

# Educational Level, Underachievement, and General Mental Health Problems in 10,866 Adolescents

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## ABSTRACT

**OBJECTIVE:** Previous research suggests that cognitive functioning is associated with the risk of several adult psychiatric disorders. In this study we investigated 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 to 16 years, underachievement at secondary school was defined as the discrepancy between predicted school grade and actual grade 1 or 3 years later. Mental health problems were assessed using the Strengths and Difficulties Questionnaire. 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 to 14 years (odds ratio [OR], 1.86; 95% confidence interval [CI], 1.47–2.37) and in pupils aged 15 to 16 years (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 years: OR, 2.22; 95% CI, 1.07–4.60 and OR, 2.41; 95% CI, 1.10–5.30, age 15–16 years: OR, 2.63; 95% CI, 1.38–5.03). In the multivariate analysis including the interaction between underachievement and teacher advice, a significant interaction effect occurs between underachievement and teacher advice in the higher tracks. Values of OR and CI are given for each significant interaction term. In the younger age group (pupils aged 13–14 years) this results in 2 sets of OR and CI. This association was most pronounced for the hyperactivity subscale of the Strengths and Difficulties Questionnaire.

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

**KEYWORDS:** adolescence; general mental health problems; school performance; underachievement

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## 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.

ADOLESCENCE IS A highly important phase in the etiology 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.<sup>1</sup>

Cognitive development is central to the changes that occur during adolescence.<sup>2</sup> It is well known from previous studies that abnormalities in cognitive development often precede the development of severe mental disorders.<sup>3</sup> Such cognitive deficits can be detected during adolescence using cognitive tests or scholastic performance.<sup>4</sup> For instance, studies of premorbid low intelligence,<sup>5</sup> poor school performance,<sup>4</sup> and a decline in cognitive functioning<sup>6</sup> show a relationship with the development of schizophrenia. Severe depression and anxiety disorder are also associated with cognitive deficits.<sup>7,8</sup>

Several studies show associations between poor scholastic achievement and mental disorders during adolescence or adulthood.<sup>9–13</sup> In a systematic review, Esch et al reported on the bidirectional associations between psychopathology and school dropout.<sup>12</sup> Externalizing disorders and substance use disorders were strongly related to school dropout, especially when the disorders developed at early age.<sup>12,13</sup> It seemed that internalizing disorders such as depression did not have a direct effect on early school leaving, but occurred after school dropout.<sup>12</sup> 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.<sup>9</sup> Furthermore, educational problems and specifically lower grade point average are associated with depression in adolescents.<sup>10,11</sup> 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.<sup>14,15</sup>

Less is known about the relationship between cognitive performance and common mental health problems 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 with 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 well-being of adolescents.<sup>16</sup> In the area of the Utrecht province, secondary schools are invited to cooperate every 4 years. The schools are located in a region that contains urban as well as 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.<sup>17</sup>

The current cross-sectional population-based sample was obtained in the 2011 to 2012 wave of this ongoing survey. In the beginning of the 2011 to 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 (ages 13–14 years) and fourth year (ages 15–16 years) at secondary school and

their parents were asked to participate in an opt-out procedure. More than 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%; nonresponse was mostly due because of absence of pupils because of illness or truancy, and at 1 school an information technology failure prevented some pupils from filling in the questionnaires. The total sample included 10,803 adolescents.

## MEASUREMENTS

### UNDERACHIEVEMENT

The Dutch education system consists of 8 years of primary education, 4 to 6 years of secondary education, and 2 to 6 years of higher education. Education is compulsory until the age of 16 years in the Netherlands (Fig) and state schools provide almost all primary and secondary education. In primary school (ages 4–12 years), all children are educated at the same level. In secondary school (starting at age 12 years), children can attend 4 different tracks of education (apart from special education): low, medium, and high prevocational and pre-university education.<sup>18</sup> These tracks are associated with general intelligence: the mean IQ among pupils in the low prevocational track was 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).<sup>19</sup>

At the end of primary school, all pupils take a standardized national exam to test their aptitude at age 11 to 12 years. Their primary school teacher refers them to their starting track (low, medium, high prevocational, or pre-university) at secondary school on the basis of their results on the exam and the child's entire primary school record.<sup>18</sup> Some teachers recommend a pupil to 2 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 2 adjacent tracks are grouped together. During their school career all pupils

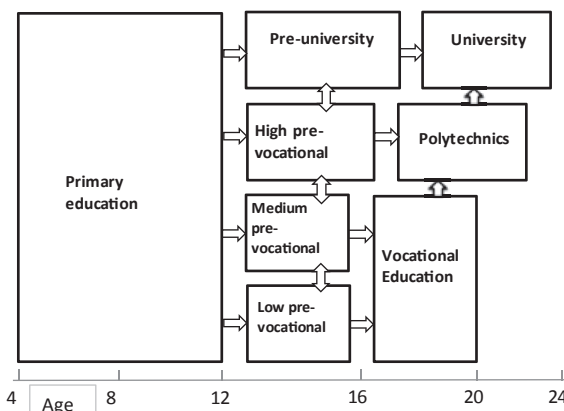


Figure. Dutch school system with 4 tracks.

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