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RUNNING HEAD: Teacher–Student Relationship and Noncompletion

A Chance Lost in the Prevention of School Dropout?

Teacher–Student Relationships Mediate the Effect of Mental Health Problems on  
Noncompletion of Upper Secondary School.

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**Abstract**

There is increasing awareness of the challenges that young people who do not complete upper secondary school may encounter. The aim of the current study was to investigate teacher–student relationship as a possible mechanism to reduce the associations between mental health problems, grades and subsequent noncompletion. Mental health problems and teacher–student relationships were assessed through students’ self-reports in 10<sup>th</sup> grade, and linked with Norwegian registries of education and sociodemography (n = 10,931). A dual-factor serial mediator model was specified, allowing the effect of mental health problems on school dropout to be mediated by the teacher–student relationship via school grades. Results indicated that teacher–student relationship is a potential mechanism to reduce the negative associations between mental health problems and later noncompletion. However, students with mental health problems seemed to experience less supportive teachers; therefore, interventions targeting teacher–student relationships may be required. The patterns were similar between genders.

*Keywords:* teacher–student relationship; mental health problems; grades; noncompletion; upper secondary school

**A Chance Lost in the Prevention of School Dropout?  
Teacher–Student Relationships Mediate the Effect of Mental Health Problems on  
Noncompletion of Upper Secondary School.**

Noncompletion of upper secondary school is of major concern in Western societies. A recent report from the OECD shows that between 20 and 40 percent of the students who enter an upper secondary program have not graduated when they reach the age of 25 (OECD, 2014). In Norway, where about 98 percent of all adolescents attend free upper secondary school, the noncompletion rate after five years is about 30 percent (Markussen, Frøseth, Sandberg, Lødding, & Borgen, 2011; Sagatun, Heyerdahl, Wentzel-Larsen, & Lien, 2014). Despite several political efforts to reduce the number of noncompleters, this dropout rate has been stable for two decades. Individuals who do not complete upper secondary school are at high risk of several negative labour market outcomes, such as unemployment and low income (De Ridder et al., 2012; OECD, 2001; Rumberger & Lamb, 2003) as well as poorer health and more criminal behaviour in adulthood than completers (Rumberger, 2011). Consequently, it is important to increase the number of students who graduate to prevent individual hazard and societal costs. A prerequisite for making such changes is knowledge regarding the mechanisms of student accomplishment and completion.

School dropout is likely to be influenced by an array of factors. Individual as well as contextual risk factors for school dropout have been identified. Of individual risk factors, multiple studies identify poor academic performance at the lower secondary (compulsory) level as one of the strongest predictors of noncompletion of upper secondary school (Markussen, Frøseth, & Sandberg, 2011; Quiroga, Janosz, Bisset, & Morin, 2013; Rumberger, 2011). Furthermore, an increasing number of studies indicate that mental health problems, especially externalizing problems, are associated with noncompletion of upper secondary school (Esch et al., 2014; Hawkins, Jaccard, & Needle, 2013; Sagatun et al., 2014). Non-

Western minorities and boys are at higher risk of dropping out of school (Markussen, Frøseth, & Sandberg, 2011; Rudasill, Reio Jr, Stipanovic, & Taylor, 2010; Rumberger, 2011; Sagatun et al., 2014).

Contextual circumstances predicting noncompletion of upper secondary school include family-related factors such as low levels of parental education, low family income and living in a single-parent household (Markussen, Frøseth, & Sandberg, 2011; Rudasill et al., 2010; Rumberger, 2011; Sagatun et al., 2014).

School-related factors, such as teacher–student relationships, are also important. A lack of meaningful relationships with caring adults at school has been pointed out as a major element of student alienation, school failure and finally dropout (Roorda, Koomen, Spilt, & Oort, 2011). A meta-analysis concluded that several teacher variables, described as positive relationships, non-directivity, empathy, warmth and encouraging thinking, were associated with dropout prevention (Cornelius-White, 2007). Furthermore, in several studies, negative social interactions between teachers and students have been found to predict noncompletion of upper secondary school (Fortin, Marcotte, Diallo, Potvin, & Royer, 2013; Lessard, Butler-Kisber, Fortin, & Marcotte, 2014). Lee & Burkham (2003) found that students attending schools defined by negative teacher–student relationships were more likely to drop out than those who attended schools with more positive teacher–student relationships. However, one study from Quebec in Canada of around 4,000 upper secondary school students reported diverging results. They found that teacher–student relationships did not contribute to dropout risk (Lessard, Poirier, & Fortin, 2010). For boys, school satisfaction and achievement contributed significantly to noncompletion, whereas for girls, commitment, satisfaction and achievement were of particular importance.

Although several risk factors for school dropout have been identified, the mechanisms explaining their predictive effect remain poorly understood (Esch et al., 2014). Studies

indicate that certain risk factors may operate as mediators for other risk factors; thus, there are indirect as well as direct effects in the paths between risk factors and school dropout. A recent study of a population-based sample of Norwegian high school students found that the students' academic performance at the age of 15–16 served as a mediating factor between concurrent mental health problems and subsequent dropout from upper secondary school within the following five years (Sagatun et al., 2014). More specifically, results from causal mediation analyses indicated that a ten percent reduction in externalizing problems led to a reduction in noncompletion rates of four to five percentage points. About 75 percent of this effect was mediated by school grades. For internalizing problems, significant effects were only found for girls, and the total effect was lower (one percentage point). Of this total effect, about 30 percent was mediated through grades.

### **Teacher–Student Relationship as a Possible Mediating Mechanism to Prevent Noncompletion**

For the prevention of school dropout, identifying potentially modifiable mechanisms are of particular interest (Esch et al., 2014). The teacher–student relationship is a school-related factor that is not only a risk– or protective factor for school dropout in itself, but is also associated with several individual school-adjustment factors that have proved to be predictive of school dropout. One meta-analysis concluded that a positive and warm relationship with teachers predicted a number of positive school-adjustment outcomes for students (Cornelius-White, 2007). Another recent meta-analytic review of students from preschool to upper secondary school investigated the associations between affective teacher–student relationships and students' school engagement and academic achievement (Roorda et al., 2011). Overall, they identified small to medium associations between teacher–student relationships and academic achievement. There was an even stronger association between

teacher–student relationships and student engagement, which is considered an important factor in upper secondary school completion (Wang & Fredricks, 2014).

Significant associations between affective teacher–student relationships and students’ internalizing or externalizing problems have been reported in several recent studies (O’Connor, Collins, & Supplee, 2012; O’Connor, Dearing, & Collins, 2011; Rudasill et al., 2010; Wang, Brinkworth, & Eccles, 2013). In a longitudinal study (fourth to sixth grade) of both teacher–student conflict and teacher–student closeness, the researchers found that students who were in conflict with their teachers between these grades reported more risk-taking behaviour in the sixth grade (e.g. riding in cars without seatbelts, smoking, drinking alcohol, stealing or fighting) (Rudasill et al., 2010). In addition, Rudasill found that student–teacher closeness was longitudinally associated with less risky behaviour. Another longitudinal study investigated *inter alia* the role of teacher relationships during childhood (first to fifth grade) on mental health problems in late childhood (fifth grade), and identified differences in the types of teacher–student relationships that were predictive of externalizing and internalizing difficulties (O’Connor et al., 2012). While elevated levels of teacher–child conflict during childhood were associated with externalizing behaviours in late childhood, low levels of teacher–child closeness were associated with later internalizing behaviours.

Another study investigated the typology of students at risk of dropping out of school and identified four subgroups (Fortin, Marcotte, Potvin, Royer, & Joly, 2006). Common for the students in these groups, were that they all encountered more social and school adjustment difficulties and a higher score for depression compared to a not-at-risk control group. However, teachers showed significantly more negative attitudes only towards the group of students who were also characterized by a co-occurrence of behaviour problems and learning difficulties. Other, longitudinal studies also indicate that children with externalizing problems and risk-taking behaviour seem to be more likely to have conflicts in their relationships with

teachers (Fortin et al., 2013; Hamre & Pianta, 2001; Rudasill et al., 2010). These studies imply that over time, externalizing problems and teacher–student relationships may negatively influence each other.

The empirical basis for the existence of gender differences in the associations between teacher–student relationships and various school-adjustment factors is so far inconclusive. Several studies report that there are no gender differences (Allen et al., 2013; Cornelius-White, 2007; Hughes, 2011). However, other studies have reported stronger associations between teacher–student relationships and school adjustment for girls (Baker, 2006; McCormick & O’Connor, 2015), whereas yet others have reported a stronger effect for boys (Furrer & Skinner, 2003; Wang et al., 2013).

### **Research Questions**

As discussed above, there is some empirical support for the assumption that teacher–student relationships are involved in a more complex risk mechanism whereby individual risk factors of school grades and mental health difficulties contribute to school dropout.

In the present study, we had the advantage of building further on the mediation model reported by Sagatun et al. (2014). This previous study showed that academic performance in the tenth grade served as a mediating factor between mental health problems (of adolescents aged 15–16 years) and noncompletion of upper secondary school during the following five years. Being a modifiable factor that is potentially accessible through teachers, the teacher–student relationship clearly constitutes an interesting possible mediating mechanism in these established associations. Thus, we explored whether teacher–student relationships mediated the associations between mental health problems and academic grades, and subsequent noncompletion of upper secondary school, using the same sample as Sagatun et al. (Sagatun et al.). To investigate this, a dual-factor serial mediator model was specified, allowing the



effect of mental health problems on later school dropout to be (partly) mediated by the teacher–student relationship via school grades.

Because of the paucity of studies investigating these double mediating associations, the significance of the teacher–student relationship within the framework of the total model was examined through several sub questions. First, previous research suggests that teacher–student relationships are important for various individual school-adjustment factors. Thus, we investigated the association of teacher–student relationships with grades. Second, previous studies provide some support for the notion those students with mental health difficulties, in particular those students with externalizing problems, receive less teacher support. Therefore, the associations between mental distress/externalizing symptoms and teacher support were studied. Then, the teacher–student relationship was examined as a possible mechanism in the association between mental health problems and school grades.

Based on inconclusive results from previous research on possible gender differences, the analyses were stratified by gender. In addition, adjustments were made for parents' level of education.

## **Method**

### **Study Population and Procedure**

This paper is based on a large and comprehensive survey of all tenth graders (aged 15–16 years) in six Norwegian counties; Finnmark (5.2%), Troms (11.8%), Nordland (19.2%), Oppland (16%), Hedmark (16.3%) and Oslo (31.3%). These counties represent both the north and the south-east regions of Norway, as well as rural and urban areas. The survey was linked to high-quality Norwegian registries for education provided by Statistics Norway. The Norwegian Institute of Public Health conducted these health surveys between 2000 and 2004. Of the study population, about 13% had an ethnic minority background and in approximately

40 percent of the households, the mother or the father had more than upper secondary school (Sagatun et al., 2014).

The students completed two four-page questionnaires during two school classes. A project assistant was present to inform the students about the study and to administer the questionnaires. For those absent, questionnaires, informed consent forms and a pre-stamped envelopes were left at school. A letter was sent to their home addresses to prompt students who did not return the completed questionnaire during the course of the school year. The overall response rate for the survey was 87 percent ( $n = 12,434$ ). Of the participants in the survey, 88 percent ( $n = 10,931$ ) accepted linkage of information between the survey and official registers (77 percent of all the tenth graders). The 12 percent that did not accept linkage to national registers did not differ significantly in gender distribution or mental health problems compared with participants in the study sample (Sagatun et al., 2014).

### **Ethics**

All parents received written information. The students signed an informed consent form at baseline indicating their acceptance of participating in the study and the linkage of survey data to registry data. Permission to use the survey data was given by the Norwegian Institute of Public Health. The study was approved by the Regional Committee for Medical and Health Research Ethics and by the Norwegian Data Inspectorate.

### **Measures**

The survey was carried out at three time points. The questionnaires, which included questions on mental health problems and teacher–student relationships, were completed three to four months prior to when the grade points in tenth grade were determined. In Norway, vocational tracks lasts for four years. Thus, in consistency with Statistics Norway, we define noncompleters as individuals who do not complete upper secondary education within five

years (four years + one year) of completing the tenth grade. Statistics Norway provided information on completion of upper secondary school.

**Mental health problems.** Externalizing and internalizing problems were assessed by the Strengths and Difficulties Questionnaire (SDQ) (R. Goodman, 1997) and the Hopkins Symptoms Checklist (HSCL-10) (Derogatis, Lipman, Rickels, Uhlenhuth, & Covi, 1974), respectively. SDQ is a screening questionnaire that has been used in a large number of population-based studies in several countries (Youthinmind, 2006). In the current study, the self-report version was used. The SDQ is a 25-item questionnaire with five subscales, each consisting of five items which form scores for emotional symptoms, conduct problems, hyperactivity–inattention, peer problems and prosocial behaviour. Each question can be answered with “not true” (0), “somewhat true” (1) or “certainly true” (2). Scoring was conducted in line with SDQ instructions (Youthinmind, 2006). In the current study we used the conduct problems and hyperactivity-inattention subscales (Sagatun, Heyerdahl, Wentzel-Larsen, & Lien, 2015). There is theoretical and empirical support for combining the SDQ’s behavioural and hyperactivity subscales into an “externalizing” subscale (A. Goodman, Lamping, & Ploubidis, 2010), which is done in the current paper (Cronbach’s  $\alpha = 0.68$ ). The externalizing subscale is coded on a scale from 0 to 20, with higher scores signifying more problems.

To analyze internalizing problems, Sagatun et al. (2014) used the SDQ subscales related to emotional symptoms and peer problems. These subscales include items that reflect social relations, and thus may coincide with some aspects of teacher relationships. On this basis, we chose to use the HSCL-10, which only reflects the symptoms of anxiety and depression referred to as mental distress (Strand, Dalgard, Tambs, & Rognerud, 2003). The HSCL-10 comprises questions on symptoms experienced in the previous week and is used as a measure of mental distress in primary care as well as epidemiological studies (Haavet,

Sirpal, Haugen, & Christensen, 2011; Strand et al., 2003). For each question, there are four possible answers, ranging from “not troubled” (1) to “heavily troubled” (4). The HSCL-25 version is shown to have satisfactory validity and reliability as a measure of internalizing problems in adults (Derogatis et al., 1974). The version with ten questions performs almost as well as the longer version in adolescents aged 16–24 years (Strand et al., 2003). The average item score is used as a measure of mental distress (Cronbach’s  $\alpha = 0.86$ ).

**Teacher–student relationships.** The teacher-student relationship questions was part of a social support questionnaire that was developed in accordance with the theoretic framework by Cohen and Wills (1985) and Dalgard et al (1995). The questions focus on attachment, respect, mutual care and availability of support (Ulriksen, Sagatun, Zachrisson, Waaktaar, & Lervåg, 2015). The four items that measured teacher relationships as perceived by the students in tenth grade were: “My teachers appreciate my opinions”; “My teachers appreciate me”; “My teachers help me with my subjects when I need it,” and “My teachers help me with my personal problems if needed” (Cronbach’s  $\alpha = .82$ ). Mean scores were calculated when at least three of the four items were answered. All items had a response format on a scale of 1 (strongly agree) to 4 (strongly disagree). The mean scores were reversed so that a score of 4 indicated strong perceived support.

**Final marks (grades).** Grades (1–6) received in the tenth grade certificate in 11 main school subjects were summed to create the variable “grade points” (11–66). To pass a course, a grade of 2 or higher must be achieved. This information was provided by Statistics Norway’s register on education.

**Parents’ education.** Educational level was provided by Statistics Norway’s register on education. The highest level of education accomplished by mothers and fathers of participants aged 15–16 years was used to identify parents’ education. The educational levels

were categorized as “compulsory education,” “intermediate education,” “tertiary education” and “tertiary education for more than four years” (Statistics Norway, 2008).

### **Analyses**

All analyses were performed separately for boys and girls. To explore whether teacher–student relationships mediated the associations between mental health problems and school grades and subsequently noncompletion of upper secondary school, mediation analyses with the PROCESS computational tool were conducted (Hayes, 2013b; Hayes & Preacher, 2013). This analytic tool enables a path analysis-based mediation model to be used as a “conditional process model” based on a bootstrap approach. In this study, we analysed a multiple mediator model (model 7) in which the variables operated as several mediators in serial. In addition to estimating the coefficients of the model using maximum likelihood logistic regression for dichotomous outcomes, PROCESS generates direct and indirect effects in mediation models. The tool provides the indirect effect of all the mediators as a group, in addition to that of each mediator, controlling for the others (Preacher & Hayes, 2008).

The model included two mediators in serial (see Figure 1) to examine the mediating role of teacher–student relationships on the association between mental health, grade points and subsequent noncompletion of upper secondary school.

Insert Figure 1

Through this approach, we were able to explore the extent to which teacher–student relationships mediated the direct and indirect effects between mental health problems, grade points and noncompletion of upper secondary school. To estimate the total effect of mental

health problems on grade points in the complete model, we used the formula  $c = c' + (a*b)$ , where  $(a*b)$  represents the mediator path (Hayes, 2013a).

To facilitate comparison of effect sizes in the tables that reflect the mediator model, the variables were normalized by changing their range to 0–10 for externalizing problems, mental distress and teacher–student relationships.

All analyses were performed using SPSS v22. The computational tool PROCESS, invented for SPSS by Andrew F. Hayes (<http://www.afhayes.com>), was used in the mediation analysis.

### **Cluster Design**

The data in this study have a typical cluster-based design, whereby members of the same school may not be independent with respect to outcome variables (Ukoumunne, Gulliford, Chinn, Sterne, & Burney, 1999). Therefore, the hierarchical structure in the current data may need to be accounted for when analysing them. Authors suggest that a high intraclass correlation coefficient ( $ICC > .05$ ) indicates the need for complex sample analysis (Muthén & Satorra, 1995; Peugh, 2010). To establish whether the current data had a hierarchical structure, we estimated the ICC coefficients for mental health problems in the tenth grade in terms of both externalizing difficulties and mental distress ( $ICC = \sigma_b^2 / (\sigma_b^2 + \sigma_w^2)$ ,  $\sigma_b^2 =$  between cluster variance,  $\sigma_w^2 =$  within cluster variance). The results indicated that school affiliation was of no significance regarding the students' level of mental health problems in the tenth grade. The ICC coefficients for both mental health problem areas were below .05—specifically, .02 for externalizing difficulties and .01 for mental distress. Thus, we did not need to account for a hierarchical design in the analyses.

## Results

Descriptive analyses indicated that 32.4 percent of the study population did not complete upper secondary education within five years of finishing compulsory schooling (including 2 percent that did not start upper secondary school). More boys (38.9 percent) than girls (25.8 percent) were noncompleters, which are in accordance with the results reported by Sagatun et al. (2014).

Furthermore, both boys and girls who did not complete upper secondary school reported more mental distress and externalizing problems in the tenth grade than those who did (Tables 1 and 2). In addition, the students who did not complete upper secondary school experienced less affective teacher–student relationships, had poorer grade points from the tenth grade and came from families with lower levels of education than their peers who completed upper secondary school.

Insert Table 1

Insert Table 2

As indicated in Table 3, most of the correlations between the variables were significant ( $p < 0.01$ ), except for that between socioeconomic status and mental distress for boys. Only the associations between noncompletion and grade points in the tenth grade were larger than .5 for both boys and girls. Furthermore, the associations between teacher–student relationships and mental health problems were negative, both for externalizing problems (boys,  $r = -.34$ ; girls,  $r = -.36$ ) and mental distress (boys,  $r = -.24$ ; girls,  $r = -.30$ ). These results indicate that boys and girls with externalizing problems or mental distress may experience less supportive and affective teacher–student relationships.

Insert Table 3

Significance testing of possible differences between genders, indicated that mental

distress was more negatively associated with school noncompletion, teacher–student relationships, grade points and parent’s education for girls compared to boys.

The results from the multiple mediator regression models are presented separately for boys and girls in Tables 4 and 5.

Insert Table 4

Insert Table 5

The dual-factor serial mediator model includes both teacher–student relationship and grades as serial mediators between student mental difficulties and subsequent school dropout. (see Tables 4 and 5). In summary, the complete models were significant ( $p < 0.05$ ), both for mental distress (boys: coeff = .184; girls: coeff = .176) and externalizing problems (boys: coeff = .330; girls: coeff = .416). The four-step indirect paths in the full model (MD/EP -> TR -> GP -> NC; Tables 4 and 5) were also significant for both mental distress (boys: coeff = .052; girls: coeff = .048) and externalizing problems (boys: coeff = .030; girls: coeff = .038).

There were significant positive associations between the teacher–student relationship and grades in the full model for both mental distress (boys: coeff = .668; girls: coeff = .735) and externalizing problems (boys: coeff = .355; girls: coeff = .413). Furthermore, the results indicated that teacher–student relationships in the tenth grade had no significant direct effect on noncompletion of upper secondary school within this serial mediator model. Only for girls did the mental distress model identify a weak but significant negative direct effect (Table 4, TR -> NC: coeff =  $-.039$ ). In addition, the mediator path leading from mental distress via teacher–student relationships to non-completion, was significant only for girls (table 4, MD->TR->NC: coeff = .015). However, the confidence intervals for boys and girls overlapped moderately, indicating that the differences between genders were not significant.

Based on the multiple mediator model, significant negative associations between



mental health problems and teacher–student relationships were identified. For mental distress, the associations were  $-.482$  for boys and  $-.388$  for girls (Table 4, MD  $\rightarrow$  TR), and for externalizing problems they were  $-.538$  and  $-.570$  for boys and girls, respectively (Table 5, EP  $\rightarrow$  TR).

Focusing on the teacher–student relationship as a mediator between mental health problems and grade points within the complete model, we find that the direct effect of mental distress on grade points was  $-.260$  for boys and  $-.348$  for girls (Table 4, MD  $\rightarrow$  GP). The total effect of mental distress on grade points was estimated to be  $-.58$  ( $-.26 + (-.48 * .67)$ ) for boys and  $-.63$  ( $-.35 + (-.39 * .74)$ ) for girls, using the simple mediation formula  $c = c' + (a*b)$  (Hayes, 2013a). To explain this in more detail, for boys the mediating effect of the teacher–student relationship on the association between mental distress and grade points was  $-.32$  ( $-.48 * .67$ ), whilst the mediating effect for girls was  $-.29$  ( $-.39 * .74$ ). Thus, the relative mediating effect of teacher–student relationships on the association between mental distress and grade points  $((a*b)/c)*100$  was approximately 55 percent  $(-.48 * .67)/.58)*100$  for boys, whereas about 45 percent  $(-.39 * .74)/.58)*100$  of the total effect was mediated through the teacher–student relationship for girls. In similar estimations for externalizing problems, the relative mediating effect of the teacher–student relationship on the association between externalizing problems and grade points seemed to be less substantial. The direct effect of externalizing problems on grade points for boys was  $-1.613$ , whereas the total effect was  $-1.804$ . For girls, the direct effect was  $-1.794$  and the total effect was  $-2.029$ . Hence, the relative mediating effect of the teacher–student relationship was about 11 percent for boys and 12 percent for girls.

## Discussion

The main findings in the present longitudinal study was that the teacher–student relationship served as a significant mediator in the path from mental health difficulties via school grades in high school, which predicted later dropout from upper secondary school. With no direct significant path from teacher–student relationship to later dropout, the entire effect of the teacher–student relationship on later dropout was through its mediating effect on the influence of mental difficulties on school grades. Furthermore, the results indicate that everyday teacher–student relationship may be a significant contributor in the risk mechanisms by which students with mental health difficulties and lower grades end up with higher dropout rates later in secondary school.

The paucity of studies investigating this particular double mediating association excludes the possibility of comparisons of the complete model with earlier research. However, several studies have reported direct associations between teacher–student relationships and individual variables included in the complete model studied here. Therefore, the various possible direct and indirect roles of the teacher–student relationship within the complete model will be discussed in relation to previous findings in more detail below, before we return to a more comprehensive discussion of the results of the overall double serial mediation model.

### Teacher–Student Relationships and Grades

As expected, there was a positive association between the teacher–student relationship and grades in the present study. This is consistent with the findings from several earlier studies, including a meta-analytic review that concludes that several teacher factors, described as positive relationships, low directivity, high empathy, warmth and encouraging thinking, are

associated with a number of positive school-adjustment outcomes for students such as participation, satisfaction, mathematics achievement, self-esteem, high grades and reduction in disruptive behaviour (Cornelius-White, 2007). Another recent meta-analytic review concluded that overall, there was a small to medium positive association between teacher–student relationships and achievement (Roorda et al., 2011), with the strongest associations reported in adolescent samples.

Furthermore, there is substantial reason to assume that the association between teacher–student relationships and grades may be of a causal nature. Several intervention-based studies have supported the notion that emotionally supportive teachers promote children’s social and academic outcomes (Allen et al., 2013; Diseth, Danielsen, & Samdal, 2012; McCormick, O’Connor, Cappella, & McClowry, 2013; Roorda et al., 2011). Especially for mathematics, previous research suggests that there are significant positive effects of high-quality teacher–child relationships (Crosnoe et al., 2010; McCormick et al., 2013). One study even concluded that a positive teacher–child relationship in kindergarten had a positive longitudinal effect on mathematics achievement in first grade (McCormick et al., 2013). In addition, a longitudinal study investigating a comprehensive theoretical model of school dropout, found that negative teacher interactions were intercorrelated with academic achievement (Fortin et al., 2013). This result indicates that teachers tend to be more negative towards students who perform poorly, at the same time as students’ academic achievement decrease when teachers are negative.

Based on the evidence for significant effects of teacher–student relationship on students’ academic outcomes, and given the general assumption that students with mental health problems are in particular need of caring and supportive relationships with their teachers, one would expect that students with mental health difficulties would receive a large

amount of positive attention from their teachers. However, this does not seem to be reflected in these students' relationships with their teachers.

### **Teacher–Student Relationships and Mental Health Problems**

According to the results of the current study, both mental distress and externalizing problems were associated with poorer teacher–student relationships. Thus, based on the students' ratings, teachers seemed to interact less supportively with students who suffered from mental health problems compared with students without such difficulties.

Previous studies of the association between mental health and teacher–student relationships have concluded that elevated levels of mental health problems are in fact associated with poorer teacher–student relationships, especially for externalizing problems (Hamre & Pianta, 2001; Rudasill et al., 2010). Focusing on adolescents with externalizing problems and risk-taking behaviour, Rudasill (2010) concluded that these students also seemed more likely to have conflicts in their relationships with teachers. Mutually reinforcing conflicts in teacher–student relationships may start at an early age; Birch (1998) found that antisocial behaviours in kindergarten predicted negative teacher–student relationships in the first grade, and that conflicting teacher–student relationships predicted decreasing prosocial student behaviours. With respect to students suffering mental distress, conflict, absence of attention and avoidance of active initiative to seek support from teachers seem to be characteristic of teacher–student relationships. A five-year longitudinal study of depression in adolescents showed that while teachers' support predicted reductions in depressive symptoms, depressive symptoms did not predict more teacher support (Pössel, Rudasill, Sawyer, Spence, & Bjerg, 2013). Keep in mind that depressive symptoms tend to make adolescents isolate and withdraw from interactions (Lewinsohn, Hoberman, Teri, & Hautzinger, 1985), so non-

intervention from teachers in the face of depressive symptoms could exacerbate the development of depressive symptoms.

In summary, the results of the current study and previous research indicate that students with mental health problems tend to experience less supportive teachers. Thus, in everyday classroom practice, reciprocal teacher–student interactions seem to reinforce negative as well as positive student characteristics. The results of the present study also indicate that left uncorrected, such mutually reinforcing transactions over time may contribute to negative academic outcomes for students with behavioural and mental health difficulties.

### **Teacher–Student Relationships as a Mechanism in the Association between Mental Health Problems and Grades**

As predicted, the results of the current analyses suggested that perceived teacher–student relationships served as a significant mediator in the association between mental health problems and grade points in the tenth grade. That is, students with more mental health difficulties received lower final grades, and part of this effect was mediated by the experience of less positive and supportive teachers. The direct negative association between mental health difficulties and grades was reduced but not eliminated when teacher–student relationships were included in the model, indicating a partial mediating effect. It should be noted that even though the relative significance of the teacher–student relationship as a mediator was stronger for mental distress compared with externalizing problems, the association between externalizing problems and grades was considerably stronger than that between mental distress and grades. Thus, the relative percentages may be somewhat misleading. Nevertheless, a substantial part of the negative association between externalizing problems and grades cannot be explained by teacher–student relationships, and needs further investigation.

The results of the mediator model indicate that a positive, supportive and affective teacher–student relationship is an important predictor of academic achievement. However, adolescents with various mental health problems do not perceive their relationship with their teachers to be positive, and this perceived lack of support from teachers contributes significantly to the academic problems experienced by these students.

This result may seem to be inconsistent with studies that have investigated a possible buffering effect of teacher–student relationships for students with mental health difficulties. A comprehensive longitudinal study examined the associations between the quality of teacher–child relationships and mental health problems among elementary school students from birth through adolescence (O’Connor et al., 2011). There were two main findings from this study: (1) high-quality teacher-child relationships predicted low levels of externalizing behaviours, and (2) high-quality relationships acted as protective factors, helping to prevent children with high levels of internalizing problems in early childhood from developing long-term internalizing problems. Another study focusing on adolescents (13 to 18 years of age) found that positive teacher–student relationships protected adolescents from both misconduct and depression, helping such at-risk adolescents to attain more positive developmental trajectories over time (Wang et al., 2013). Thus, there seems to be little doubt about the potential of a positive teacher–student relationship for enhancing a range of personal and academic outcomes for students at risk.

Nevertheless, results from other studies indicate that this potential does not always seem to be fully utilized. Previous research has found that in everyday practice in schools, teachers do not behave in ways that buffer against problem behaviours in their classrooms. In a review of international studies of teachers’ use of approval and disapproval in classrooms (Beaman & Wheldall, 2000), the authors concluded that there was *“little evidence to suggest that teachers, universally, systematically deploy contingent praise as positive reinforcement*

*in spite of the considerable literature testifying to its effectiveness”* (p. 432). A detailed study that observed and registered teachers’ classroom interactions with children with behavioural disorders (Shores et al., 1993) concluded that most of the teacher–child interactions consisted of teachers giving directions followed by student compliance, while teachers giving positive consequences in response to prosocial behaviour occurred only rarely. With regard to internalizing problems, a recent study on school children showed that low teacher–child relationship quality was related to negative appraisals of students’ interactions with their teacher; furthermore, negative perceptions mattered more than positive perceptions for students with internalizing problems (Jellesma, Zee, & Koomen, 2015). Thus, students’ negative appraisals of teachers’ behaviour could at least partly originate from the relational difficulties inherent in mental distress and behavioural problems. However, teachers’ ignorance of or avoidance of addressing these negative appraisals could partially explain the mechanism by which teacher–student relationships contribute to the negative effect of internalizing difficulties on students’ academic outcomes.

### **Mental Health, the Teacher–Student Relationship, Grades and Noncompletion**

The full serial mediator model shows that school grades significantly mediated the longitudinal association between mental health or behavioural problems and later school dropout. The associations and mediator pathways in the current study were similar for boys and girls. Furthermore, the quality of teacher–student relationship plays a significant role in this risk mechanism. However, the role of the teacher–student relationship in school dropout was only an indirect mediator of the association with other risk factors at the secondary high school level; we did not find any direct longitudinal association between the teacher–student relationship and school dropout. This finding is consistent with the results of a previous study performed in Canada, which concluded that teacher–student relationships did not contribute to

the dropout risk (Lessard et al., 2010). However, other studies came to the opposite conclusion, reporting that students attending schools defined by more positive teacher–student relationships were less likely to drop out than those who attended schools with less positive teacher–student relationships, independent of grade points (Lee & Burkam, 2003).

A significant mediating path from mental distress as well as from externalizing behaviours via teacher–student relationships to grades in the tenth grade leading to subsequent school dropout in secondary high school was found. This finding indicates that many teachers do not fully utilize the potential of a positive teacher–student relationship as a buffer for students at risk of low academic outcomes and school dropout. On the contrary, it seems that in everyday classrooms, students with mental distress or externalizing difficulties have more negative experiences of relationships with their teachers than students without such difficulties. Moreover, based on our results, these negative perceptions are part of the mechanisms by which these at-risk students achieve lower school grades, leading to later school dropout.

One may speculate on why teachers in many situations act more like part of the problem rather than the buffers that one would wish them to be as part of the school system. One explanation may be that meeting individual students’ negative behaviours in a positive way and addressing and correcting negative relational appraisals, all within the complex context of a fully populated classroom with students with all kinds of qualities and needs may be a very challenging, if not impossible task. The potential for a positive teacher–student relationship to prevent school dropout among students at risk can hardly be expected to be fulfilled in a consistent manner without support in the larger context of the school system, including a realistic balance of the resources and time available for each teacher to fulfil all his or her tasks. Another question is to what extent teachers are aware of the impact of, or interested in developing, their relationship with individual students as active agents in their



pedagogical work. There are studies showing that, in fact, teachers' focus on providing support tends to decrease in higher school grades (Wit, Karioja, Rye, & Shain, 2011). This may appear to be something of a paradox, given that results from previous research suggest that positive teacher–student relationships seem to be equally or even more important for older students (Baker, 2006; Cornelius-White, 2007; Furrer & Skinner, 2003).

The main conclusion from the current study is that the associations and mediator pathways were relatively similar for boys and girls. Thus, the mechanisms behind teacher–student relationships and school functioning seem to resemble between boys and girls. As mentioned previously, prior research is inconclusive. Some studies conclude that there are no gender differences (Allen et al., 2013), some suggest that a positive and supportive teacher–student relationship is most important for girls (McCormick & O'Connor, 2015; Murray, Waas, & Murray, 2008), and others have reported a stronger effect for boys (Wang et al., 2013). However, considering the fact that boys drop out of school more often than girls, a positive and warm teacher–student relationship may be of special importance in reducing their noncompletion rates in upper secondary school (Hamre & Pianta, 2001).

### **Strengths and Limitations**

Methodological strengths of the study are the use of population-based survey data on adolescents collected in schools (the tenth grade) including both internalizing and externalizing problems, and the availability of information on grades, later completion of upper secondary school and parents' education from national registers. The longitudinal nature of the data has made prospective analyses possible.

In the present study, 77 percent of all tenth graders in the respective counties for the years in question agreed to participate in the study and accepted linkage of the survey to national registers. We have no information on those who were invited but did not participate

in the baseline study. We know that the participants who did not accept the linkage of their survey to national registers do not differ significantly in their reports of symptoms of mental health problems (Sagatun et al., 2014). However, the possibility of selective attrition from follow-up data cannot be excluded.

Another limitation is that mental health problems and teacher–student relationships were only assessed by self-report. However, in a study of the psychometric properties of the SDQ, the self-reports of conduct problems and hyperactivity/inattention were all found to be associated with the relevant DSM-IV diagnoses (based on interviews) (R. Goodman, 2001). In addition, a validation study of the HSCL-10 confirms that it is a valid instrument for detecting depression in young people in primary care and that it is appropriate for use in epidemiological studies (Haavet et al., 2011).

That the teacher–student relationship is only assessed by self-report may also be considered a weakness. However, previous studies strongly suggest that sole reliance on teacher reports, which is a common practice, provides an incomplete picture of the teacher–student relationship (Hughes, 2011). Students’ perceptions are consistently related to positive outcomes such as academic self-perceptions and achievement (Hughes, 2011). Nevertheless, it would strengthen the conclusions if we also had the teachers’ assessments (Hamre & Pianta, 2001; Rudasill et al., 2010).

Furthermore, self-report measures might be erroneous due to responders permanent tendency to exaggerate or underestimate problems/behavior (permanent response style) and/or state of mind when the response were given (situational response style) (Kristensen, 2005). It may be the case that troubled students experience less support, not that they receive less support as such. Social desirability and recall bias are other types of bias that might have impaired the validity of our self-reported measures (Szklo & Nieto, 2007). More specifically,

students who perceive themselves to have more mental health problems may be more inclined to perceive negative relationships with their teachers.

It is also important to emphasize that mental health and teacher–student relationships were measured at the same time point. Thus, conclusions cannot be made about causality in the associations between these two predictors in the models. We cannot know whether adolescents report high levels of mental distress or externalizing problems because they receive less attention from the teachers, or whether they report less attention because they have more mental health difficulties than their peers. Even though our model has limitation for making causal inference, such design can be a step in an investigation into causality.

### **Conclusion and Further Implications**

The main result from the current study is that adolescents with symptoms of mental health problems report less supportive and warm teachers, and that this may contribute to the risk mechanism involved in these students achieving lower school grades and subsequently dropping out of school. Thus, based on our model there is reason to suspect that in daily practice, at least without active intervention, the teacher–student relationship may in fact be part of the mechanisms by which the negative effect of students’ mental difficulties are a mediating factor in lower school grades and noncompletion of upper secondary school. Despite mounting evidence for the buffering effect of a positive teacher–student relationship in preventing negative academic outcomes and school dropout for at-risk students, in everyday classroom practices this potential may not be fully utilized. Thus, interventions targeting teacher–student relationships focusing on supporting adolescents with mental health problems, and supporting the teachers who are expected to support these students, are both essential and a prerequisite for improvement. An active effort may have the potential to improve grades and thus reduce subsequent noncompletion of upper secondary school by

adolescents with mental health difficulties. Longitudinal studies that include teacher–student relationships in upper secondary school are necessary to disentangle these issues further.

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Teacher–Student Relationship and Noncompletion

Table 1

*Descriptive Statistics: Completion of Five Years of Upper Secondary School by Boys*

	Boys									
	Completers					Noncompleters				
	N	Mean	SD	(95% CI)		N	Mean	SD	(95% CI)	
Mental health										
Externalizing problems	3348	5.33	3.03	5.22	5.43	2082	7.11	3.26	6.97	7.24
Mental distress	3335	1.27	.33	1.26	1.28	2086	1.35	.43	1.33	1.37
Teacher–student relationships	3314	2.98	.71	2.95	3.00	2035	2.79	.80	2.75	2.82
Final grade points	3264	45.49	7.24	45.24	45.74	2062	35.63	7.59	35.30	35.96
Parents’ education	3340	2.60	.85	2.57	2.63	2098	2.10	.78	2.06	2.13

Note. Externalizing problems as measured by SDQ, range 0–20; Mental distress as measured by HSCL10, range 0–4; Teacher–student relationships, range 1–4; Grade points, range 11–66; Parents’ education, range 1–4.

Teacher–Student Relationship and Noncompletion

Table 2

*Descriptive Statistics: Completion of Five Years of Upper Secondary School by Girls*

	Girls									
	Completers					Noncompleters				
	N	Mean	SD	(95% CI)		N	Mean	SD	(95% CI)	
Mental health										
Externalizing problems	4000	5.40	2.75	5.32	5.48	1380	7.31	3.16	7.15	7.48
Mental distress	4003	1.56	0.52	1.54	1.58	1363	1.75	0.60	1.72	1.78
Teacher–student relationships	3961	3.01	0.67	2.99	3.03	1355	2.76	0.78	2.72	2.81
Grade points	3885	48.65	6.82	48.43	48.86	1353	38.32	7.85	37.90	38.74
Parents’ education	3996	2.54	0.86	2.52	2.57	1371	2.02	0.77	1.98	2.06

Note. Externalizing problems as measured by SDQ, range 0–20; Mental distress as measured by HSCL10, range 0–4; Teacher–student relationships, range 1–4; Grade points, range 11–66; Parents’ education, range 1–4.

Teacher–Student Relationship and Noncompletion

Table 3

*Correlation Matrix for the Variables Included in the Mediation Analysis Separately by Gender*

	Externalizing problems		Mental distress		Non-completion		Teacher–student relationships		Grade points	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Mental distress	<b>.34</b>	<b>.44</b>								
Noncompletion	<b>.27</b>	<b>.28</b>	<b>.10</b>	<b>.15</b>						
Teacher–student relationships	<b>–.34</b>	<b>–.36</b>	<b>–.24</b>	<b>–.30</b>	<b>–.12</b>	<b>–.15</b>				
Grade points	<b>–.38</b>	<b>–.41</b>	<b>–.09</b>	<b>–.16</b>	<b>–.55</b>	<b>–.54</b>	<b>.22</b>	<b>.24</b>		
Parents’ education	<b>–.15</b>	<b>–.16</b>	<b>.00</b>	<b>–.07</b>	<b>–.28</b>	<b>–.26</b>	<b>.04</b>	<b>.04</b>	<b>.40</b>	<b>.39</b>

Note.  $p < .01$  = bold; Externalizing problems as measured by SDQ, range 0–20; Mental distress as measured by HSCL10, range 0–4; Teacher–student relationships, range 1–4; Grade points, range 11–66; Parents’ education, range 1–4; Completion, dichotomous.

Teacher–Student Relationship and Noncompletion

Table 4

*Mental Distress, Grade Points and Teacher–Student Relationships in the Tenth Grade as Direct and Indirect Predictors of Noncompletion of Upper Secondary School by Boys and Girls*

Mental Distress	BOYS (5048)			GIRLS (5050)		
Models	Multiple mediator model			Multiple mediator model		
	Coeff	95% CI		Coeff	95% CI	
Total effect of MD on NC	<b>0.184</b>	0.136	0.231	<b>0.176</b>	0.142	0.211
Direct effect of MD on NC	<b>0.150</b>	0.095	0.206	<b>0.105</b>	0.063	0.147
Mediators						
GP -> NC	<b>-0.162</b>	-0.173	-0.151	<b>-0.168</b>	-0.180	-0.156
MD -> GP	<b>-0.260</b>	-0.443	-0.078	<b>-0.348</b>	-0.471	-0.226
TR -> GP	<b>0.668</b>	0.579	0.757	<b>0.735</b>	0.642	0.828
MD -> TR	<b>-0.482</b>	-0.544	-0.420	<b>-0.388</b>	-0.426	-0.350
TR -> NC	-0.001	-0.029	0.027	<b>-0.039</b>	-0.073	-0.006
Indirect effect of mediators						
MD -> GP -> NC	<b>0.042</b>	0.013	0.072	<b>0.059</b>	0.038	0.081
MD -> TR -> NC	0.001	-0.013	0.014	<b>0.015</b>	0.003	0.028
MD -> TR -> GP -> NC	<b>0.052</b>	0.043	0.063	<b>0.048</b>	0.040	0.057
Total indirect effect	<b>0.095</b>	0.063	0.127	<b>0.122</b>	0.098	0.148

Note. MD = mental distress; TR = teacher–student relationship; GP = grade points; NC = noncompletion. The models were adjusted for parents’ education; significant results ( $p < 0.05$ ) are in bold.



Teacher–Student Relationship and Noncompletion

Table 5

*Externalizing Problems, Grade Points and Teacher–Student Relationships in the Tenth Grade as Direct and Indirect Predictors of Noncompletion of Upper Secondary School by Boys and Girls*

Externalizing problems	BOYS (5104)			GIRLS (5082)		
Models						
	Multiple mediator model			Multiple mediator model		
	Coeff	95% CI		Coeff	95% CI	
Total effect of EP on NC	<b>0.330</b>	0.291	0.370	<b>0.416</b>	0.370	0.463
Direct effect of EP on NC	<b>0.133</b>	0.086	0.180	<b>0.153</b>	0.096	0.210
Mediators						
GP -> NC	<b>-0.155</b>	-0.165	-0.144	<b>-0.162</b>	-0.174	-0.150
EP -> GP	<b>-1.613</b>	-1.750	-1.476	<b>-1.794</b>	-1.940	-1.647
TR -> GP	<b>0.355</b>	0.267	0.444	<b>0.413</b>	0.320	0.506
EP -> TR	<b>-0.538</b>	-0.581	-0.494	<b>-0.570</b>	-0.614	-0.527
TR -> NC	0.003	-0.025	0.031	-0.034	-0.067	0.000
Indirect effect of mediators						
EP -> GP -> NC	<b>0.249</b>	0.223	0.279	<b>0.290</b>	0.259	0.325
EP -> TR -> NC	-0.002	-0.017	0.014	0.019	0.000	0.038
EP -> TR -> GP -> NC	<b>0.030</b>	0.022	0.038	<b>0.038</b>	0.029	0.048
Total indirect effect	<b>0.277</b>	0.247	0.311	<b>0.348</b>	0.311	0.388

Note. EP = externalizing problems; TR = teacher–student relationship; GP = grade points; NC = noncompletion. The models were adjusted for parents’ education; significant results ( $p < 0.05$ ) are in bold.