

Have performance-based educational reforms increased adolescent school-pressure in Sweden? A synthetic control approach

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ARTICLE INFO

Keywords:

Adolescent stress
School stress
Education
Educational policy
Educational stressors hypothesis
Cross-country comparative
Synthetic control
Gender differences

ABSTRACT

Increased levels of stress and other mental health problems have been reported amongst adolescents in high-income countries. In particular, rates of school-pressure have increased significantly. Despite such increases, little is known about the underlying determinants of increased adolescent stress, making this an emerging public health concern. The *educational stressors hypothesis* contends that increased rates of stress result from pronounced performance pressures placed on adolescents resulting from educational policy initiatives which emphasizes academic goal attainment. The present study tests this hypothesis using a synthetic control method and panel data techniques to analyse data from the Health Behavior in School-aged children (HBSC) survey, including more than 150,000 adolescents per survey wave in 25 European countries over 16 years, to assess if the Swedish Educational reforms implemented in the 2011–13 period were associated with increased self-reported school-pressure. These reforms implemented increased summative assessments, new grading systems and increased eligibility criteria in accessing further education. Results demonstrate that following the reforms, Swedish adolescents experienced greater levels of school-pressure and led to a greater gender difference in experienced school-pressure where girls were relatively more affected. We conclude that, consistent with the educational stressors hypothesis, the educational reforms have likely contributed to increasing levels of school-pressure for Swedish adolescents.

1. Introduction

Increased levels of stress and other mental health problems have been reported amongst adolescents in high-income countries (Bor et al., 2014; Högberg et al., 2020). In particular, rates of school-school-pressure have increased significantly in high-income countries (Cosma et al., 2021). This increase is problematic, as experiences of stress can lead to worsening mental health outcomes (Corell et al., 2021; Karatekin, 2018). Despite such increases, little is known about the underlying determinants of increased self-reported adolescent stress, making this an emerging public health concern (Bor et al., 2014; Erskine et al., 2015; Potrebny et al., 2017). Various studies have sought to investigate individual level factors that may account for rising rates of stress (Corell et al., 2021; Lal, 2014; Seiffge-Krenke et al., 2009), however, few have sought to assess macro-level or policy orientated determinants among adolescents in high-income countries. There is here a need for macro level research, not least as individual level factors are unlikely to entirely account for, nor explain, increased levels of stress

across time, cohorts or countries (Högberg et al., 2020).

The *educational stressors hypothesis* contends that increased rates of stress result from pronounced performance pressures placed on adolescents resulting from educational policies which emphasizes academic goal attainment (Klinger et al., 2015; West and Sweeting, 2003). Specifically, contemporary school environments emphasize increased pressures to perform in school, augmented by increased rates of tests and personal academic evaluations, prompting increased feelings of stress and burnout (West and Sweeting, 2003). The Swedish educational reforms package of 2011 is an ideal opportunity to test if such educational policies are associated with increased levels of school-pressure. These reforms prompted the introduction of increased summative assessments, and tightened eligibility criteria's in accessing higher education. Investigating whether this reform package impacted adolescent perceptions of school-pressure is critical, as Sweden currently demonstrates one of the greatest secular increases in self-reported health problems and symptoms in the European Union since the 1980s (Högberg et al., 2020; Potrebny et al., 2017).

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The aim of this study is to investigate whether the Swedish educational reform package was associated with increases in adolescent reports of school-pressure, and whether experiences of school-pressure vary by gender. In order to undertake this investigation, the current study will utilise a synthetic control method (Abadie et al., 2015; Abadie and Gardeazabal, 2003) which artificially creates a 'control', or weighted average of control units, enabling comparison with the target group before and after the educational reform in order to assess if this implementation is indeed associated with increased adolescent reports of school-pressure. The study will provide empirical knowledge on how educational policy initiatives which emphasize performance outcomes may promote increased levels of adolescent reports of school-pressure.

2. Previous research

2.1. Stress in adolescence

Mental health complaints are common among adolescents, and are typically stress-related or induced (Corell et al., 2021). Stress arises as a result of individuals experiencing demands in which they perceive they have an inability to manage sufficiently (Östberg et al., 2015). Experiences of stress likely impair day-to-day functioning, and may result in persistent mental health issues in adult life (Corell et al., 2021). The *Stress and Coping theory* contends that experiences of stress result from a dynamic interaction between an individual's environment and four key elements (Corell et al., 2021; Lazarus et al., 1984). Specifically, (1) an internal or external stressor, (2) an appraisal of the stressor, (3) a coping strategy, and (4) a stress reaction which may be psychological and/or physical (Corell et al., 2021). In line with the *Stress and Coping theory*, educational policy reforms may be conceptualized as an external stressor, as such policies may promote increased pressures to perform in school, due to increased examinations and academic evaluation leading to heightened experiences of school-pressure which is characterised as stress (West and Sweeting, 2003). Numerous studies have identified that increased rates of examinations and academic performance requirements elicit the highest rates of school stress, and are considered high-stake and stress inducing experiences (Kohn and Frazer, 1986; MacGeorge et al., 2005; Sohail, 2013). Furthermore, five out of ten major components of stress evidenced among adolescents are directly related to academic performance and future uncertainty (educational-career uncertainty) and are among the strongest predictors of anxiety and depression (Byrne et al., 2007; Hiltunen, 2017).

Experiences of stress appear to affect adolescent girls to a higher degree (Corell et al., 2021; Danielsson et al., 2012; Landstedt et al., 2009). The Swedish Public Health Agency contends that 57 % of girls report frequent mental-ill health related symptoms compared to only 31 % of similar aged boys (Swedish Public Health Agency, 2018), while 60 % of girls characterize themselves as experiencing pressure as a result of school related demands, compared to 34 % of boys (Inchley et al., 2020). Thereby, school related pressure accounts for a significant proportion of stress related symptoms among girls, but is significantly lower for similar aged boys (Högberg et al., 2020). Possible explanations for girls pronounced vulnerability to school-pressure may result from their higher levels of conscientiousness in regards to school-related achievements (Giota and Gustafsson, 2020). Additionally, girls may place greater individual demands on performance, responsibility and expectations in relation to schooling, leading to increased expectational pressures (Landstedt et al., 2009). Girls are thus more vulnerable to experiencing school-pressure, and demonstrate a heightened susceptibility in developing stress like symptoms (Sweeting et al., 2010).

2.2. The educational stressors hypothesis

The *educational stressors hypothesis* contends that contemporary schooling environments prompt a deterioration of pupil mental-health and well-being as a result of increasing stressors (West and Sweeting,

2003). Such stressors result from contemporary educational institutions placing greater emphasis on educational achievement and grade acquisition, prompting increases in school related performance pressures, while life opportunities of adolescents are increasingly dependent on their educational performance, leading to an increased sensitivity to stress-related symptoms (Högberg, 2021).

Various studies have sought to investigate the educational stressors hypothesis and the proximate causes of stress-induced symptoms (West and Sweeting, 2003). Findings conclude that adolescent stress-related symptoms from various high-income countries are strongly tied to the educational functioning of schools (Karvonen et al., 2005; Nygren and Hagquist, 2019), school disengagement, cumulative worries relating to schooling (Sweeting et al., 2010), cognitive ability (Giota and Gustafsson, 2020) perceived life satisfaction (Moksnes et al., 2016), and social class and parental pressures (Eriksen, 2021). Studies consistently demonstrate that stress complaints among adolescents are increasing, and that stress related symptoms are gradually worsening (Sweeting et al., 2010; West and Sweeting, 2003). As such, adolescent pupil's experiences of stress-related symptoms are increasing, and such increases are primarily attributed to increases in school demands (Giota and Gustafsson, 2017, 2020).

A proposed up-stream cause of increasing demands placed on adolescents is educational policy reforms which emphasize performance outcomes evaluated via summative assessments (Banks and Smyth, 2015; Cosma et al., 2021; Denscombe, 2000). Such reforms may inadvertently promote increases in school related pressures and expectations leading to pronounced stress reactions (Giota and Gustafsson, 2017). Few studies have however, sought to ascertain empirically whether educational policies emphasizing knowledge requirements and summative assessments promote secular trends in adolescent stress. Nevertheless, studies have demonstrated that at an individual level, adolescents are cognizant of how their secondary school performance is decisive in obtaining higher education and subsequent prospects in the labour market (Banks and Smyth, 2015; Denscombe, 2000; Huan et al., 2006; Låftman et al., 2013; Putwain, 2009), while high-stakes examinations which heavily affect an individuals' future educational progression are perceived as considerably more stressful than other tests (Banks and Smyth, 2015; Smyth and Banks, 2012; Von der Embse et al., 2017). Such findings indicate that uncertainty associated with future opportunities is strongly linked to perceived educational performance early in the life course, and is a major consistent stressor for adolescents in knowledge economies (Banks and Smyth, 2015; Byrne et al., 2007; Högberg, 2021). Furthermore, girls are likely more vulnerable to experiencing such stress, as women are relatively more dependent on educational achievement in accessing labour market opportunities due to historically embedded gender discrimination (DiPrete and Buchmann, 2013; Pekkarinen, 2012). Therefore, it is logical to presume that educational reforms which emphasize increased rates of high-stake national testing and knowledge requirements, likely promote increased levels of adolescent school-pressure, and that girls are likely more vulnerable to experiencing such school-pressure and subsequent stress.

Given that there are few large-scale quantitative studies which have examined the stress-related consequences of performance based educational policies, and existing evidence is scattered, a substantial literature gap exists. This gap provides the motivation to test whether reforms which prioritize educational performance outcomes are associated with increases in adolescent school-pressure, and as a possible explanation for the observed secular increase in pupil experienced stress. For the purposes of this study, the Swedish educational reform package of 2011 will be used as a case study example.

2.3. The Swedish educational reforms

The Swedish school system is comprehensive and compulsory until grade 9, and is fully tax funded. The Swedish government has implemented major educational reforms in recent decades, transforming the

Swedish school system from a centralist, state-led education system to a dispersed, marketized system (Rönnerberg et al., 2019). Following decentralization, various changes were implemented, leading to the establishment of fully tax funded public and private schools, and the introduction of the school voucher (grant) system in 1992, promoting 'free choice' in selecting schools by students and parents. A subsequent reform package in 2011 however enacted a prioritizing focus on performance orientation under a 'performance-based model' (Wahlström and Sundberg, 2015). As a result, academic achievement was evaluated by an increasing implementation of national testing, assessing knowledge requirements, output results, new grading systems and eligibility criteria (Halapuu, 2021). The relevant enactments implemented as a result of the educational reform package are outlined below.

National testing held lower stakes for pupils prior to the reform package, were used less frequently and were less significant for a pupil's final grade (Wahlström and Sundberg, 2015). Though national testing was previously used as a means to assess pupils' knowledge requirements (learning competencies) in given subjects, the reform placed a special consideration and significance on national testing as a key advisory tool, largely determining a pupil's final passing grade in each subject (Wahlström and Sundberg, 2015). National testing is also a primary instrument used to monitor pupil's overall performance and subsequent allocation into programmes in upper secondary school. Pupils perceive such tests as extremely high-stake, as they carry important institutionalized consequences for individuals, as poor grade related outcomes may have a detrimental effect on later educational access, rendering such tests as stress-inducing (Högberg, 2021).

The educational reforms further reinforced an emphasis on quality improvement and academic outcome evaluation via intensified grading protocols (Lundahl et al., 2016). The introduction of earlier grading requirements initiating in year 6 from year 8, was introduced as a means to assess academic performance sooner, which was believed to promote stronger academic performance outcomes earlier in life (Lundahl et al., 2016). Further, a refined grading scale was introduced, with the intention of improving the motivation to study harder and provide a better tool for ensuring pupil academic accountability (Gustafsson et al., 2016). This refined and earlier grading scale, though envisioned to increase the equivalence of grading, made grading assessments 'easier' to fail, as a pupil's poorest performance became largely indicative of their overall final grade. This disproportionately placed greater weight on pupil's poorest performances than their successes (Gustafsson et al., 2016). Lastly, the reforms enacted stricter passing grade eligibility criteria's in order to access national programmes in upper secondary school and higher passing grade requirements to access university (Halapuu, 2021). Following this implementation, pupils' perceptions of earlier grading in year 6 demonstrated that pupils consider national testing to be extremely high-stake, and essential to their perceived future ability in accessing further education, while making conversations surrounding grades far more prominent in school and at home, increasing education related pressures from an earlier age (Löfgren and Löfgren, 2015).

2.4. The reform packages determinants on adolescent stress

The reforms possible effects on stress can be understood as a result of how pupils are characterized into two interlinked educational hierarchies (Elstad, 2010; Högberg, 2021). Firstly, this reform enabled the ranking and differentiation of pupil's based on academic performance due to an increased focus on grades and performance evaluations via national testing (Wahlström and Sundberg, 2015). This increased focus on performance related measures, or academic rankings, has produced a 'hierarchy of educational performance' to compete within, leading to increased performance pressures and stress through academic competitiveness (Elstad, 2010). Furthermore, this increase in competitiveness is likely exacerbated by the combination of free school choice and achievement based admission, as higher-achieving students are more likely to be offered positions in preferential schools, leading to the

perception of 'good' and 'bad' schools (Brandén and Bygren, 2018). Securing placement in a 'good' school is considered as 'social proof' of school quality by students and parents (Brandén and Bygren, 2018). Therefore, to ensure placement in preferential schools, students must achieve high academic performance, further reinforcing performance pressures via academic competitiveness.

Secondly, by employing the aforementioned performance-based rankings as an academic metric, individuals' future opportunities in life are subject to their performance outcomes in secondary school, or a 'hierarchy of social prospects' (Högberg, 2021). As examination results determine access to higher stages of the education system, pupils' final educational credentials are the primary resource utilised to compete in the labour market, making academic evaluation scores carry important future opportunities for pupils. Specifically, as the reforms implemented stricter eligibility requirements, students require consistent higher passing grades in compulsory school in order to access further education (Halapuu, 2021). Ultimately, the reform package made the ranking of individuals the core metric of academic performance, while concurrently making this academic performance and ranking considerably more consequential (Halapuu, 2021). These educational performance hierarchies likely generate stress as poor academic performance in upper secondary school carry serious consequences for educational opportunities, impacting self-worth and identity (Landstedt et al., 2009). As educational performance is emphasized, pressures resulting from increased workloads and examinations produce increased experiences of stress (Högberg, 2021).

Accordingly, the aim of this study is to investigate whether the Swedish educational reform package is associated with increases in adolescent school-pressure, and whether variations exist in experienced school-pressure by gender, as previous research indicates girls a more vulnerable to experiencing such stress. To our knowledge, no previous studies have sought to employ a synthetic control method in order to ascertain if educational policies similar to the Swedish reform package are indeed associated with increased levels of adolescent stress.

Following this research background, the present study has two research questions:

- (1) Was the implementation of the Swedish reform package associated with increases in adolescent school-pressure?
- (2) Was the implementation of the Swedish reform package associated with an increase in the gender gap of experienced school-pressure for girls compared to boys.

3. Material and methods

3.1. Data

The proposed research objectives require two conditions to be met in regards to the data. Firstly, representative and harmonized individual-level data from a variety of high-income countries relating to school-pressure are required for cross-country, or group-level comparisons. Secondly, data spanning several years is required to ascertain secular trends in school-pressure at a group-level. Data from the Health Behaviour in School-aged Children (HBSC) survey meet these conditions.

3.2. Individual-level data

HBSC is a repeated cross-sectional survey which aims to gather cross-country, comparable data on the health of adolescents in middle to high income countries. This survey has been conducted every four years since 1982 in collaboration with the World Health Organisation. The target population is all adolescents in participating countries attending school, grouped into three age categories/grade levels (11–12, 13–14, and 15–16 years old). HBSC is conducted in 50 countries across Europe and North America and is collected via a two-stage cluster design, where

school classes are the primary sampling unit. However, when it is not possible to use classes as the primary sampling unit, schools are supplemented as the primary unit. Where the number of classes eligible for sampling is unknown, probability proportionate sampling is employed to calculate actual or estimated school size. At each participating school, a classroom from grades 5, 7, and 9 are invited to take part. The recommended minimum number of participants is 1500 students per grade (Moor et al., 2020). Participation in HBSC is voluntary, and both schools and students may refuse to participate or withdraw their consent until the day of the survey (Moor et al., 2020). Participating students are also free to cease filling out the questionnaire while completing the survey if they wish, and are only required to answer selected questions. The HBSC survey is completed in the classroom under the supervision of a teacher while at school, and participate in the study at no financial cost (Moor et al., 2020). HBSC has been used extensively in studies of school-pressure, stress and other related mental health outcomes (Cosma et al., 2021; Högberg et al., 2020; Sonmark and Modin, 2016). We utilised surveys from the periods 2001/2002 through to 2017/2018. Our study involved a total of $n = 1036,869$ observations over this time period ($Mage = 13.5$ years, $SD = 1.64$, 50.2% girls).

3.3. Dependent variable

School-pressure will be the dependent variable utilised for the purposes of this study. HBSC contains one item measuring perceived school-pressure: “How pressured do you feel by the schoolwork you have to do?”, with available responses ranging from “Not at all” (1), to “A lot” (4). Though this item is not overly comprehensive or detailed, it has been used extensively in previous research on school-pressure and other mental health outcomes (Cosma et al., 2021; Högberg et al., 2020; Sonmark and Modin, 2016). We collapsed (dummy-coded) this variable in order to render all observations into one single aggregate outcome measure by country and year, with the first two response options coded = 0, and the second two coded = 1.

3.4. Synthetic control method

In order to undertake this study, we employed a synthetic control method (Abadie et al., 2015; Abadie and Gardeazabal, 2003). The synthetic control method is a statistical design adapted to comparative case studies. This method is a data-driven technique that matches a case (i.e. Sweden) with relevant comparison countries based on quantitative similarities. Similarity in case of a synthetic control is defined as being similar in terms of different statistical variables, where the variables can be predictors of the outcome as well as the outcome itself (Abadie et al., 2015). Based on similarities to Sweden, all potential comparison countries are assigned a weight, with the weighted average of control units best matching the quantitative characteristics of Sweden prior to the reform, and is referred to as ‘synthetic Sweden’. Quantitatively identifying countries with similar pre-treatment characteristics minimizes the difference in covariate values between the treated and non-treated unit (Abadie et al., 2015). In order to best match the pre-treatment school-pressure levels of Sweden, the algorithm employed in the synthetic control combines countries using weights in order to optimize similarity with Sweden. Therefore, if a contributing country matches Swedish school-pressure levels in a given year but not another over the surveyed period, the algorithm will ‘borrow’ higher values from other countries which better match Sweden in other years. The synthetic control approach thus enables the development of a rigorous counterfactual to the unit that received treatment, allowing researchers to determine the effect on the treated unit, had the treatment not occurred (Cunningham, 2021). Furthermore, unlike traditional difference-in-difference approaches, this method can account for the effects of confounders and changes over time, as this approach can handle time-varying confounding in a flexible way (Cunningham, 2021).

For the purposes of this study, the synthetic control will comprise a

host of ‘untreated’ countries from the European Union to compare with Sweden. The potential synthetic donor pool countries included in this study were 25 European Union countries: Flanders region of Belgium, Wallonia region of Belgium, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greenland, Hungary, Ireland, Italy, Latvia, Netherlands, Norway, Poland, Portugal, Slovenia, Spain, and Switzerland. England, Scotland and Wales were also included in our investigation as they were European Union members while conducting this investigation. As the reforms took place in 2011, we utilised survey data from 2001/2–2017/18, providing our synthetic control with a preintervention period of ten years, and roughly seven years of post-intervention data.

3.5. Analytical strategy

In order to execute the synthetic control method, we undertook the following analytical strategy. Firstly, we sourced HBSC survey data from the HBSC Data Management Centre, an open access platform hosting completed HBSC survey data by completed year. We utilised survey data from 2001/2–2017/18. All survey data was imported into *Stata version 17.0*, a general-purpose statistical software storage and management package.

In order to accurately assess whether levels of school-pressure have increased at a group-level (country), individual response data was collapsed (dummy-coded) to render all observations into one single aggregate outcome measure by country and year. Therefore, we collapsed the following item into a single aggregate outcome unit in order to ascertain the proportion of students reporting school pressure by country and year: (1) school pressure. Following the collapsing of all data, we set the following variables into time series or panel data to enable a sequence of discrete-time data: (1) country number, (2) survey year/wave.

In order to establish synthetic Sweden, a selection of comparison units (countries) were selected. Twenty-five European countries were selected as donor pool countries (see Section 3.4). As the treated unit and the amalgamated synthetic counterfactual are as similar as possible in all relevant aspects before the educational reforms, the only difference between the treated and non-treated units is the intervention of interest. Therefore, the synthetic control method, when controlling for pre-treatment differences, provides a robust estimate of the increase in school-pressure levels on the treated unit following the implementation of the educational reforms, while the amalgamated synthetic control provides an estimated counterfactual of school-pressure levels to Sweden, had the educational reform not been implemented. That is to say, what Sweden’s adolescent school-pressure levels would likely be estimated to have been, had the reform never taken place. Ultimately, this method provides an estimated difference in school-pressure levels, and whether the educational reforms were associated with increased levels of adolescent school-pressure and stress.

4. Results

In order to firstly determine the proportional change of experienced school-pressure over the surveyed period among Sweden and the donor pool countries, we dummy-coded the school-work pressure item included in HBSC data from the period 2001/2–2017/18 across all surveyed countries. Fig. 1 presents the proportion of school-pressure over time, demonstrating that the majority of surveyed countries have experienced an increase in adolescent school-pressure during the surveyed period, with the exception of the Flanders region of Belgium, Denmark, Germany, Greece, Latvia and Switzerland. Most notably however, is the substantial increase in school-pressure levels in Sweden compared to other countries, increasing by 16.9% over the 2010–18 period, closely followed by Poland with a 16.6% increase in absolute terms.

In order to undertake the primary analysis in this investigation, all

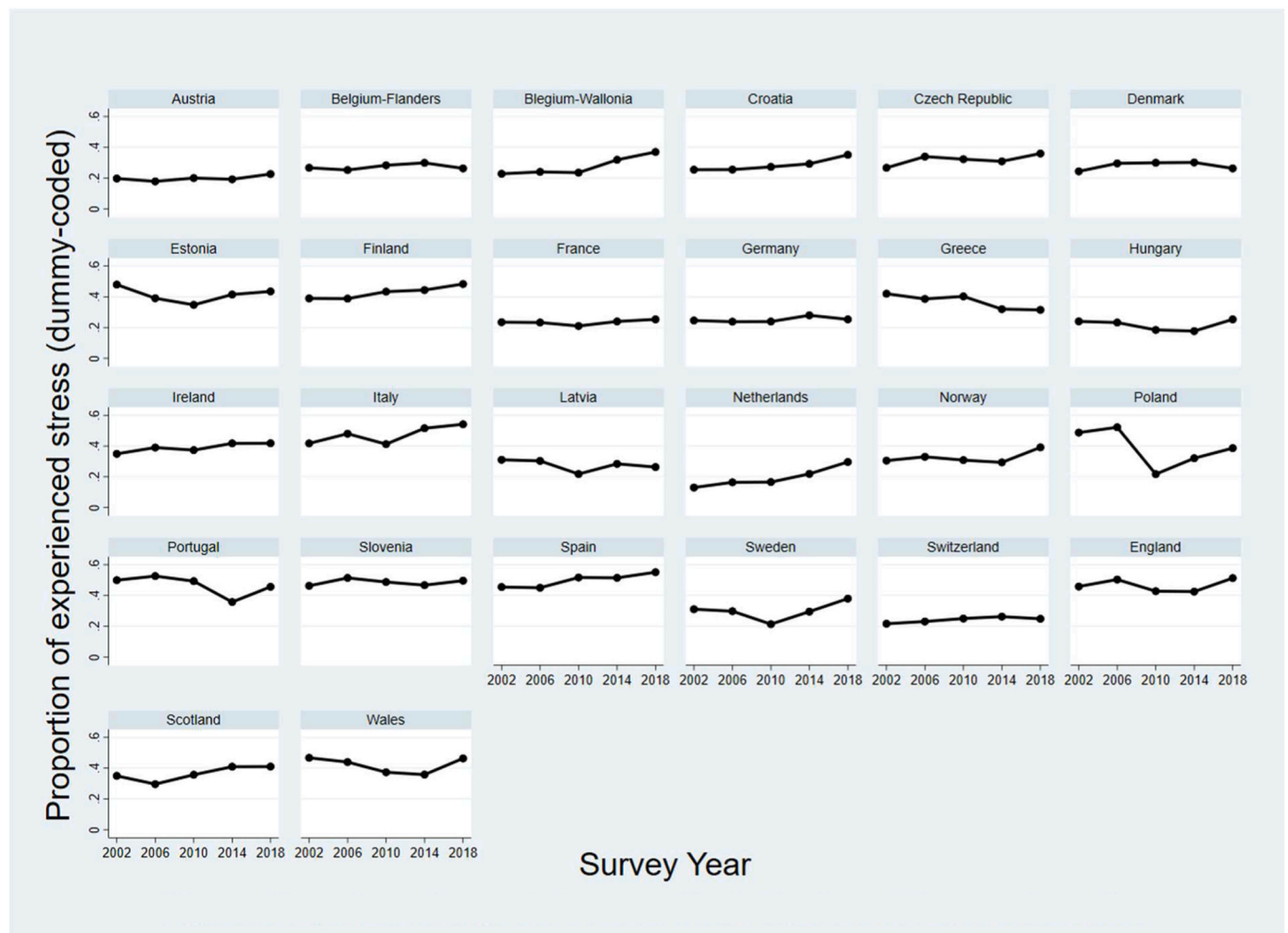


Fig. 1. Average levels of school stress, 2002–2018.

donor pool countries utilised for undertaking the synthetic control must be attributed synthetic weights to produce the synthetic control which will be compared with Sweden in order to assess if the educational reforms were associated with an increase in school-pressure among Swedish adolescents. Table 1 displays the weights of each donor pool country in synthetic Sweden.

The weights reported in Table 1 indicate that the following combination of countries best match the pre-intervention school-pressure levels of Sweden prior to the implementation of the reform as a single synthetic construct, and is referred to as synthetic Sweden. The primary

Table 1
Respective country weights in synthetic Sweden.

Country	Unit Weight	Country	Unit Weight
Austria	.002	Italy	0
Belgium FL	.001	Latvia	.003
Belgium FR	.001	Netherlands	0
Croatia	.001	Norway	.001
Czech Republic	0	Poland	.147*
Denmark	0	Portugal	0
Estonia	.138*	Slovenia	0
Finland	0	Spain	0
France	.002	Switzerland	.001
Greece	.001	England	0
Germany	.001	Scotland	.001
Hungary	.699*	Wales	.001
Ireland	0		

Note: * represents primary donor pool weights estimated in synthetic control

contributing countries are: Hungary (.699), Poland (.147) and Estonia (.138). The remaining donor pool countries are assigned zero weights as they poorly match Swedish school-pressure levels prior to the implemented reforms, and are discarded in the analysis.

Following the construction of synthetic Sweden utilising the appropriate donor pool countries, the primary analysis of the synthetic control can be undertaken in order to determine if the reform package were associated with an increase in Swedish adolescent school-pressure.

Fig. 2 displays the school-pressure levels for Sweden and synthetic Sweden during the period 2001/2–2017/18. This figure displays the difference in school-pressure levels in Sweden and its synthetic counterpart before and after the implementation of the reform package in 2011.

Immediately following the enactment of the reform package, Sweden and its synthetic counterpart begin to diverge noticeably. Though reported school-pressure levels appear to be diverging prior to the implementation, this is simply an artifact of the data utilised for this study, as HBSC is conducted in four-year intervals. The discrepancies between the lines suggest a large positive effect following the reform package on Swedish adolescent's school-pressure levels. These findings suggest that had the reform package not been introduced, Swedish adolescents school-pressure levels would have been lower than current reported levels.

In order to assess the robustness of the estimated difference in school-pressure levels between Sweden and synthetic Sweden, we undertook secondary analyses. Fig. 3 plots the estimated change or gap between Sweden as the treated unit, and synthetic Sweden as the non-treated unit

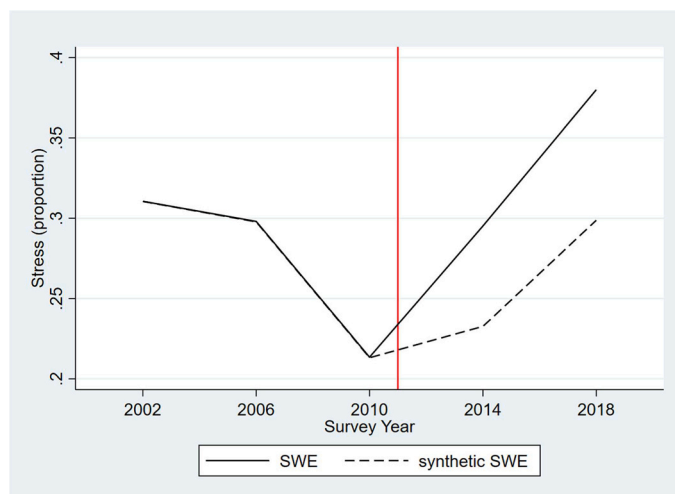


Fig. 2. Trends in stress levels, Sweden vs. synthetic Sweden.

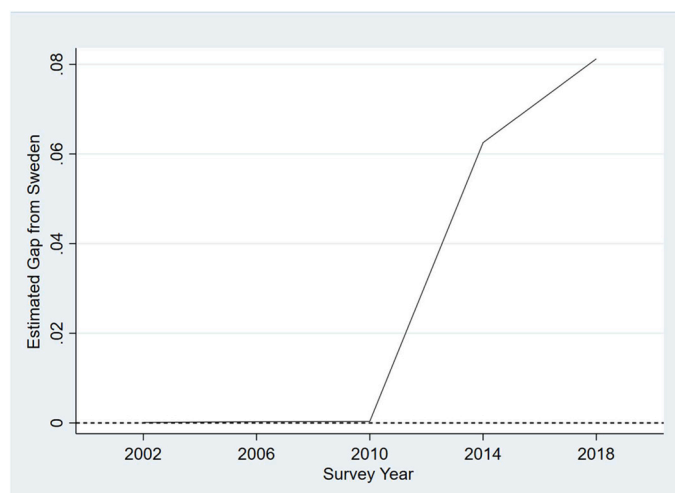


Fig. 3. Estimated stress gap, Sweden vs. synthetic Sweden.

following the implementation of the reform package. Fig. 3 demonstrates that following the implementation of the reforms in 2011, Sweden diverges from synthetic Sweden, with a sharp increase in school-pressure levels over time. During the 2013–14 survey period, Swedish adolescents experienced an increase in school-pressure approximately six percent greater than synthetic Sweden, while further increasing to approximately eight percent greater in absolute terms during the 2017–18 period.

In order to further evaluate the robustness of our synthetic control estimate, we undertook a set of placebo tests, by iteratively applying the synthetic control method used to estimate the effect of the reform package in Sweden to every other country utilised in the donor pool. In each iteration, we applied and reassigned in our data the educational reform package to each of the 25 donor pool countries employed in the synthetic control. If these placebo tests demonstrate that the gap estimated for Sweden is particularly large in comparison to the gap for the donor pool countries estimated, we can interpret that our analysis provides robust evidence that the reform package were associated with higher levels of adolescent school-pressure levels, and that our findings are not simply resulting from prediction error as a result of poor treatment fit.

Fig. 4 displays the results of the iterative placebo tests. The colored lines represent the gaps associated with the 25 iterative runs of the test, demonstrating the difference in school-pressure levels between each

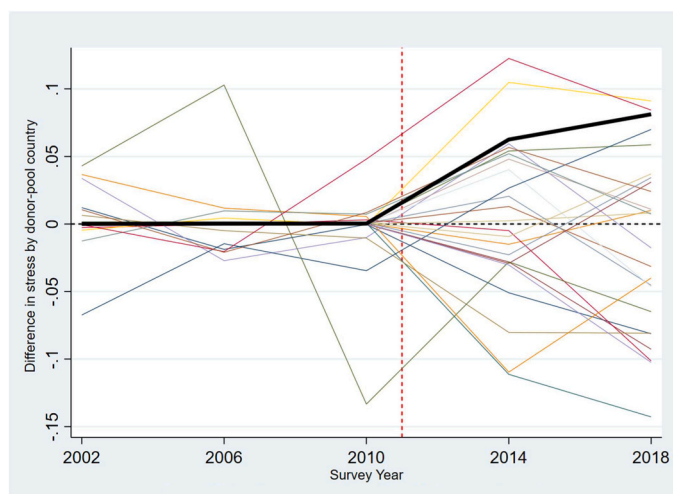


Fig. 4. Placebo stress level gaps in all 25 donor-pool countries.

donor pool country and its respective synthetic counterfactual. The bolded black line estimates the gap for Sweden during the 2001/2–2017/18 period, and demonstrates that the estimated gap is unusually large relative to the distribution of the gaps for the countries in the donor pool post intervention. As Fig. 4 indicates, the synthetic control method provides a sufficient fit for the majority of countries in the donor pool. However, Fig. 4 also indicates that school-pressure levels cannot be well produced over the surveyed period in some donor pool countries due to poor pre-intervention fit, and it is therefore difficult to interpret their post-intervention trajectories.

As a result, we provide an alternative iteration of Fig. 4, which excludes donor pool countries with a pre-implementation level of RMSPE (Root Mean Square Prediction Error) 10 times greater than Sweden following recommendations by Abadie et al. (2015).

Following this exclusion, the gap for Sweden appears highly unusual, as the positive effect in Sweden is discernably greater than the remaining donor pool countries which shared a highly similar pre-treatment match in regards to school-pressure levels. These findings indicate that the reform package appeared to prompt increases in Swedish adolescent experiences of school-pressure. Fig. 5.

We additionally sought to determine if the increases in school-pressure resulting from the reform package affected girls to a greater degree than boys. Fig. 6 presents the gender gap in school-pressure

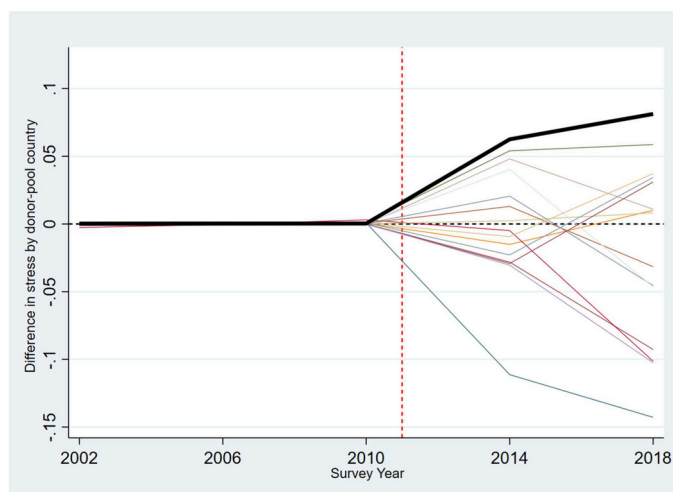


Fig. 5. Placebo stress levels gaps (discards countries with RMPSE ten times higher than Sweden).

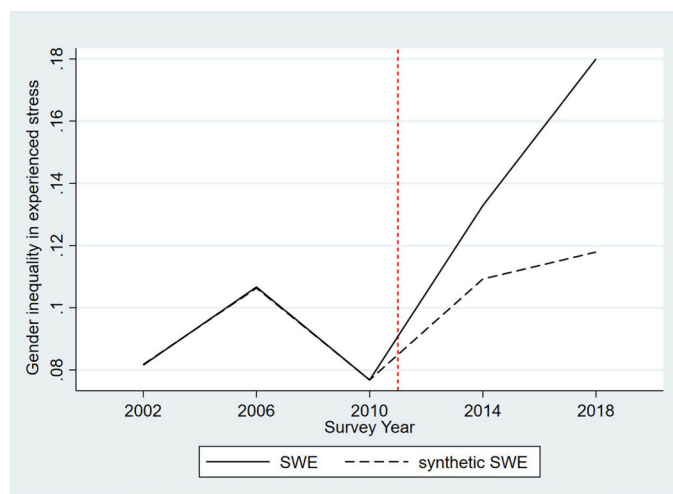


Fig. 6. Gender gap in experienced stress, Sweden vs. synthetic Sweden.

levels across the surveyed period, where positive values represent higher school-pressure levels for girls compared to boys. According to Fig. 6, immediately following the enactment of the reform package, the gender gap in experienced school-pressure was greater in Sweden than the synthetically constructed counterfactual, comprised of Wallonia Region of Belgium (.342), Czech Republic (.005) and France (.653). This counterfactual differs from our primary analysis as the above countries possessed better pre-treatment fit regarding the gender differences in experienced school-pressure between boys and girls in Sweden. As aforementioned, school-pressure levels appear to diverge prior to the implementation, which results from the four-year intervals of HBSC survey, and is therefore an artifact of our data. Fig. 6 demonstrates that the reform package was associated with an increased gender gap in experienced school-pressure levels, increasing from 8% to 18% in absolute terms, suggesting that this reform has increased the overall gender gap in experienced stress levels by 10% in absolute terms.

Three subsequent supplementary analyses were performed to further probe the robustness of our results. The two first supplementary analyses suggest that following the educational reforms, psychosomatic symptoms increased, as did perceived academic achievement or 'self-confidence'. These results further substantiate our primary findings. These analyses are attached as an appendix (see Section 7). As it is not possible to include macro-level confounders in a synthetic control, a two-way fixed regression was estimated as additional robustness tests. These models adjust for student's age, gender, academic achievement, and SES to account for compositional differences between countries. We utilised the HBSC Family Affluence Scale (FAS) as an indicator of SES. FAS is an additive index consisting of four items, measuring the number of cars and computers in the household, and whether the respondent has their own bed, and how many vacations the household has had in the last year. The FAS-index ranges from 0 to 9, with higher values indicating higher SES. FAS is a reliable proxy of social background, and possesses low numbers of missing values (Currie et al., 2008). This is attached as an appendix (see Section 7).

5. Discussion and conclusions

The point of departure for this study was the educational stressors hypothesis, contending that greater emphasis on educational policies that function as stressors contributes to higher levels of adolescent school-pressure and stress. Following this hypothesis, we argued that educational reforms which emphasize educational performance, such as the Swedish reform package of 2011, likely have a significant impact on experienced adolescent school-pressure. This reform enacted changes leading to an increased use of summative assessments, reformed grading

systems and tightened eligibility criteria in order to access national programmes in upper secondary school and university (Halapuu, 2021). This reform also made it 'easier' to fail as pupils' poorest performances became largely indicative of their overall final grade (Gustafsson et al., 2016). Against this background, the present study sought to answer two research questions: (1) Was the implementation of the Swedish reform package associated with increases in adolescent school-pressure? (2) Was the implementation of the Swedish reform package associated with an increase in the gender gap of experienced school-pressure for girls compared to boys. With regards to question 1, results demonstrated that following the implementation of the reform package, Swedish adolescents experienced an increase in school-pressure relative to the synthetic control, in which true Sweden experienced an increase in school-pressure of 8% in absolute terms. With regards to question 2, results demonstrated that the reform had a marked effect on the gender gap in experienced school-pressure levels, increasing by 10% in absolute terms, and it appears that this trend is increasing.

Our results have implications for the educational stressors hypothesis and reform packages which emphasize educational achievement under a performance-orientated model. Firstly, our results support previous findings relating to the *educational stressors hypothesis* (West and Sweeting, 2003). This hypothesis contends that contemporary schooling environments place greater emphasis on achievement, grade acquisition and performance related metrics. The Swedish reforms enacted in 2011 prioritized a focus on performance orientations under a 'performance-based model' (Wahlström and Sundberg, 2015), where achievement is evaluated by increased rates of national testing assessing knowledge requirements, output results, and reformed grading protocols and eligibility criteria's for accessing higher education. Viewed in tandem, our results add a previously uninvestigated dimension to the *educational stressors hypothesis*, by assessing the effect of educational reforms on adolescent school-pressure levels using a method previously not utilised. This approach utilising a synthetic control method, demonstrates that the Swedish reform package are associated with increased levels of school-pressure experienced by Swedish adolescents.

To further understand this cause and effect mechanism, the *stress and coping theory* contends that experiences of stress result from a dynamic interaction between an individual's environment and four previously discussed elements (Corell et al., 2021; Lazarus et al., 1984). Findings from our study indicate that the educational reform package was a substantial external stressor, as this reform prompted numerous increasing stressors on Swedish adolescents in the form of increased performance pressures as a result of increased national testing and reformed eligibility criteria's, making such tests high stakes and stress inducing. Given the high-stake nature of national testing, adolescents appraisal of such stressors can be considered maladaptive, leading to increasing stress levels. Previous research has indicated that such tests are stress inducing and lead to periods of stress, anxiety and even panic attacks (Kohn and Frazer, 1986; MacGeorge et al., 2005; Sohail, 2013). While space and data limitations preclude a deeper investigation into adolescent coping mechanisms, our findings suggest that adolescents coping strategies are likely characterized by increasing levels of self-accountability and individualized performance pressures, subsequently leading to stress reactions. Ultimately, our findings further add to this literature field, underscoring the effect performance-orientated educational reforms may have on external causes of increased school-pressure and stress on adolescents. This finding emphasizes the need to further investigate the effects such policies have on both increases in adolescent stress, and other mental health outcomes, which is currently under researched as a likely candidate for the observed increasing trends in worsening adolescent mental health (Högberg, 2021).

The educational stressors hypothesis was primarily developed to explain the relatively greater increase in mental health problems among girls (Högberg, 2021; West and Sweeting, 2003). Previous findings demonstrate that girls tend to experience school-pressure to a higher

degree than boys (Corell et al., 2021; Danielsson et al., 2012; Högborg et al., 2020; Landstedt et al., 2009). Our investigation further supports these findings, as the reform appeared to increase the gender gap in experienced school-pressure for girls compared to boys. Understanding girl's pronounced vulnerability to school-pressure is multi-factorial and requires further investigation than could be undertaken in this study.

However, previous research contends that this vulnerability likely arises for two corresponding reasons. Firstly, girls likely possess higher levels of conscientiousness in regards to school-related achievements (Giota and Gustafsson, 2017). Though boys and girls report no differences in perceived academic demands, girls report higher levels of school-pressure which appears to increase over time during secondary school (Giota and Gustafsson, 2017). Despite girls possessing higher grades than boys on average, girls likely perceive the likelihood of failure to live up to academic demands as more severe than boys, and such perceived failures may lead to loss of self-esteem generating stress (Giota and Gustafsson, 2017; Matthews et al., 2000). Therefore, in order to mitigate perceived failures to live up to academic demands, girls increase academic effort which causes achievement to be high, but simultaneously generates increased school-pressure and stress. Secondly, given historically embedded gender discrimination in the labour market, educational success is likely perceived as an essential requirement to compete in a typically male dominated sphere (Högborg, 2021; West and Sweeting, 2003). As the reform enacted reformed eligibility criteria for accessing upper secondary school, the need to obtain high academic performance outcomes was heightened, as poor performances may lead to increased fears of educational uncertainty (Giota and Gustafsson, 2017; Högborg et al., 2020). Therefore, as a result of increasing demands and a perceived need to achieve high academic success, girls may be especially vulnerable to developing increased levels of school-pressure following the reforms implemented in Sweden.

Certain interventions have been implemented in the schooling environment in order to combat increasing levels of adolescent school-pressure in other high-income countries (van Loon et al., 2020). Intervention based programmes have sought to introduce mindfulness meditation, life skills training and cognitive behavioral techniques, which provide conflicting results in terms of overall effectiveness (van Loon et al., 2020). Such approaches however, do not treat the underlying mechanism which triggers increased stress levels in adolescence, which according to our findings, stem from increasing pressures to achieve high academic success. Therefore, an effective and meaningful mitigation approach may result from policy change that addresses the underlying determinants of adolescent school-pressure. Accordingly, we propose the following two recommendations from an educational policy perspective to reduce adolescent school-pressure and subsequent stress.

Firstly, in accordance with recommendations provided by the Council of European Union (Council of European Union, 2018) an introduction of competence-orientated models of learning over performance-based models (Schneckenberg et al., 2011). Competence-orientated models seek to foster individualized learning abilities, and to "move students beyond a focus on the memorization and regurgitation of scientific facts, and better enable them to understand scientific principles and apply them" (Brauer, 2021, p. 1378). This approach highlights individual learning abilities contextually, while minimizing the need to achieve predefined knowledge requirements. Competence-orientated models of learning, though still utilising standardized tests in order to assess learning objectives, are not utilised as the primary means of assessing overall academic success, but as a means to redirect and tailor suitable individual learning needs to pupils contextually (Schneckenberg et al., 2011). Competence-orientated learning models are typically holistic in nature, enabling individuals to absorb and apply skills practically, rather than simply memorizing knowledge requirements, promoting individual abilities to learn proactively in a variety of environments (Mulder, 2012). Most importantly, this approach de-emphasizes the prioritization of knowledge requirements and high-stake testing, likely reducing test related pressure, ultimately

reducing adolescence stress.

Secondly, a de-emphasis of the importance and influence of standardized national testing. As aforementioned, national testing largely determines an individual's passing grade at the completion of secondary school. National tests also emphasize an individual's worst performance over the course of upper secondary school, as a knowledge gap or skill area significantly affects the overall grade received (Gustafsson et al., 2016). This approach likely promotes prolonged periods of stress, as such tests determine pupil's final grade, which is utilised as an academic 'sorting function'. This likely leads to compounded experiences of school-pressure and stress, as one poor performance over the course of upper secondary school greatly affects one's overall grade, and thus access to further educational programmes. A recent report published by the Official Reports of the Swedish Government from the Ministry of Education (SOU, 2020) advised an overall reform regarding the current grading system, and proposes the following changes to ensure grading equivalence. Specifically, compensatory grading should be introduced, meaning that the current grading criteria does not need to be met in its entirety, and pupils may be awarded a grade following an assessment by a teacher in correspondence to a pupil's overall knowledge of a relevant subject. We also recommend such changes, as these changes would reduce compounded experiences of school-pressure, as poor performances may be compensated by a later good performance. Therefore, poor performances do not carry as severe consequences for pupils, as the current system may have a detrimental effect on pupil's success at upper secondary school, affecting perceived opportunities for further educational and labour market access, generating stress.

6. Strengths and Limitations

This study has provided a novel approach and previously untested dimension in understanding the policy implications of increasing school-pressure among Swedish adolescents. The synthetic control approach provided an effective method in quantitatively identifying countries with similar pre-treatment characteristics, which minimizes the difference in covariate values between the treated and non-treated unit, providing a robust counterfactual in this comparative case study approach. In association with this strength, our study utilised repeated cross-sectional data over a period of approximately sixteen years, enabling this study to detect developments and changes in the characteristics of the target population at both the group and the individual level overtime in regards to school-pressure following the implementation of the 2011 reforms.

The results of this study should however be interpreted while taking its limitations into account. Firstly, our investigation utilised only one measure to account for school-pressure, which likely does not account for the full complexity of adolescent stress (Byrne et al., 2007; Löfstedt et al., 2020, 2020). Further, this item is self-reported, meaning that changes in school-pressure levels may reflect shifts in cultural or reporting practices (Bor et al., 2014; Collishaw, 2015). This is unlikely however, given that we assess changes over time within countries, meaning these cultural factors will be held constant and reflects the strength of employing a synthetic control approach in this study. Secondly, the response rate at the school level of the HBSC has declined in Sweden during the 2014–18 period, raising questions of non-response bias. However, previous analyses have not found any systematic differences between participating and non-participating schools in terms of non-participation, geographical location, or public or private management (Public Health Agency of Sweden, 2018). Thirdly, given the complexity and multi-factorial nature of educational reforms, it was not possible to determine if and how other reforms implemented in the donor-pool countries utilised for this investigation may have impacted our results. Specifically, our results demonstrated that certain countries also possessed increasing rates of school-pressure, which may be accounted for by implementing similar educational reform policies that mimic the reform package in Sweden. According to Abadie and

Gardeazabal (2003), any control unit that shares a similar implementation should be dropped from the analysis, as similar interventions to those being tested will interfere and distort the results. Such an inclusion was not possible in our investigation however, as such policies are wide ranging and complex, and were unable to be qualitatively determined to be similar to that of the Swedish reform package. Therefore, though our results demonstrate a positive effect on school-pressure following the reform package, and continued to demonstrate this effect following the iterative placebo tests, this omission should nonetheless be considered in terms of its possible distortion of the results.

Funding

The work on this article (planning, analysis and writing) was funded by the VR, the Swedish Research Council (grant number 2018-03870) and Forte, the Swedish Research Council for Health, Working Life and Welfare (2022-01062).

Conflict of Interest

The authors have no relevant financial or non-financial interests to disclose.

Acknowledgements

The synthetic control analysis code was developed from Abadie, A., Diamond, A. & Hainmueller, J. (2011). "SYNTH: Stata module to implement Synthetic Control Methods for Comparative Case Studies," Statistical Software Components S457334, Boston College Department of Economics, revised 09 May 2020.

Code availability

All code used to generate the results are available on request from the corresponding author.

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at [doi:10.1016/j.ijedudev.2023.102922](https://doi.org/10.1016/j.ijedudev.2023.102922).

References

- Abadie, A., Gardeazabal, J., 2003. The economic costs of conflict: a case study of the Basque country. *Am. Econ. Rev.* 93 (1), 113–132. <https://doi.org/10.1257/000282803321455188>.
- Abadie, A., Diamond, A., Hainmueller, J., 2015. Comparative politics and the synthetic control method: comparative politics and the synthetic control method. *Am. J. Political Sci.* 59 (2), 495–510. <https://doi.org/10.1111/ajps.12116>.
- Banks, J., Smyth, E., 2015. 'Your whole life depends on it': academic stress and high-stakes testing in Ireland. *J. Youth Stud.* 18. <https://doi.org/10.1080/13676261.2014.992317>.
- Bor, W., Dean, A.J., Najman, J., Hayatbakhsh, R., 2014. Are child and adolescent mental health problems increasing in the 21st century? A systematic review. *Aust. N. Z. J. Psychiatry* 48 (7), 606–616. <https://doi.org/10.1177/0004867414533834>.
- Collishaw, S., 2015. Annual research review: secular trends in child and adolescent mental health. *J. Child Psychol. Psychiatry* 56 (3), 370–393. <https://doi.org/10.1111/jcpp.12372>.
- Council of European Union, 2018. Council Recommendation of 22 May 2018 on key competences for lifelong learning Text with EEA relevance. *Off. J. Eur. Union*, C. 189 1.
- Brandén, M., & Bygren, M. (2018). School Choice and School Segregation: Lessons from Sweden's School Voucher System. The Institute of Analytical Sociology. (<https://www.diva-portal.org/smash/get/diva2:1218847/FULLTEXT02.pdf>).
- Brauer, S., 2021. Towards competence-oriented higher education: a systematic literature review of the different perspectives on successful exit profiles. *Educ. + Train.* 63 (9), 1376–1390. <https://doi.org/10.1108/ET-07-2020-0216>.
- Byrne, D.G., Davenport, S.C., Mazanov, J., 2007. Profiles of adolescent stress: the development of the adolescent stress questionnaire (ASQ). *J. Adolesc.* 30 (3), 393–416. <https://doi.org/10.1016/j.adolescence.2006.04.004>.
- Corell, M., Friberg, P., Löfstedt, P., Petzold, M., Chen, Y., 2021. Subjective health complaints in early adolescence reflect stress: a study among adolescents in Western Sweden, 546–523. *Scand. J. Public Health* 50 (4). <https://doi.org/10.1177/14034948211008555>.
- Cosma, A., Stevens, G.W.J.M., Vollebergh, W.A.M., De Looze, M., 2021. Time trends in schoolwork pressure among Dutch adolescents, 2001–2017: gender and educational differences. *Scand. J. Public Health* 50 (5), 538–541. <https://doi.org/10.1177/14034948211018388>.
- Cunningham, S., 2021. Synthetic Control & Causal Inference. Yale University Press. (<https://mixtape.scunning.com/synthetic-control.html>).
- Currie, C., Molcho, M., Boyce, W., Holstein, B., Torsheim, T., Richter, M., 2008. Researching health inequalities in adolescents: the development of the Health Behaviour in School-Aged Children (HBSC) family affluence scale. *Soc. Sci. Med.* 66 (6), 1429–1436. <https://doi.org/10.1016/j.socscimed.2007.11.024>.
- Danielsson, M., Heimerson, I., Lundberg, U., Perski, A., Stefansson, C.-G., Åkerstedt, T., 2012. Psychosocial stress and health problems: health in Sweden: the National Public Health Report 2012. Chapter 6. *Scand. J. Public Health* 40 (9), 121–134. <https://doi.org/10.1177/1403494812459469>.
- Denscombe, M., 2000. Social conditions for stress: young people's experience of doing GCSEs. *Br. Educ. Res. J.* 26, 359–374. <https://doi.org/10.1080/713651566>.
- DiPrete, T.A., Buchmann, C., 2013. The Rise of Women: The Growing Gender Gap in Education and What It Means for American Schools. Russell Sage Foundation.
- Elstad, J.I., 2010. Indirect health-related selection or social causation? Interpreting the educational differences in adolescent health behaviours. *Soc. Theory Health* 8 (2), 134–150. <https://doi.org/10.1057/sth.2009.26>.
- Eriksen, I.M., 2021. Class, parenting and academic stress in Norway: middle-class youth on parental pressure and mental health. *Discourse: Stud. Cult. Polit. Educ.* 42 (4), 602–614. <https://doi.org/10.1080/01596306.2020.1716690>.
- Erskine, H.E., Moffitt, T.E., Copeland, W.E., Costello, E.J., Ferrari, A.J., Patton, G., Degenhardt, L., Vos, T., Whiteford, H.A., Scott, J.G., 2015. A heavy burden on young minds: The global burden of mental and substance use disorders in children and youth. *Psychol. Med.* 45 (7), 1551–1563. <https://doi.org/10.1017/S0033291714002888>.
- Giota, J., Gustafsson, J.-E., 2017. Perceived demands of schooling, stress and mental health: changes from grade 6 to grade 9 as a function of gender and cognitive ability. *Stress Health: J. Int. Soc. Investig. Stress* 33 (3), 253–266. <https://doi.org/10.1002/smi.2693>.
- Giota, J., Gustafsson, J.-E., 2020. Perceived academic demands, peer and teacher relationships, stress, anxiety and mental health: changes from grade 6 to 9 as a function of gender and cognitive ability. *Scand. J. Educ. Res.* 65 (6), 1–16. <https://doi.org/10.1080/00313831.2020.1788144>.
- Gustafsson, J.-E., Sörin, S., Vlachos, J., 2016. Policyidéer för svensk skola. E-print, Stockholm.
- Halapuu, V. (2021). Upper Secondary Education: Access, Choices and Graduation [Uppsala University]. (<http://urn.kb.se/resolve?urn=urn:nbn:se:uu:diva-441900>).
- Hiltunen, L. (2017). Just right: Experiences of ill health among young girls and boys. Arkiv förlag. (<http://ebookcentral.proquest.com/lib/umeau-ebooks/detail.action?docId=5380068>).
- Högberg, B., 2021. Educational stressors and secular trends in school stress and mental health problems in adolescents. *Soc. Sci. Med.* 270, 113616. <https://doi.org/10.1016/j.socscimed.2020.113616>.
- Högberg, B., Strandh, M., Hagquist, C., 2020. Gender and secular trends in adolescent mental health over 24 years—the role of school-related stress. *Soc. Sci. Med.* (1982) 250, 112890. <https://doi.org/10.1016/j.socscimed.2020.112890>.
- Huan, V., Yeo, L.S., Ang, R., Chong, W.H., 2006. The influence of dispositional optimism and gender on adolescents' perception of academic stress. *Adolescence* 41, 533–546.
- Inchley, J., Currie, D., Budisavljevic, S., Torsheim, T., Jästad, A., Cosma, A., Kelly, C., Már Arnarsson, A., Samdal, O. (2020). Spotlight on adolescent health and well-being: Findings from the 2017/2018 Health Behaviour in School-aged Children (HBSC) survey in Europe and Canada international report (Volume 2). WHO Regional Office for Europe. <https://apps.who.int/iris/bitstream/handle/10665/332104/9789289055017-eng.pdf>.
- Karatekin, C., 2018. Adverse Childhood Experiences (ACEs), stress and mental health in college students. *Stress Health* 34 (1), 36–45. <https://doi.org/10.1002/smi.2761>.
- Karvonen, S., Vikat, A., Rimpelä, M., 2005. The role of school context in the increase in young people's health complaints in Finland. *J. Adolesc.* 28 (1), 1–16. <https://doi.org/10.1016/j.adolescence.2004.05.006>.
- Klinger, D.A., Freeman, J.G., Bilz, L., Liiv, K., Ramelow, D., Sebok, S.S., Samdal, O., Dür, W., Rasmussen, M., 2015. Cross-national trends in perceived school pressure by gender and age from 1994 to 2010. *Eur. J. Public Health* 25 (Suppl 2), 51–56. <https://doi.org/10.1093/eurpub/ckv027>.
- Kohn, J.P., Frazer, G.H., 1986. An academic stress scale: identification and rated importance of academic stressors. *Psychol. Rep.* 59 (2), 415–426. <https://doi.org/10.2466/pr0.1986.59.2.415>.
- Läftman, S., Almqvist, Y., Östberg, 2013. Students' accounts of school-performance stress: a qualitative analysis of a high-achieving setting in Stockholm, Sweden. *J. Youth Stud.* 16. <https://doi.org/10.1080/13676261.2013.780126>.
- Lal, K., 2014. Academic stress among adolescent in relation to intelligence and demographic factors. *Am. Int. J. Res. Hum. Arts Soc. Sci.* 5 (1), 123–129.
- Landstedt, E., Asplund, K., Gådin, K.G., 2009. Understanding adolescent mental health: The influence of social processes, doing gender and gendered power relations. *Sociol. Health Illn.* 31 (7), 962–978. <https://doi.org/10.1111/j.1467-9566.2009.01170.x>.
- Lazarus, R., S. Folkman, S., 1984. Stress, Appraisal, and Coping. Springer Publishing Company.

- Löfgren, H., Löfgren, R., 2015. Alone with the test—students' perspectives on an enacted policy of national testing in Swedish schools. *Utbild. Och Lärande / Educ. Learn.* 9 (2), 34–49.
- Löfstedt, P., García-Moya, I., Corell, M., Paniagua, C., Samdal, O., Välimaa, R., Lyyra, N., Currie, D., Rasmussen, M., 2020. School satisfaction and school pressure in the WHO European Region and North America: an analysis of time trends (2002–2018) and patterns of co-occurrence in 32 countries. *J. Adolesc. Health* 66 (6, Suppl.), S59–S69. <https://doi.org/10.1016/j.jadohealth.2020.03.007>.
- van Loon, A., Creemers, H.E., Beumer, W., Okorn, A., Vogelaar, S., Saab, N., Miers, A., Westenberg, P., Asscher, J.J., 2020. Can schools reduce adolescent psychological stress? A multilevel meta-analysis of the effectiveness of school-based intervention programs. *J. Youth Adolesc.* 49. <https://doi.org/10.1007/s10964-020-01201-5>.
- Lundahl, C., Hultén, M., Tveit, S. (2016). Betygssystem i internationell belysning. Skolverket. (<http://urn.kb.se/resolve?urn=urn:nbn:se:liu:diva-136111>).
- MacGeorge, E.L., Samter, W., Gillihan, S.J., 2005. Academic stress, supportive communication, and health. *Commun. Educ.* 54 (4), 365–372. <https://doi.org/10.1080/03634520500442236>.
- Matthews, G., Davies, D.R., Stammers, R.B., & Westerman, S.J. (2000). Human Performance: Cognition, Stress, and Individual Differences. Psychology Press.
- Moksnes, U.K., Løhre, A., Lillefjell, M., Byrne, D.G., Haugan, G., 2016. The association between school stress, life satisfaction and depressive symptoms in adolescents: life satisfaction as a potential mediator. *Soc. Indic. Res.* 125 (1), 339–357. <https://doi.org/10.1007/s11205-014-0842-0>.
- Moor, I., Winter, K., Bilz, L., Bucksch, J., Finne, E., John, N., Kolip, P., Paulsen, L., Ravens-Sieberer, U., Schlattmann, M., Sudeck, G., Brindley, C., Kaman, A., Richter, M., 2020. The 2017/18 Health Behaviour in School-aged Children (HBSC) study – methodology of the World Health Organization's child and adolescent health study. *J. Health Monit.* 5 (3), 88–102. <https://doi.org/10.25646/6904>.
- Mulder, M., 2012. Competence-based education and training. *J. Agric. Educ. Ext.* 18 (3), 305–314. <https://doi.org/10.1080/1389224X.2012.670048>.
- Nygren, K., Hagquist, C., 2019. Self-reported school demands and psychosomatic problems among adolescents – changes in the association between 1988 and 2011? *Scand. J. Public Health* 47 (2), 174–181. <https://doi.org/10.1177/1403494817725687>.
- Östberg, V., Almquist, Y.B., Folkesson, L., Låftman, S.B., Modin, B., Lindfors, P., 2015. The complexity of stress in mid-adolescent girls and boys. *Child Indic. Res.* 8 (2), 403–423. <https://doi.org/10.1007/s12187-014-9245-7>.
- Pekkarinen, T., 2012. Gender differences in education. *Nord. Econ. Policy Rev.* 1, 1–38. <https://doi.org/10.2139/ssrn.2019442>.
- Potrebny, T., Wiium, N., Lundegård, M.M.-I., 2017. Temporal trends in adolescents' self-reported psychosomatic health complaints from 1980–2016: a systematic review and meta-analysis. *PLoS One* 12 (11), 1–24. <https://doi.org/10.1371/journal.pone.0188374>.
- Public Health Agency of Sweden. (2018). Skolbarns hälsovanor i Sverige 2017/2018 – grundrapport—Folkhälsomyndigheten (p. 144). (<https://www.folkhalsomyndigheten.se/publicerat-material/publikationsarkiv/s/skolbarns-halsovanor-i-sverige-201718—grundrapport/>).
- Putwain, D.W., 2009. Assessment and examination stress in Key Stage 4. *Br. Educ. Res. J.* 35 (3), 391–411. <https://doi.org/10.1080/01411920802044404>.
- Rönnerberg, L., Lindgren, J., Lundahl, L., 2019. Education governance in times of marketization. In: Langer, R., Brüsemeister, T. (Eds.), *Handbuch Educational Governance Theorien*. Springer Fachmedien, pp. 711–727. https://doi.org/10.1007/978-3-658-22237-6_31.
- Schneckenberg, D., Ehlers, U., Adelsberger, H., 2011. Web 2.0 and competence-oriented design of learning—potentials and implications for higher education. *Br. J. Educ. Technol.* 42 (5), 747–762. <https://doi.org/10.1111/j.1467-8535.2010.01092.x>.
- Seiffge-Krenke, I., Aunola, K., Nurmi, J.-E., 2009. Changes in stress perception and coping during adolescence: the role of situational and personal factors. *Child Dev.* 80 (1), 259–279. <https://doi.org/10.1111/j.1467-8624.2008.01258.x>.
- Smyth, E., Banks, J., 2012. There was never really any question of anything else: young people's agency, institutional habitus and the transition to higher education. *Br. J. Sociol. Educ.* 33 (2), 263–281. <https://doi.org/10.1080/01425692.2012.632867>.
- Sohail, N., 2013. Stress and academic performance among medical students. *J. Coll. Physicians Surg. Pak.* 23 (1), 67–71. <https://doi.org/10.1013/JCPS.6771>.
- Sonmark, K., Modin, B., 2016. Psychosocial work environment in school and students somatic health complaints: an analysis of buffering resources. *Scand. J. Public Health* 45, 64–72. <https://doi.org/10.1177/1403494816677116>.
- SOU. (2020). Build, assess, grade—Grades that better correspond to students' knowledge. SOU 2020: Report from the Grading Survey 2018 (U 2018: 03). Elanders Sverige AB, Stockholm.
- Swedish Public Health Agency. (2018, May 22). Child and adolescent health—The Public Health Agency of Sweden. (<https://www.folkhalsomyndigheten.se/the-public-health-agency-of-sweden/living-conditions-and-lifestyle/child-and-adolescent-health/>).
- Sweeting, H., West, P., Young, R., Der, G., 2010. Can we explain increases in young people's psychological distress over time? *Soc. Sci. Med.* 71 (10), 1819–1830. <https://doi.org/10.1016/j.socscimed.2010.08.012>.
- Von der Embse, N., Jester, D., Roy, D., Post, J., 2017. Test anxiety effects, predictors, and correlates: a 30-year meta-analytic review. *J. Affect. Disord.* 227, 483–493. <https://doi.org/10.1016/j.jad.2017.11.048>.
- Wahlström, N., & Sundberg, D. (2015). A theory-based evaluation of the curriculum Lgr 11 (2015:7; pp. 1–24). Institute for Labor Market and Education Policy Evaluation. (<https://www.ifau.se/globalassets/pdf/se/2015/r-2015-07-teoribaserad-utvardering-av-larooplanen-lgr11.pdf>).
- West, P., Sweeting, H., 2003. Fifteen, female and stressed: changing patterns of psychological distress over time. *J. Child Psychol. Psychiatry Allied Discip.* 44 (3), 399–411. <https://doi.org/10.1111/1469-7610.00130>.