.67**	0.33	0.22-0.50**
<i>Underachievement * teacher advice</i> #				
Medium ⇒ Low	Reference category		Reference category	
Medium / high ⇒ Medium	1.67	0.69-4.02	0.91	0.45-1.87
High ⇒ Medium / high	1.82	0.89-3.71	0.93	0.49-1.77
High / pre-university ⇒ High	2.22	1.07-4.60*	1.43	0.76-2.70
Pre-university ⇒ High / pre-university	2.41	1.10-5.30*	2.63	1.38-5.03*

* reference category: teacher advice medium prevocational

#reference category: teacher advice medium prevocational, downgraded to low prevocational

* significant at $p < .05$, ** significant at $p < .001$

Appendix

Table 3. Multivariate analyses valid sub scales SDQ (odds ratio, 95% confidence intervals CI)

Hyperactivity subscale

Predictor	Age 13-14		Age 15-16	
	OR	95 % CI	OR	95 % CI
Underachievement	1.94	1.57-2.40*	1.82	1.51-2.19*
Female gender	0.86	0.73-1.00	0.93	0.80-1.08
Non-Dutch ethnicity	0.69	0.55-0.86	0.90	0.72-1.12
Low affluence	0.79	0.42-1.46	1.03	0.58-1.81
Separated from one or both parents	1.58	1.30-1.92*	0.99	0.80-1.22
Teacher advise 1	1.22	0.95-1.57	1.01	0.78-1.31
Teacher advise 2	1.03	0.79-1.35	1.12	0.86-1.47
Teacher advise 3	0.92	0.72-1.17	1.08	0.85-1.38
Teacher advise 4	0.80	0.61-1.03	0.73	0.56-0.95

* significant at $p < .001$

* reference category: teacher advice medium prevocational

Emotional subscale

Predictor	Age 13-14		Age 15-16	
	OR	95 % CI	OR	95 % CI
Underachievement	1.37	1.01-1.85	1.40	1.09-1.82
Female gender	3.36	2.68-4.20*	4.52	3.57-5.73*
Non-Dutch ethnicity	0.74	0.55-1.00	0.87	0.66-1.16
Low affluence	0.84	0.54-2.16	1.20	0.63-2.31
Separated from one or both parents	1.42	1.10-1.83	1.24	0.96-1.61
Teacher advise 1	0.91	0.65-1.27	1.06	0.77-1.46
Teacher advise 2	0.85	0.69-1.20	0.91	0.63-1.30
Teacher advise 3	0.79	0.57-1.08	1.02	0.75-1.38
Teacher advise 4	1.02	0.74-1.40	0.77	0.55-1.09

* significant at $p < .001$

* reference category: teacher advice medium prevocational

Prosocial subscale

Predictor	Age 13-14		Age 15-16	
	OR	95 % CI	OR	95 % CI
Underachievement	0.56	0.37-0.85	0.53	0.38-0.76*
Female gender	5.65	3.63-8.78*	4.75	3.20-7.06*
Non-Dutch ethnicity	1.02	0.66-1.59	0.98	0.64-1.48
Low affluence	0.84	0.25-2.82	1.19	0.36-3.93
Separated from one or both parents	0.77	0.50-1.18	0.82	0.55-1.23

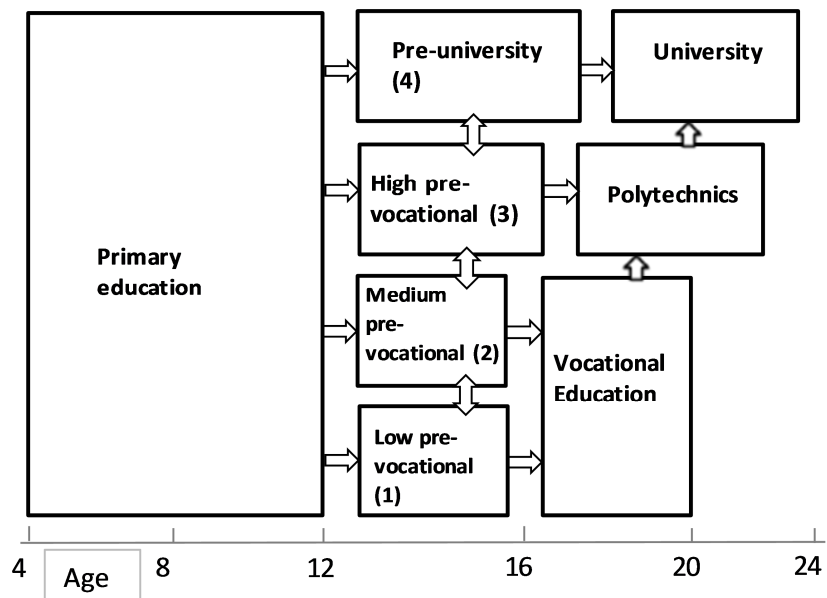
Teacher advise 1	1.07	0.65-1.76	0.69	0.42-1.15
Teacher advise 2	1.45	0.61-1.20	0.84	0.49-1.43
Teacher advise 3	1.50	0.84-2.51	1.28	0.76-2.15
Teacher advise 4	2.49	0.92-2.43	1.43	0.83-2.49

* significant at $p < .001$

* reference category: teacher advice medium prevocational

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Figure 1. Dutch school system with four streams (1-4)



Appendix

Figure 2. Time line

