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# Trends in perceived school stress among adolescents in five Nordic countries 2002–2014

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## Abstract

Associations between school-related stress and poor health, risk behaviours and low well-being are well documented. The aim of this paper was to estimate trends of perceived school stress experienced by boys and girls of different ages in the Nordic countries, and to describe trends in school stress between the Nordic countries. Nordic data from the Health Behaviour in School-aged Children study (HBSC) between 2002 and 2014 were used. The participants were aged 11–16 years. School stress was measured by a single item; “How pressured do you feel by schoolwork?” The participants answering “some” or “a lot” were categorised as reporting school stress.

Sweden, Norway and Denmark had lower prevalence of school stress compared to Finland and Iceland. There was an increase in Iceland, Finland and Denmark, whereas adolescents from Sweden showed a decreasing trend. In Norway, the level was stable. Boys showed a marginal decline in school stress whereas girls showed an increase, and school stress increased by age for the whole period. It is a challenge for the public education systems in the Nordic countries to develop policies and practices that provide children with the necessary tools to achieve knowledge and skill, and at the same time minimise stress in school.

## Keywords

perceived school stress, trends, adolescents, Nordic countries

## Introduction

As adolescents move through the educational system, they are subjected to greater academic demands and expectations. This exposure to academic demands facilitates learning and developments, but may also be a source of stress during adolescence. An international comparative survey showed a marked increase in school stress in the transition through adolescence (Klinger et al., 2015). It also showed consistent gender and age differences over time. Except for children at 11 years of age, girls reported higher levels of school pressure than boys, and school pressure was higher in older age groups (Klinger et al., 2015).

According to the stress burnout model, continued long-term school stress might lead to burnout (Korhonen et al., 2016). Perceived high stress in school increases the risk of burnout, with lower well-being, lower engagement, lower achievement and increased risk of mental ill health (Parker & Salmela, 2011; Salmela-Aro, 2017). Several studies have also shown an association between school-related stress, measured as perceived pressure by school, and poor health and health-risk behaviours (Rathmann et al., 2018; Torsheim & Wold, 2001a; Torsheim & Wold, 2001b; Torsheim, Aaro & Wold, 2003; Modin, Östberg, Toivanen & Sundell, 2011). Generally, students who experience higher levels of pressure at school also experience frequent health complaints. High levels of school pressure are also associated with poorer mental health (Torsheim, Aaro & Wold, 2003) and studies have also shown that experiencing school-related stress may impede students' academic performance (Kaplan, Liu & Kaplan, 2005). Recent research also shows a stronger association between perceived school stress and poor mental health among girls compared to boys (Brålin Låftman, 2012). From this perspective, perceived school stress is a key factor to monitor and intervene on.

While school stress plays a key role in future academic choices and mental health (Gådin & Hammarström, 2003; Torsheim & Wold, 2001b; Liu & Lu, 2011), little is known about adolescents' perception of school stress in the Nordic countries. Perceptions of school stress might be related to the national context in which it is experienced and to historical structures and events that help create the educational system that children encounter. The Nordic countries have many cultural similarities, but the developments of educational policies show both similarities and differences across the countries that might be related to differences in school stress across countries (Lundahl, 2016).

Since the 1960s and 1970s, all Nordic countries have implemented comprehensive school systems, as a contrast to tracking systems, i.e. separating students by academic ability

into groups for all subjects, or into certain classes and curricula within a school (Lundahl, 2016; Gustafsson & Blömeke, 2018; Organisation for Economic Cooperation and Development, 2016).

The Nordic countries differ in other respects, such as learning outcomes. The Programme for International Student Assessment (PISA), which was first conducted in 2000, does not consider the participating countries' respective curricula (Swedish National Agency for Education, 2016), but uses questions that are designed to measure skills that are considered particularly important for life. Therefore, PISA enables comparison over time and between countries.

When PISA was first conducted, all Nordic countries performed around, or better than, the standardised international mean of 500 points in mathematics (Henrekson & Jävervall, 2016; Organisation for Economic Cooperation and Development, 2018, Organisation for Economic Cooperation and Development, 2019; Stanat et al., 2002). After that, performance decreased between 2000 and 2012 in Denmark (514 to 500), Norway (499 to 489), and Sweden (510 to 478). There was an improvement in learning outcomes between 2012 and 2015, to 511 in Denmark, 502 in Norway, and 494 in Sweden. Finland scored 544 in 2000, which was by far the highest among the Nordic countries. It remained above 540 points up to 2009, but then decreased from 519 to 511 between 2012 and 2015. In Iceland, the points decreased gradually from 515 in 2000 to 488 in 2015 (Organisation for Economic Cooperation and Development, 2018).

In Sweden, Denmark, Norway, and in other European countries where relatively poor developments of performance according to PISA were experienced, there were intensive public debates, known as 'PISA shock' (Ertl, 2006). It has been argued that an upward shift in perceived stress observed in some countries between 2002 and 2006 was a result of the 'PISA shock' (Klinger et al., 2015). In countries where the PISA results were comparatively strong, no such intensive public debate occurred.

Previous research on school stress and the differences in organisation, mainstreaming and learning outcomes calls for a continued Nordic perspective on school stress, which also can facilitate identifying policy options in a Nordic setting. The Health Behaviour in School-aged Children (HBSC) study provides a unique opportunity to explore the extent to which students' perceptions of school stress differ by age, sex, and across countries and regions. A repeated cross-sectional data collection can also be used to determine whether there exist systematic trends in perceived school stress.

## Aims

The main purposes of this paper are (1) to estimate the overall differences in the levels and trends of perceived school stress experienced by boys and girls of different ages; and (2) to describe trends in school stress across the Nordic countries.

## Method

### Samples

This study uses data from the five Nordic countries participating in the Health Behaviour in School-Aged Children study (HBSC): Denmark, Finland, Iceland, Norway, and Sweden. The sample is drawn from four waves of data collection: 2002, 2006, 2010, and 2014. The HBSC study includes cross-sectional data collected on nationally representative samples of 11-, 13-, and 15-year-olds, except in Iceland, where the whole population is targeted. It is conducted every fourth year. In all countries, the study follows a standardised protocol for

sampling, survey instrument and data collection. To obtain a representative sample, each country uses cluster sampling of classes or schools at a national level. The questionnaire is filled-in voluntarily and anonymously by the children during school hours (Table 1). Iceland entered the HBSC study in 2005 and, therefore, only sampled for the data collection in 2006, 2010, and 2014. The background to the HBSC study and the present research collaboration is given in another paper (Eriksson et al., this issue).

**Table 1.** Sample size by country and survey year (total)

Country	2002	2006	2010	2014
Denmark	4672	5741	4330	3891
Finland	5388	5249	6723	5925
Iceland	NA	9540	11119	10602
Norway	5023	4711	4342	3422
Sweden	3926	4415	6718	7700

### Variables and measures

School stress was measured by a single item: “How pressured do you feel by schoolwork?” There were four response options: “not at all”, “a little”, “some”, and “a lot”.

The participants answering “some” or “a lot” were categorised as reporting school stress.

School stress can be defined and measured in (a number) different ways, depending on the context (and scope). The measure applied in the HBSC study is well functioning and has been validated in several countries and included in other validated subscales measuring school pressure (Klinger et al., 2015; Torsheim & Wold, 2001b).

### Data Analysis

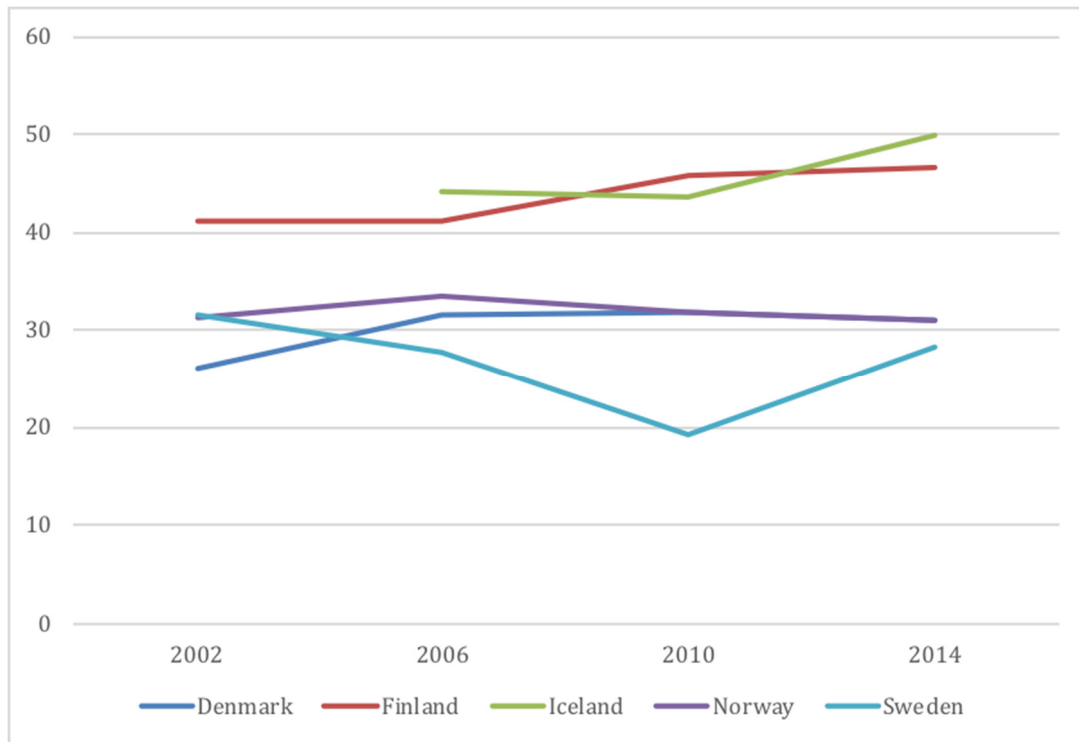
Time trends in school stress was analysed with logistic regression analysis, using the Stata svy routines. The svy analysis included design effects related to school class clustering, as well as strata for each survey cycle. To test the differences related to sex, age, country and time, we tested a factorial model. Contrasts and marginal predictions from the model were obtained using the Stata MARGINS routine. It is well established that students’ socioeconomic background is inversely associated with their academic achievement (Sirin 2005), and that children living in single-parent families have lower school achievement than those in two-parent families (Pong et al. 2003). Whether also perceived school pressure is associated with socioeconomic background and family structure is less clear. Yet, in order to assess time trends in perceived school pressure net of the potential influence of these factors, all analyses were adjusted for FAS and family structure.

## Results

### Descriptive results

Figure 1 shows the proportion of students reporting perceived school stress in the Nordic countries from 2002–2014, combining sex and age for each country. In Iceland, Finland and Denmark, there was an increase in perceived school stress, even though the proportions differed between the countries. The highest levels of school stress were reported in Iceland, with 49.9 per cent in 2014, jumping from 44.0 per cent in 2006. In Finland, it increased from 41.4 per cent to 46.5 per cent, and in Denmark from 26.1 per cent to 31.1

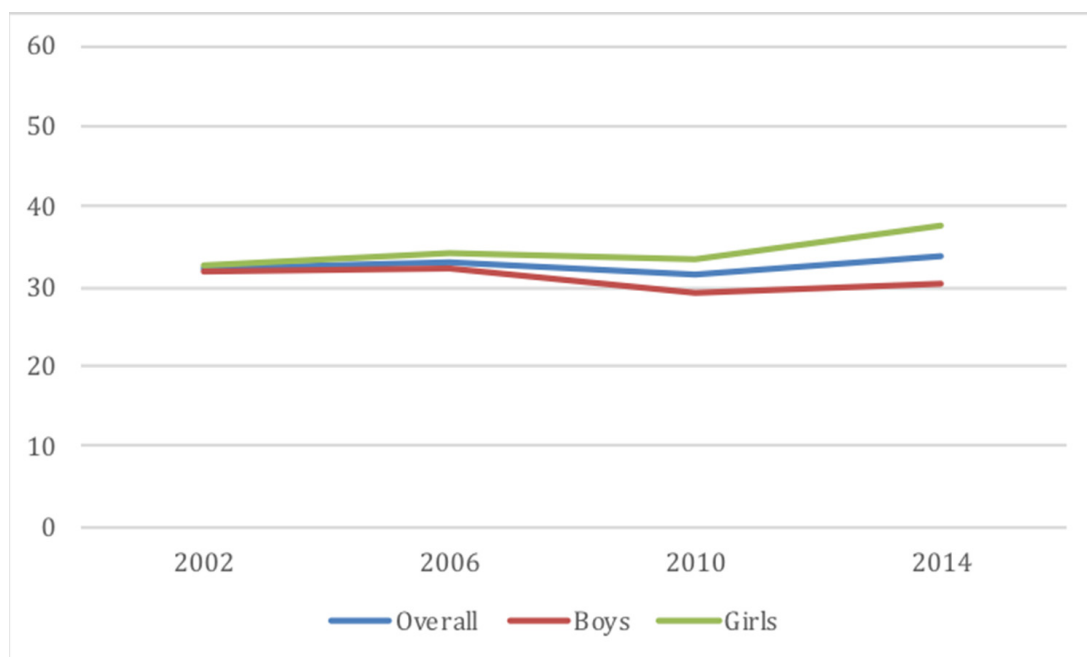
per cent between 2002 and 2014. In contrast, in Sweden the proportion of students who reported school stress decreased from 31.4 per cent to 28.1 per cent during the same period, which was the lowest proportion of school stress. In Norway, the proportion of students reporting “some” or “a lot” of school stress was stable around 31 per cent for the whole period.



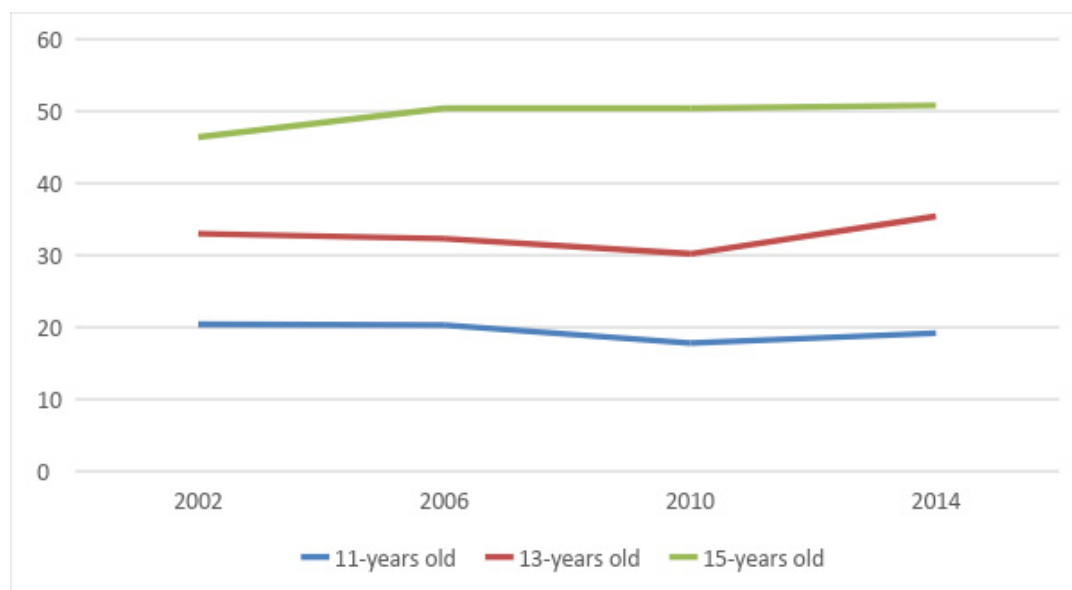
**Figure 1.** The proportion of students reporting school stress in the Nordic countries, combining sex and age, 2002–2014.

Based on pooled data, figure 2 shows the difference in perceived school stress between boys and girls within the Nordic countries from 2002–2014. Boys showed a marginal decline in school stress across time, whereas girls increased linearly across time.

School stress increased by age for the whole period, as presented in figure 3 based on pooled data. In 2014, it was 19.2 per cent for 11-year-olds, and 35.5 per cent and 50.8 per cent for 13- and 15-year-olds respectively. For 11-year-olds, the level of school stress was fairly stable, whereas school stress increased across time for 13- and 15-year-olds.



**Figure 2.** The proportion of students reporting school stress in the Nordic countries, by sex, 2002–2014.



**Figure 3.** The proportion of students reporting school stress in the Nordic countries, by age, 2002–2014.

## Regression analyses

### Age, sex, and country: Differences

The prevalence and trends are given in Table 2. The full regression model including all main and interactive effects revealed strong main effects of age, sex, and country and survey year. School stress increase with age group ( $F(2,4237) = 1327.62, p < 0.0001$ ), OR 13 vs 11 = 2.02 CI [1.91, 2.12], OR 15 vs 11 = 4.07, 95% CI [3.86, 4.29]), and was higher among girls ( $F(1,4237) = 81.32, p < 0.0001$ ) as compared to boys (OR girls vs boys = 1.18, 95% CI [1.14, 1.22]).

**Table 2.** Prevalence (%) and trends in perceived school stress 2002 to 2014

	2002	2006	2010	2014	2014 vs 2002	Trend
Overall	32.3	33.2	31.4	33.9	1.07 (1.01 to 1.14)	Cubic
Boys	31.8	32.4	29.2	30.3	0.93 (0.86 to 1.01)	Linear, Cubic
Girls	32.8	34.1	33.6	37.6	1.24 (1.14 to 1.34)	Linear, Quadratic, Cubic
11-year-olds	20.4	20.3	17.8	19.2	0.93 (0.83 to 1.04)	Linear, Cubic
13-year-olds	33.0	32.3	30.2	35.4	1.12 (1.01 to 1.23)	Quadratic, Cubic
15-year-olds	46.4	50.4	50.4	50.8	1.19 (1.07 to 1.33)	Linear, Quadratic
Denmark	26.1	31.5	31.7	31.1	1.28 (1.12 to 1.45)	Linear, Quadratic
Finland	41.4	41.2	45.7	46.5	1.23 (1.11 to 1.36)	Linear, Quadratic
Iceland	NA	44.0	43.7	49.9	1.27 (1.18 to 1.36)	Linear, Quadratic
Norway	31.2	33.4	31.9	31.1	1.00 (0.87 to 1.14)	Stable
Sweden	31.4	27.6	19.2	28.1	0.85 (0.76 to 0.96)	Linear, Quadratic, Cubic

School stress differed by country ( $F(3, 4237) = 298.37, p < 0.0001$ ), being higher among adolescents from Finland, and lowest among Swedish adolescents (OR Finland vs Sweden 2.18, 95% CI [2.06, 2.30]). Across countries, there was a marked sex by age interaction ( $F(2, 4237) = 210.30, p < 0.0001$ ), so that the age increase in stress was stronger for girls. For girls the age differences were large: (OR 13 vs 11 = 2.54, 95% CI [2.37, 2.71], OR 15 vs 11 = 6.43, 95% CI [5.99, 6.90]), with highest school stress among 15-year-old girls. The age differences were weaker for boys: (OR 13 vs 11 = 1.60, 95% CI [1.49, 1.72], OR 15 vs 11 = 2.57, 95% CI [2.40, 2.76]).

Overall, a weak main effect of time was observed: ( $F(3,4237) = 5.37, p < 0.0011$ , OR 2002 vs 2014 = 1.07, 95% CI [1.01, 1.14]). The pooled prevalence of school stress varied between 32.3 per cent in 2002 to 33.9 per cent in 2014. Interaction terms revealed that the trend of time differed by country ( $F(9, 4237) = 16.96, p < .0001$ ), sex ( $F(3, 4237) = 11.84, p < .0001$ ), and age group ( $F(6, 4237) = 5.47, p < .0001$ ). A decomposition of trends indicated linear components and non-linear components in four of the countries. A linear trend of increasing stress was evident in Finland ( $F(1,4237) = 24.32, p < 0.0001$ ), Denmark ( $F(1,4237) = 13.21, p < 0.0003$ ) and Iceland ( $F(1,2079) = 41.58, p < 0.0001$ ), a decreasing linear trend in Sweden ( $F(1,4237) = 23.65, p < 0.0001$ ), and no linear trend in Norway ( $F(1,4237) = 0.12, p < 0.7254$ ). There were also nonlinear deviations from linearity in Denmark, Sweden, and Finland. The most notable nonlinear effect was observed in Sweden, with an initial reduction from 2002 until 2010, and then a return to the initial level in 2014.



Moving to the sex by time interaction, boys showed a marginal linear decline in school stress across time ( $F(1, 4237) = 7.54, p < 0.0061$ ), whereas girls increased linearly across time ( $F(1, 4237) = 22.29, p < 0.0001$ ), indicating an increasing sex difference across time.

For the age group by time interaction, a diverse pattern was observed. For 11-year-olds the level of school stress was fairly stable across time, with a weak linear decrease ( $F(1,4237) = 4.32, p < 0.0378$ ), with cubic nonlinear effect ( $F(1, 4237) = 5.59, p < 0.0181$ ). For the 13-year-olds there were no linear trends, but a significant quadratic effect ( $F(1, 4237) = 14.89, p < 0.0001$ ) and cubic nonlinear trend ( $F(1, 4237) = 6.89, p < 0.0087$ ). For the 15-year-olds a linear effect ( $F(1,4237) = 9.92, p < 0.0016$ ) with a small quadratic nonlinear component ( $F(1,4237) = 3.95, p < 0.0470$ ).

## Discussion

The main objective of the current study was to describe trends in school stress across the Nordic countries from 2002–2014, as well as examine the experience of school stress by boys and girls of different ages. Overall, there was no common, general trend, but countries and demographic subgroups showed differences in trends.

There were notable country differences in the level of school stress. Sweden, Norway and Denmark had lower prevalence compared to Finland and Iceland. In Iceland, Finland and Denmark, there was an increase in perceived school stress, whereas adolescents from Sweden showed an initial decreasing trend until 2010 and an almost complete return to previous levels in 2014. In Norway, the level of school stress was stable.

Within the Nordic countries, boys showed a marginal decline in school stress across time whereas girls showed an increase. School stress increased by age for the whole period. For 11-year-olds, the level of school stress was stable, whereas school stress increased across time for 13- and 15-year-olds.

In the above-mentioned study on school stress in over 18 countries in the regions of North America, Great Britain, Eastern Europe, and Nordic and Germanic countries, an upward shift in perceived stress occurred between 2002 and 2006 (Klinger et al, 2015). It was hypothesised that the increasing levels of school stress in 2002 and 2006 for some countries might be connected with the release of the first PISA survey results in 2001, showing higher proportion of school stress in countries performing lower-than-expected in the PISA survey, known as ‘PISA shock’ (Ertl, 2006).

Our findings are not consistent with the ‘PISA shock’ explanation. Finland is the Nordic country with highest school stress, while at the same time being the best performing country of the Nordic countries according to overall PISA performance. The situation in Finland has been described as one of increasing school burnout and reduced engagement (Salmela-Aro & Upadaya 2017; Widlund, Tuominen & Korhonen, 2018). Living with high stress over time might lead to school burnout. Although Finnish adolescents as a group perform well, it can be hypothesised that the competition to be high-achieving within these groups might be a source of stress.

In contrast, Swedish adolescents’ performance in mathematics and reading fell continuously between 2000 and 2012. No other country participating in PISA experienced a steeper PISA performance decline over the past decade than Sweden (Swedish National Agency for Education, 2016). This coincided with a decline in school stress in Sweden (Public Health Agency of Sweden, 2014). In Sweden, it has rather been suggested that there is a connection between poor school performance, as seen in the PISA surveys, and an increase in multiple health complaints during the same period (Public Health Agency of Sweden, 2018).

Several studies have shown an association between school-related stress, measured as perceived pressure by school, and poor health and health risk behaviours (Rathmann et al., 2018; Klinger et al, 2015; Torsheim & Wold, 2001a; Torsheim & Wold, 2001b ; Modin, Östberg, Toivanen & Sundell, 2011). There is also an association between academic performance and mental health (Grimm, 2007; Halonen, Aunola, Ahonen Nurmi, 2006; Herman, Lambert, Reinke & Ialongo, 2008; Weeks, Ploubidis, Cairney, Wild, Naicker & Colman, 2016). So, the association between school stress, performance, and mental health is intricately correlated, and the Nordic comparison shows no consistent pattern.

The increase in perceived school stress by age, and a higher prevalence among girls compared to boys, is congruent with previous studies on perceived school stress. For example, in the study looking at school stress across over 18 countries in the regions of North America, Great Britain, Eastern Europe, and Nordic and Germanic countries from 1994 to 2010 showed that girls reported higher levels of school stress than boys, and that stress was higher in older age groups (Klinger et al, 2015).

Regarding age differences, as children move through the educational system, they are subjected to greater academic demands and expectations, which might result in increased stress about succeeding in school. As children get older, they also approach the transition to higher education. Thus, with globalisation and living in high competence economies, the salience of school demands would be expected to increase with age as the necessary transition to higher education gets closer. However, the percentage of youth with low connectedness to their school increased steadily across the age groups in a Danish study (Nielsen et al, (2017) as well as in other countries (Lester & Cross, 2015; Loukas, Suzuki & Norton, 2016; Monahan et al., 2010). School connectedness can be seen both as an individual attribute and as indicator of a contextual factor, school climate (Damsgaard, Holstein, Poulsen & Due, 2005).

High academic performance could be linked to an increase in perceived school pressure, which might explain why girls report more school stress than boys, since girls in general show better academic performance than boys (Organisation for Economic Cooperation and Development, 2018). On the other hand, poor school performance is associated with poor mental health, which could be expected to increase school stress among boys. Again, the association between school stress, performance, and mental health is complex and intricately correlated. Gender differences in school results and mental illness may be due to biological factors, structural factors and expectations related to gender (Ombudsman for Children in Sweden, 2015).

The current study is not without limitations. The observed age differences were based on repeated cross-sectional data. A potential challenge with these kind of data is separation of age, period and cohort effects. For example, the observed age differences might reflect a birth cohort effect or age effects. Similarly, cohort effects can sometimes be difficult to separate from period effects. However, in the current study, the same age effect was found across survey years. This provides a basis for concluding about age rather than cohort effects.

School stress was measured with a single self-report item. Self-reporting is the relevant mode of appraisal for stress and focus on the perceived stress, as there are no objective demands in schools. For group comparisons, the reliability of the current study was adequate. Single items can have lower reliability than multiscale items. Still, the current item has shown strong association with health emotional and physical complaints. Furthermore, the objective of the current analysis was not individual prediction.

## Conclusion

The correlation between school demands and stress among Nordic Adolescents has been studied and debated. For example, PISA results created significant debate across countries (Baird, Isaacs & Johnson, 2011; Breakspear, 2012; Ertl, (2006). It has been argued that in some countries with relatively poor performance, increasing accountability demands and increase pressure by educators towards students in an attempt to make students perform better also resulted in an increase in perceived school pressure (Klinger et al, 2015). As shown above, the Nordic countries do not show patterns consistent with that argument. In Sweden, for example, academic performance, according to PISA, decreased between 2000 and 2012. During the same period perceived school pressure also decreased. On the other hand, according to PISA data from 2015, there was a statistically significant improvement in academic performance and school pressure also decreased (Swedish National Agency for Education, 2016; Public Health Agency of Sweden, 2014). On the contrary, Finland was the Nordic country performing best in the PISA surveys during this period and also the one showing the highest school pressure.

The challenge for the public education systems in the Nordic countries is to develop policies and practices that provide children with the necessary tools to achieve knowledge and skill, and at the same minimising stress in school. The different trends in Nordic countries call for increased efforts to understand cross-national comparison. These might be found in curriculum, tracking demands, demographic changes and educational reforms. In addition, students' own statements about their views, thoughts, and experience in the Nordic countries offer valuable insights for school improvement (Robinson & Tylor, 2007)

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