Gustavsen, *Cogent Education* (2017), 4: 1411035
https://doi.org/10.1080/2331186X.2017.1411035

cogent education

STUDENT LEARNING, CHILDHOOD & VOICES | RESEARCH ARTICLE

Longitudinal relationship between social skills and academic achievement in a gender perspective

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Received: 01 March 2017
Accepted: 27 November 2017
First Published: 04 December 2017

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Reviewing editor:
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Abstract: Previous studies found that girls have higher academic achievement than boys in most school subjects. Teachers' grading of academic achievement seems to be based not only on students' knowledge but also their social skills, and teachers tend to assess girls as having better social skills than boys. The main aim of this study was to examine through multilevel analysis the extent to which teacher-rated social skills predicted teacher-rated academic achievement in Norwegian, mathematics and English over two years when controlling for age, cultural background and previous academic achievement. Possible gender differences were also investigated. Few studies on student achievement in school subjects have included multiple grades, but this study included 1st–8th grade at time point 1 (TI) and 3rd–10th at time point 2 (T2). Data on 2,266 Norwegian students were gathered in the autumn of 2012 and 2014. The results showed that teacher-rated social skills at T1 had a significant influence on boys' and girls' academic achievement two years later, but the fixed effect varied by subject. Social skills seemed to explain the variance in mathematics and Norwegian but not English, when controlling for previous academic achievement. There were no gender differences in the influence of social skills on academic achievement.

Subjects: Primary/Elementary Education; Teaching & Learning; Secondary Education

Keywords: gender differences; academic achievement; social skills; social skills rating system (SSRS)

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PUBLIC INTEREST STATEMENT

Boys and girls have the same general intellectual ability, but girls outperform boys in school, attaining higher grades and reaching higher levels of education. In the school system, teachers interact with students' cognitive and social development everyday in instruction and assessment. Research has documented that teachers' grading reflects more than student's subject skills. The result of the present study shows that teacher-rated social skills at one time point have a statistically significant influence of boys' and girls' academic achievement in Norwegian and mathematics two years later. Social skills did not seem to predict English achievement. There were no gender differences in the influence of social skills, but teachers assessed girls' social skills statistically significant larger than boys'.

1. Introduction

In the social cognitive perspective, students' academic achievement skills result from continuous, reciprocal interactions among behaviour (e.g. social skills), the external environment and cognitive and other internal events that can affect perceptions and actions (Bandura, 1978). Students' social behaviour seems to promote or hinder their learning, and their academic achievement may influence their behaviour and opportunities to develop social skills and relationships (Miles & Stipek, 2006). The present study was intended to investigate the extent to which teacher-rated social skills predict teacher-rated academic achievement and whether the predictions are different for boys and girls.

In general, girls do better in school than boys in most Western industrialised countries (Backe-Hansen, Walhovd, & Huang, 2014; Legewie & DiPrete, 2012; Lekholm & Cliffordson, 2009; OECD, 2015; Spinath, Eckert, & Steinmayr, 2014; Vantieghem & Van Houtte, 2015). Studies on gender and education from kindergarten through high school find that girls seem to demonstrate better academic skills, attain higher grades, reach higher levels of education and make better overall academic progress than boys (Birch & Ladd, 1998; Duckworth & Seligman, 2006; OECD, 2015). Teachers are one of the most important groups of significant others in the educational context and daily assess students' cognitive and social development during instruction and assessment (Retelsdorf, Schwartz, & Asbrock, 2014). Thus, teachers' beliefs about boys and girls might have consequences for their academic achievement and social skills development.

Researchers often use grades to measure students' success in school. Studies, however, have indicated that grades not only reflect student academic subject knowledge but are also influenced by other factors (Lekholm & Cliffordson, 2008), including social skills (Malecki & Elliot, 2002). Prosocial behaviour predicts students' grades, even after controlling for intelligence quotient scores, ethnicity, academic behaviour and teacher preferences (Teo, Carlson, Mathieu, Egeland, & Sroufe, 1996). The way students behave in the classroom seems to directly contribute to how they learn and achieve (Wentzel, 1991). Social skills thus are important when teachers assign students' grades (Cornwell, Mustard, & Parys, 2013). Subjective teacher assessments have a stronger association with students' social skills than objective test scores (DiPrete & Jennings, 2012). Scholars have also documented greater gender differences in subjective teacher assessments (e.g. grades) than objective test scores (Cornwell et al., 2013; Lekholm & Cliffordson, 2008).

From kindergarten to twelfth grade, teachers expect students to have certain skills needed to resolve tasks in school, such as self-control and cooperation (Lane, Wehby, & Cooley, 2006). Students' ability to meet these expectations influences their academic and social experiences in school (Lynne Lane, Stanton-Chapman, Roorbach Jamison, & Phillips, 2007). Studies have found that students who developed positive social skills in kindergarten were more successful in their roles as students and at mastering specific social entry tasks in formal education (e.g. listening, following directions, attending to activities) (Ladd, Herald, & Kochel, 2006). In addition, these students were better positioned to engage in classroom settings (Hamre & Pianta, 2001), developed more positive attitudes towards school and performed better in general (Konold, Jamison, Stanton-Chapman, & Rimm-Kaufman, 2010).

Although numerous longitudinal studies have investigated the impacts of students' social skills on both concurrent and future academic achievement (Caprara, Barbaranelli, Pastorelli, Bandura, & Zimbardo, 2000; Miles & Stipek, 2006), several gaps remain in the literature. First, most studies have defined academic achievement by reading and numeracy skills, and little research has addressed the association between social skills and school subjects, such as mother language, second-language instruction and mathematics. Second, few studies have included students across several grades in the analysis. Instead, only students from one or two grades have been measured at several time points. Third, little attention has been given to relationship of social skills with boys' and girls' academic achievement (Oberle, Schonert-Reichl, Hertzman, & Zumbo, 2014).

2. Social skills

Success at school requires competent performance in specific skills, such as social and academic tasks (Wentzel, 2015). In behaviour, an important distinction is made between the concepts of social skills and social competence, which are variously defined in the literature. Social skills are the actual behaviours that students perform in specific social situations, while social competence encompasses the cognitive understanding of social skills and how to use them in interactions with other students (Gresham, Elliott, & Kettler, 2010). In the current study, students' social skills are defined as an important set of specific learned behaviours that promote positive interactions with others in their environment. Social skills are manifested in actions, and it is common to operationalize teacher rated social skills in three domains: cooperation, self-control and assertion (Gresham & Elliott, 1990). Essential social skills that enable students to be successful in the classroom, according to teacher reports, include raising one's hand for permission to speak in the classroom, following classroom rules, complying with teacher directives, asking for help, helping others, cooperating with peers, and controlling temper in conflict situations both with adults and peers (Gresham & Elliott, 1990; Lane, Givner, & Pierson, 2004; Lane, Pierson, & Givner, 2003; Meier, DiPerna, & Oster, 2006). Teachers view competence in the cooperation and self-control domains, as mentioned above, as more important than competence in assertion domain (Lane et al., 2003).

There are different types of social skills deficit and the deficits are conceptualised as problems in acquiring or in performing social behaviour. When acquisition deficits involve the lack of particular social skills, means that the student does not know how to perform the targeted social skill ("can't do" problems), performance deficits involve knowing how to perform, without exhibiting it appropriately ("won't do" problems) (Gresham et al., 2010). Researchers can only study social skills in schools as students' behaviour or interactions with peers and teachers. The school environment might affect how students exercise social skills, but students can also choose whether to use their social skills in positive or negative ways. Students' personal and social outcomes result both from their own efforts and interactions with peers and teachers (Wentzel, 2015).

3. The longitudinal relation between social skills and academic achievement

Investigations of the longitudinal effects of social skills on academic achievement have produced mixed results. Some studies have reported a significant positive relationship (Caprara et al., 2000; Jennings & DiPrete, 2010; Konold et al., 2010), whereas others have found that social skills are not a strong predictor of later academic achievement (Claessens, Duncan, & Engel, 2009). A meta-analysis covering a large sample of students from kindergarten to high school documented that school-based, universal social-emotional learning programmes led to higher prosocial behaviour, social skills and achievement (Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011). Furthermore, kindergarteners with higher social skills ratings were more likely to have higher achievement on tests through second grade (Parke et al., 1997) and do better on measures of third-grade literacy (Miles & Stipek, 2006). Similarly, United States teachers' ratings of third- and fourth-grade students' social skills had significant associations with their later reading and math achievement (Malecki & Elliot, 2002). An Italian study found that the ratings of students' prosocial behaviour in third grade were a strong predictor of their academic achievement in eighth grade (Caprara et al., 2000).

Researchers have also investigated reading skills and social behaviour among subgroups of students. Those with low or average reading skills but higher social skills in kindergarten were found to perform better on academic skills in fifth grade than students with similar reading skills but lower level of social skills in kindergarten (Cooper, Moore, Powers, Cleveland, & Greenberg, 2014). According to these studies, social skills appear to be a unique, long-term predictor of academic achievement for students at greatest risk of academic difficulties. In contrast, two US studies found that ratings of students' social skills in kindergarten, except for the capacity to pay attention, had no significant influence on their performance in reading and math in fifth grade. These studies reported that school-entry math, reading and attention skills were the strongest predictors of later achievement (Claessens et al., 2009; Duncan et al., 2007).

Several scholars have investigated a possible bi-directional relationship between social skills and achievement (Caemmerer & Keith, 2015; Hinshaw, 1992; Miles & Stipek, 2006). Some studies found that early social skills predicted later literacy achievement, but literacy achievement did not predict later social skills (Caprara et al., 2000; Miles & Stipek, 2006). Other researchers, though, reported that students' achievement affected their social skills, and their social skills had significant effects on their subsequent achievement (Chen, Huang, Chang, Wang, & Li, 2010). A US study on students from kindergarten through eighth grade found that achievement had a stronger effect on later social skills than social skills had on later achievement. Social skills seem to indirectly mediate academic achievement, but the effects vary by grade level (Caemmerer & Keith, 2015)

4. Gender differences in academic achievement and social skills

In a comparison of boys and girls in more than 30 OECD countries, a significantly higher share of boys (5%) did not attain the baseline level of proficiency in any subject in the 2012 Programme for International Student Assessment (PISA) tests (OECD, 2015). Furthermore, the PISA results showed that the percentage of boys who did not attain proficiency in any subject differed by country and was troublingly high in many OECD countries (OECD, 2015). However, research on gender differences in academic achievement in various subjects has reported mixed results. Some studies have shown that girls have higher overall achievement, except in physical education (Bakken, Borg, Hegna, & Backe-Hansen, 2008; Lekholm & Cliffordson, 2009; Spinath et al., 2014), whereas others have found that boys outperform girls in mathematics and science (Driessen & van Langen, 2013) or that there are no gender differences in mathematics (Lachance & Mazzocco, 2006). Despite these mixed results, researchers seem to hold a general view that the greatest gender differences are in literacy and language, favouring girls over boys (De Gaer, Pustjens, Damme, & Munter, 2007; Marks, 2008).

A body of research documents the effects of teachers' perceptions of gender on academic outcomes (Baker, Tichovolsky, Kupersmidt, Voegler-Lee, & Arnold, 2015; de Boer, Bosker, van der Werf, & Graesser, 2010; Hinnant, O'Brien, & Ghazarian, 2009). Some studies have found students' gender to be a predictor of teacher perceptions. For example, in a US study, teachers tended to overestimate girls' and underestimate boys' reading skills in first, third and fifth grades (Hinnant et al., 2009). In addition, a German study on third- and fifth-grade students found that gender stereotypes influenced teachers' perceptions of remedial and low-performing students but not high-achieving students and that teachers rated boys as having greater abilities in mathematic than girls (Tiedemann, 2002).

A few studies have explored the influence of social skills on gender differences in academic achievement. A study of US eighth graders found that behaviour regulation partly explains gender differences in academic achievement and that self-discipline is important when investigating gender differences in school (Duckworth & Seligman, 2006). A German study reached the same conclusions regarding gender differences in German language achievement among fifth graders (Weis, Heikamp, & Trommsdorff, 2013). An US longitudinal study (Konold et al., 2010) that assessed students at 4–5 years old and in first, third and fifth grades found that the explanatory power of boys' and girls' social skills depended on the type of achievement (e.g. numeracy skills, reading skills) and accounted for more individual variation in numeracy skills than reading skills. There was also more variance in teachers' ratings than mothers' ratings (Konold et al., 2010). The authors of a US study of children from kindergarten through fifth grade argued that gender differences in the acquisition of social and behavioural skills offer a significant explanation of the gender gap in academic achievement (DiPrete & Jennings, 2012).

5. Research questions

Although numerous studies have investigated gender differences in academic achievement, these differences have yet to be adequately explained and understood (Spinath et al., 2014; Weis et al., 2013). A substantial body of literature has documented the existence of a relationship between social skills and academic achievement (Caemmerer & Keith, 2015; Konold et al., 2010; Malecki & Elliot, 2002; Wentzel, 1991, 1993) and reported that the influence of social skills on academic achievement

varies by academic skill (Konold et al., 2010). Therefore, there is reason to assume that the same dynamic exists in various subjects. Furthermore, several studies have demonstrated the role of social skills in gender differences in academic performance (DiPrete & Jennings, 2012). This study extends previous research on the association between social skills and academic achievement by including teacher ratings of students from first grade through eighth grade at one time point and two years later.

This study controlled for students' cultural background and age because previous research showed that the majority of native students have higher achievement levels than immigrant students (Bakken & Elstad, 2012) and that students' social skills and their association with academic achievement change across the stages of students' development (Konold et al., 2010; La Paro & Pianta, 2000). A meta-analysis showed that students' achievement scores are strongly related to prior achievement scores (La Paro & Pianta, 2000); therefore, the present study also takes into account prior academic achievement.

The research questions explored in this present study are:

(1) Do teacher-rated social skills predict teacher-rated academic achievement in Norwegian, mathematics and English two years later, when controlling for age, cultural background and previous academic achievement?
(2) Do social skills function in similar or different ways for boys and girls?

6. Method and methodology

6.1. Participants

The study participants were 2,266 Norwegian schoolchildren in first through eighth grade in 153 classes at 27 schools in 14 municipalities in six counties. The students had teacher ratings for first through eighth grade at the first measure point (T1) and for third to tenth grade of the same students at measure point two (T2).

The student sample consisted of 50.2% girls (n = 1,138) and 49.8% boys (n = 1,128). Female teachers assessed 83% of the teacher ratings. The minimum number of students per class was 10, and the mean class size for the sample was 16.58. Table 1 shows the number of students in the various grade levels with the percentages of girls and boys in parenthesis.

6.2. Procedure

The schools studied participated in a school development project, the LP model (LP = Learning environment and Pedagogical analysis), in the autumn of 2012, and a survey was a key element in the project. The goal of the LP model is to change and develop teaching practices with the intention of improving student achievement. The focus of the first survey, conducted at the beginning of the project, was to discover whether any one particular area is especially strong or weak, and where measures should be targeted. The second survey, carried out two years later, focused on change and

Table 1. Number of students by grade level (N = 2,266)

Grade level	1	2	3	4	5	6	7	8	9	10
T1	359	374	350	436	382	62	109	295		
(Girls)	(46.2%)	(50%)	(49.5%)	(50%)	(52.4%)	(56.5%)	(55%)	(50.5%)		
(Boys)	(53.8%)	(50%)	(50.5%)	(50%)	(47.6%)	(43.5%)	(45%)	(49.5%)		
T2			359	374	350	436	382	62	109	295
(Girls)			(46.2%)	(50%)	(49.5%)	(50%)	(52.4%)	(56.5%)	(55%)	(50.5%)
(Boys)			(53.8%)	(50%)	(50.5%)	(50%)	(47.6%)	(43.5%)	(45%)	(49.5%)

development. In such a way, schools gained a clear picture of their own results compared to the average of the other schools in the same LP model project.

The LP model is comprehensive of the whole municipality so that decisions about schools' participation were made by the schools' owner in each municipality. The Centre of the Study of Educational Practice at Inland Norway University of Applied Sciences administered the survey and gathered data in the autumn of 2012 (T1) and 2014 (T2). The school development project took a broad approach to developing schools' learning environment, so its implementation was not intended to have different influences on girls and boys.

All the students at each school were invited to take the survey. Parents had to give permission for teachers to assess their children's social skills and academic achievement. With parents' consent, the teachers evaluated the students. At total of 8,822 students in first through tenth grade were invited in T1. However, the parents of 1,675 students did not give permission, and 210 teachers did not assess their student. Thus, T1 included 6,937 student evaluations, resulting in a response rate of 79%. Of students whose parents gave permission, teachers rated 97% of them.

At T2, the ninth and tenth graders who participated in the first survey had left compulsory school (1,385 students). In Norway, most students change schools between grade seven and eight, so 1,082 students were not included in the T2 sample. One thousand five hundred and fifty-five students were not assessed by their teachers at both measure points. They are excluded from the analysis. A total of 2,915, or 53.5%, of the invited students, participated at both T1 and T2. In 2016, 30% of Norwegian schools had fewer than 100 students (SSB), which means that many students received their primary education in rural schools with small classes which include multiple grades. Due to this contextual characteristic, only classes with 10 or more students were retained. Ultimately, the analyses included 2,266 students.

Data were collected through an electronic questionnaire, while social skills and academic achievement were measured through informant-based reports provided by teachers. Teachers were also asked to share background information about students, such as cultural background and gender.

6.3. Ethics

Information explaining the purpose and procedure of the study was provided to parents and teachers. They were also assured of the participants' anonymity, and it was emphasised that participation was voluntary. The survey was registered with the Norwegian Data Inspectorate in accordance with Norwegian law.

6.4. Instruments

6.4.1. Social skills

Social skills were rated using the Social Skills Rating System (SSRS) (Gresham & Elliott, 1990), a standardised, norm-referenced scale among the most widely used instruments for measuring pro-social behaviour among children ages 3–18 years (Gamst-Klaussen, Rasmussen, Svartdal, & Strømgren, 2014; Gresham, Elliott, Vance, & Cook, 2011). The scale has been translated into Norwegian (Ogden, 1995). The 30-item secondary-level teacher version of the social skills dimension was used in the present investigation. In the original version of SRSS, the items have a 3-point rating scale, but the modified Norwegian version had a 4-point Likert scale (1 = never, 2 = sometimes, 3 = often, 4 = almost all the time) (Ogden, 2003). The original teacher version included 3 factor-based subscales (Gresham & Elliott, 1990): Cooperation, which covered behaviours, such as paying attention, completing tasks on time and following instructions; assertion, which covered initiating behaviours, such as introducing oneself and inviting others to join activities; and self-control, which covered behaviours that emerge in conflict situations, such as controlling anger and responding appropriately to teasing and peer pressure. In the present study, the measure of social skills was a sum score. Cronbach's alpha for the total sum score in the present study was 0.95 at both T1 and T2. Several

studies have supported the validity and reliability of the SSRS (Demaray et al., 1995; Gresham & Elliott, 1990; Walthall, Konold, & Pianta, 2005).

6.4.2. Academic achievement

The teachers rated the students' academic achievement using the SSRS (Gresham & Elliott, 1990). The original SSRS measured academic achievement with teacher ratings on a 9-item scale. In the present study, students' academic achievement was measured on a 6-point scale in three subjects: Norwegian, mathematics and English. The Centre of the Study of Educational Practice made this change as the Norwegian educational system assigns grades from 1 to 6 in secondary school, with 1 indicating very low competence and 6 very high competence. The same measurement was used for all students from first to tenth grade. High correlations between this scale and test results for reading and mathematics skills were found (Topphol, Haug, & Nordahl, 2017).

6.4.3. Control variables

This analysis controlled for students' age, gender and cultural background. Age was measured by grade level. Gender was divided into 2 categories: 0 = female, 1 = male. Cultural background was grouped into 3 categories—Norwegian (95.3%), Western minority (0.9%) and non-Western minority (3.8%)—which were operationalised into a dummy (0 = minority, 1 = majority).

6.5. Missing

Among the continuous variables, 1.1% of the cells in SPSS had missing values. The little MCAR test showed that the data were missing completely at random. Missing data were replaced at the item level using the expectation maximisation procedure. This interactive procedure used the current best guess for the value within the subscale instead of who was missing (Graham, 2009). Of the students, 2.5% had missing values for cultural background (n = 70) and were not included in the multilevel analysis.

6.6. Statistics

The present study used a kvasi-experimental longitudinal research design. Descriptive data were subjected to t tests and correlation analysis. In general, the following guidelines for the strength of relationships as determined by Pearson's r (Cohen, Manion, & Morrison, 2011) were used; 0–0.20 (very weak), 0.20–0.40 (weak), 0.40–0.60 (moderate), 0.60–0.80 (strong) and 0.80–1.00 (very strong). Cohen's d was used as a measure of the effect size of the differences in the means. This measure is generally interpreted as small (d = 0.2), medium (d = 0.5) and large (d = 0.8) (Cohen, 1988).

Given the research questions, three-level univariate regression analysis was used, although the purpose of the study was only to investigate one-level units by building an individual-level random intercept model. Treating individuals as independent of their organisational groupings in grades and schools ignores the inherent complexity in the data and introduces an important potential source of bias into the analysis as individuals, for example, in one grade tend to have more similarities in many important variables than individuals in different grades (Hox, 2010). All variables were grand-mean centred. The analysis was carried out and four models for each subject were built using ML estimation. Step 1 analysed the random-intercept-only model with no predictors to partition the variance in the outcomes into the individual, class and school levels. In step 2, the three one-level control predictors of age, cultural background and gender were added to social skills at T1. In step 3, all the previous-academic-achievement variables were added. Lastly, in step 4, a one-level interaction between social skills and gender was added to investigate whether social skills had statistically significant different influences on boys' and girls' academic achievement.

Preliminary analyses were conducted to ensure that the assumptions of normality, linearity, homoscedasticity, skewness and kurtosis were not violated. All analyses were carried out using SPSS version 23. Multilevel analysis was also controlled in STATA.

7. Results

The results from the descriptive statistics and multilevel analysis are presented in this section.

7.1. Descriptive statistics

Table 2 presents the mean scores and standard deviations for the teachers' ratings of boys' and girls' social skills and academic achievement.

Table 2 shows the first level means and standard deviations for boys and girls. Girls had statistically significant higher teacher ratings for Norwegian and English than boys at both measurement points. Teachers also gave girls statistically significant higher ratings in social skills than boys. There were no statistically significant gender differences in mathematics from first through tenth grade.

Table 3 presents the correlations of academic achievement at the second measurement time point (T2) with social skills and academic achievement at first measurement point (T1) for all grade levels.

Positive statistically significant correlations were found between social skills and academic achievement and between prior and subsequent academic achievement at all grade levels. All the correlations were statistically significant at the 0.01 level. The correlations seemed to vary across grade levels. The strongest associations were between prior and subsequent academic achievement, and are in line with previous studies that students' achievement scores are strongly related to prior achievement scores (La Paro & Pianta, 2000).

7.2. Multilevel analysis results

Multilevel analyses were performed to investigate the research questions. Four models were built for each dependent variable for academic achievement in Norwegian, mathematics and English at the second measurement point (see Tables 4–6). The teachers rated all the variables.

The multilevel analysis showed that teacher-rated social skills had a large, statistically significant contribution to academic performance in Norwegian after controlling for age, cultural background and gender ($p < 0.001$). The contribution decreased when controlling for previous academic performance, but social skills still seemed to have influence. The impact of a 1-unit increase in social skills

Table 2. Descriptive statistics, means and standard deviations (*N* = 2,266)

Variables	Mean score (SD) Boys (*n* = 1,128)	Mean score (SD) Girls (*n* = 1,138)	Cohen's *d*	*p*-value
Norwegian T1	3.85 (1.22)	4.33 (1.09)	−0.41	0.000
Norwegian T2	3.81 (1.20)	4.37 (1.06)	−0.48	0.000
Mathematics T1	4.13 (1.22)	4.20 (1.11)	−0.06	0.148
Mathematics T2	4.11 (1.30)	4.21 (1.19)	−0.08	0.058
English T1	3.67 (1.24)	4.04 (1.10)	−0.31	0.000
English T2	3.81 (1.32)	4.14 (1.15)	−0.27	0.000
Social skills T1	2.85 (0.52)	3.11 (0.45)	−0.51	0.001

Table 3. Descriptive statistics and bivariate correlations between academic achievement and social skills (*N* = 2,266)

Academic achievement T2	Grade level	3	4	5	6	7	8	9	10
Social skills T1		0.33*	0.47*	0.32*	0.37*	0.56*	0.65*	0.31*	0.46*
Academic achievement T1		0.56*	0.73*	0.76*	0.77*	0.81*	0.87*	0.72*	0.65*

*$p < 0.01$.

Table 4. Random intercept model for academic achievement in Norwegian (*N* = 2,266)

Fixed effects	Norwegian T2							
	M0		M1		M2		M3	
	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
Intercept	4.102***	0.031	4.127***	0.124	4.281***	0.106	4.279***	0.106
Age			−0.049***	0.014	−0.048***	0.014	−0.049***	0.014
Cultural background			0.309***	0.109	0.132	0.088	0.130	0.088
Boys			−0.261***	0.045	−0.233***	0.037	−0.232***	0.037
Social skills T1			1.154***	0.053	0.220***	0.050	0.262**	0.072
Norwegian T1					0.404***	0.029	0.403***	0.029
English T1					0.161***	0.028	0.162***	0.028
Mathematics T1					0.124***	0.024	0.124***	0.024
Boys * SosT1							−0.017	0.088
−2LL	7,111.984						5,364.151	
AIC	7,117.984						5,388.151	
BIC	7,135.161						5,456.539	
School expl.%	0.31		0.44		0.78		0.82	
Class expl.%	3.70***		5.63***		11.57***		11.57***	
Individual expl.%	95.98***		93.93***		87.65***		87.61***	

*$p < 0.05$.
**$p < 0.01$.
***$p < 0.001$.

Table 5. Random intercept model for academic achievement in mathematics (*N* = 2,266)

Fixed effects	Mathematics							
	M0		M1		M2		M3	
	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
Intercept	4.195***	0.051	4.426***	0.125	4.536***	0.117	4.534***	0.117
Age			−0.103***	0.016	−0.103***	0.015	−0.103***	0.015
Cultural background			0.049	0.105	−0.008	0.096	−0.010	0.096
Boys			0.219***	0.044	0.116**	0.040	0.117**	0.040
Social skills T1			1.253***	0.049	0.238***	0.055	0.266***	0.079
Norwegian T1					0.129***	0.031	0.129***	0.031
English T1					0.141***	0.030	0.141***	0.030
Mathematics T1					0.478***	0.026	0.478***	0.026
Boys * Sos1							−0.049	0.097
−2LL	7,353.080						5,755.726	
AIC	7,361.080						5,779.726	
BIC	7,383.983						5,848.114	
School expl.%	2.03		0.65		0.41		1.02	
Class expl.%	5.37***		5.82***		13.05***		11.59***	
Individual expl.%	92.60***		93.53***		86.53***		87.39***	

*$p < 0.05$.
**$p < 0.01$.
***$p < 0.001$.

Table 6. Random intercept model for academic achievement in English (*N* = 2,266)

Fixed effects	English							
	M0		M1		M2		M3	
	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
Intercept	3.976***	0.033	4.146***	0.138	4.256***	0.092	4.253***	0.114
Age			−0.007	0.015	−0.007	0.012	−0.007	0.015
Cultural background			−0.128	0.123	−0.246**	0.078	−0.250**	0.095
Boys			−0.047	0.051	−0.038	0.034	−0.036	0.040
Social skills T1			1.103***	0.060	0.009	0.042	0.048	0.079
Norwegian T1					0.245***	0.026	0.245***	0.031
English T1					0.449***	0.030	0.449***	0.030
Mathematics T1					0.123***	0.026	0.128***	0.026
Boys * Sos1							−0.098	0.096
−2LL	7,400.222						5,742.627	
AIC	7,408.222						5,766.627	
BIC	7,431.125						5,835.014	
School expl.%	0		0		0		0	
Class expl.%	4.01***		5.72***		12.60***		16.66***	
Individual expl.%	95.99***		94.28***		87.40***		87.34***	

*$p < 0.05$.
**$p < 0.01$.
***$p < 0.001$.

increased academic achievement in Norwegian by 0.220 when controlling for previous achievement in Norwegian, math and English.

The null model showed that 3.70% ($p < 0.001$) of the variance in Norwegian achievement was between the classes in the sample and 95.98% ($p < 0.001$) between the students. The addition of the independent variables reduced the explained variance at the first level (students) and increased it at the second level (class). There were no differences in Norwegian achievement between schools in any model.

Regarding gender, the analysis showed that boys had statistically significant ($p < 0.001$) lower teacher ratings for academic achievement in Norwegian. However, there were no statistically significant differences between girls and boys in the extent to which teacher-rated social skills predicted teacher-rated academic achievement in Norwegian.

Table 5 presents the results for teacher-rated academic achievement in mathematics. The multilevel analysis showed that teacher-rated social skills also made a large, statistically significant contribution to academic performance in mathematics after controlling for age, cultural background and gender ($p < 0.001$). The contribution decreased when controlling for previous academic performance. The impact of a 1-unit increase in social skills increased mathematical achievement by 0.238 when controlling for previous achievement in Norwegian, math and English.

The null model indicated that 5.37% ($p < 0.001$) of the variance in math achievement was between classes and 92.6% ($p < 0.001$) between students. The addition of the independent variables decreased the explained variance at the first level (students) and increased the explained variance at the second level (grades). Differences in mathematical achievement between schools did not exist in any model.

Regarding gender, the analysis showed that boys had statistically significant ($p < 0.001$) higher teacher ratings for mathematical achievement. However, there were no statistically significant differences between girls and boys in the extent to which teacher-rated social skills predicted teacher-rated academic achievement in mathematics.

Table 6 presents the results for teacher-rated academic achievement in English. The multilevel analysis showed that teacher-rated social skills made a large, statistically significant contribution to academic performance in English after controlling for age, cultural background and gender ($p < 0.001$). There, however, was no statistically significant contribution when controlling for previous academic performance.

The null model indicated that 4.01% ($p < 0.001$) of variance in English academic achievement was between classes and 95.99% ($p < 0.001$) between students. The addition of independent variables reduced the explained variance at the first level (students) and increased the explained variance at the second level (grades). Differences in English academic achievement between schools did not exist in any model.

Regarding gender, the analysis showed no statistically significant gender differences in English achievement or in the extent to which teacher-rated social skills predicted teacher-rated academic achievement in English.

8. Discussion

The main finding of the present study was that teacher-rated social skills explained much of the variance in students' academic achievement. These findings are in line with previous studies (Durlak et al., 2011; Wentzel, 1993) reporting that prosocial behaviour predicts achievement scores. When controlling for academic achievement at T1, the contribution of social skills decreased. Social skills still had a statistically influence on academic achievement in Norwegian and mathematics but not English. These findings indicated that influence of social skills varied by subject. Another study also confirmed that explanatory power depends on the type of achievement (Konold et al., 2010). A Swedish study found that most variance in grading was due to achievement in different subject areas, but factors other than achievement also influenced grading (Lekholm & Cliffordson, 2008). The current study also found that social skills explained the variance in both boys' and girls' academic achievement. This finding indicated that there were no gender differences in how social skills predicted academic achievement.

The present study contributed to understanding of the extent to which the teacher-rated social skills of students in first to eighth grade predicted teacher-rated academic achievement in Norwegian, mathematics and English two years later, when controlling for students' age, cultural background and previous academic achievement. This study also helped to understand the extent of predict varies for boys and girls. Most previous studies measured only one or two grades at different time points. The current study differed by measuring eight grades at two time points. Whereas Konold et al. (2010) found that students' social skills explained more variance in achievement scores in reading and numeracy for pre-schoolers than first, third and fifth graders, the current study found that social skills explained the variation in academic achievement when controlling for students' age and cultural background. The correlation between social skills and academic achievement did not decrease at higher grade levels. Another contribution of the present study was to measure academic achievement by school subject, not academic skills, such as reading and numeracy, as in many other studies.

A somewhat surprising finding in the present study was that social skills made significant contributions to explaining the variation in academic achievement in only Norwegian and mathematics and not in English. A possible explanation was that teachers and students spend a larger number of hours in the subjects Norwegian and mathematics than in English, per week. In total, according to the Norwegian curriculum (Utdanningsdirektoratet, 2011), the students should have 1,770 lessons in

Norwegian, 1,201 in mathematics and 593 in English, during compulsory school. Another explanation may be that didactics and methodology are unique in second-language learning. English is also the only compulsory subject where students must master a language other than their native language.

Regarding gender, the current study demonstrated that, in general, teacher-rated social skills were equally important for boys' and girls' academic achievement, but teachers rated girls' social skills as higher than boys'. Therefore, social and behavioural skills seemed to influence gender differences in educational outcomes (DiPrete & Jennings, 2012). To understand how boys' and girls' social skills affected academic achievement, the present study employed social and contextual approaches, such as stereotypes in education and the consequences of interactions between students and teachers (i.e. expectations and perceptions).

Students need social skills to successfully resolve tasks and progress academically. Children who acquire good social skills at an early age more easily adopt the student role, participate in classroom activities and have better academic outcomes later in school (Ladd et al., 2006). The present study found that teachers assessed girls to have higher achievement than boys in Norwegian and English across grades. In addition, the teachers rated boys as having poorer social skills than girls. The value placed upon and the rewards given for different types of behaviour influence teacher expectations for students' behaviour, which might differ both within and between grade levels (Lane et al., 2006; Wentzel, Filisetti, & Looney, 2007). In general, it seems that girls have advantages over boys in displaying social skills that fulfil schools' norms (DiPrete & Jennings, 2012). Prior research has found that teachers believe that average-achieving girls are less talented than equally achieving boys in math (Tiedemann, 2002), and vice versa for boys in reading (Retelsdorf et al., 2014). Furthermore, researchers have documented greater gender differences in teachers' subjective assessments than in test scores (Lekholm & Cliffordson, 2009; Robinson & Lubienski, 2011) and a stronger association between subjective teacher assessments and students' social skills (DiPrete & Jennings, 2012).

Social competence is determined by the ability to fulfil the norms and expectations for socially accepted skills and behaviours in different environments (Ogden, 2011). Parents, teachers and peers might desire different skills and behaviours, and different contexts are believed to reinforce different social skills (Warnes, Sheridan, Geske, & Warnes, 2005). In addition, children's own conceptions of social skills might change according to the social context. For instance, a previous study found that children conceptualised kindness directed towards adults as cooperation and kindness directed towards peers as friendliness (Youniss, 1980). Children need to meet the behavioural expectations of their given context to engage in successful interactions (Kwon, Kim, & Sheridan, 2014). In the school learning context, teachers expect specific skills and behaviours from students (Lane et al., 2006), but students might fail to meet teachers' expectations for many reasons. The teachers' expectations might be unclear, differ from the parental expectations laid out at home or change across grades or even between teachers. Teachers might not even be aware of their own expectations for student behaviour (Lane et al., 2006). In addition, evidence suggests that expectations can vary by gender (Saft & Pianta, 2001). Consequently, students may not know how they are expected to behave and so behave inappropriately according to teachers' expectations (Lynne Lane et al., 2007). Previous studies have found that teachers overestimated the reading and numeracy skills of elementary-school students who they believed to have better social skills (Hinnant et al., 2009). Many teachers expect minority and low-achieving students to display less competent behaviour and lower levels of academic performance (Weinstein, 2001). More boys than girls are considered to be low-achieving students in most subjects (OECD, 2016).

9. Strengths and limitations

A strength of this study was the inclusion of teacher ratings of the social skills and academic achievement in three subjects of 2,266 students in first to eighth grade at T1 and third to tenth grade at T2. The sample size was large, and using the same measurement made comparisons across grade levels possible. The survey also had a high response rate, and the sample included schools from different locations in Norway.

A potential methodological weakness of the current study was that only teachers rated both academic achievement and social skills. Compared to parents' ratings, though, teacher ratings have been shown to be more reliable (Tourangeau, Nord, Lê, Sorongon, & Najarian, 2009) and to generally explain more variance in academic achievement (Konold et al., 2010). Unfortunately, the study did not record student socio-economic background.

It was not clear whether teacher-reported ratings reflected actual or perceived gender differences in social skills. Teachers rated the occurrence of behaviours retrospectively and did not measure behaviour at a specific time and place, so the SSRS must be considered to be an indirect measure of social skills (Gresham & Lambros, 1998). Teachers indicated what they *thought* students would do in specific situations rather than observe what the students actually did. Consequently, social skills might be a proxy for unmeasured processes such as stereotype threats that operate through gender (Konold et al., 2010).

10. Practical implications and suggestions for future research

The study findings have important implications for teachers and others working in or with schools. Teacher-rated social skills explained some of the variance in academic achievement. Intervention research has shown that school-based programmes that increase students' social skills often also improve achievement (Durlak et al., 2011). Practitioners can use knowledge about the development of social skills and academic achievement to enhance both competences.

The fixed effect of social skills on academic achievement was equal for boys and girls. As teachers rated girls' social skills higher than boys', social skills might influence gender differences in academic achievement. Jones and Myhill (2004), for instance, described a tendency to associate boys with underachievement and girls with high achievement. A growing number of teachers seem to define the ideal student as female (Younger, Warrington, & Williams, 1999). High-achieving girls are characterised as 'compliant, conformist and willing to please' (Myhill, 2002, p. 350). Thus, teacher ratings might reflect different expectations for boys and girls based on traditional gender stereotypes, so it is possible that teachers contribute to the production of gender differences in academic achievement. An equitable educational system demands that teachers become aware of and resistant to stereotypes (Retelsdorf et al., 2014).

The current study found that most of the variance in academic achievement in all subjects occurred at the first level, but some lay at the second level between classes. In future research, it would be interesting to more closely investigate variance at the second level.

Funding
The author received no direct funding for this research.

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Citation information
Cite this article as: Longitudinal relationship between social skills and academic achievement in a gender perspective, Ann Margareth Gustavsen, *Cogent Education* (2017), 4: 1411035.

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Cogent Education **(ISSN: 2331-186X) is published by Cogent OA, part of Taylor & Francis Group.**