Original Article

Factors Associated with School Engagement Changes During the COVID-19 Pandemic Among Finnish Middle School Students

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Abstract: *Introduction*: "School engagement" refers to the feelings and thoughts pupils have for school, which, according to theory, can be divided into behavioral, cognitive, and emotional engagement. Previously identified factors predicting school engagement are teacher-student relationship, individual characteristics, emotional stability, and gender. *Aim:* The current study addresses changes in behavioral, cognitive, and emotional school engagement during the COVID-19 pandemic. It analyzes the effect of previously identified risk factors on self-reported change in school engagement among middle-school students in Finland. *Methods:* We collected the data in the spring of 2021. Participants were 1,788 Finnish middle-school pupils (age range 12–17) who responded to an online survey during the school day. *Results:* After we controlled for multiple tests, the results revealed a few significant factors associated with negative changes in school engagement. However, prior anxiety, depression, or externalizing behavior were related to negative changes. *Discussion:* Pupils with previous risk factors for low engagement or different kinds of struggles in school were more likely to react negatively to the changes brought forth by the pandemic on several engagement outcomes compared to students with few or no risk factors. In the future, should disruptions of normal school routines be necessary, special attention should be given to planning proper support for at-risk students.

Keywords: COVID-19 pandemic, school engagement, school attendance problems, risk factor, adolescents

Introduction

The COVID-19 pandemic disrupted children, families, and schooling, which presented school communities worldwide with an unequaled challenge (Gassman-Pines et al., 2022; Nickerson & Sulkowski, 2021). Despite being relatively protected from the disease themselves, adolescents suffered from restrictions such as physical distancing caused by the disruptions. Their academic and social functioning were especially affected (Lessard & Puhl, 2021). Children and adolescents endured considerably altered school and social dynamics, such as being moved to emergency remote learning, isolation from social supports and community resources, significant changes in classroom configurations and lunch gatherings, and cancellations of numerous in-school activities and events (Herbers et al., 2021; Lessard & Puhl, 2021). Many of these could have impacted students' school engagement.

In Finland, in early 2020, health authorities and the government responded to the infection by recommending people reduce their face-to-face interactions. Lockdowns of diverse activities and school closures soon followed. School shutdowns were implemented in March 2020, and many schools remained closed until May when some schools gradually reopened. Most teaching was then transferred to digital platforms. Children with special needs were granted regular schooling, often in special units or classes. In international comparisons, the epidemic burden proved to be relatively low in Finland. No nationwide school closures were implemented during the second and subsequent waves of the pandemic. However, based on the local epidemic situation, temporary local and regional school closures of varying durations continued under the guidance of local governments and the Regional State Administrative Agencies (Rimpelä et al., 2023).

School Engagement

School engagement, sometimes also referred to as student engagement, is a broad concept that entails involvement and interest in learning as well as the experience of connectedness within the school environment (Axelson & Flick, 2010). Previous research indicates that school engagement is plastic and predicts students' academic success, while

also being a protective factor against negative academic outcomes. The benefits of engagement extend well beyond school and have attracted attention from researchers and educators thanks to its high predictive power for several developmental and educational outcomes (Lam et al., 2014). According to Lam et al., most contemporary researchers agree that student engagement is a meta construct involving several dimensions of school involvement or the commitment to learning. The dimensions usually included in definitions of school engagement are behavioral, emotional, and cognitive engagement (Hazel et al., 2014; Lam et al., 2014; Skinner et al., 2016). This study uses a conceptualization of school engagement that includes these three dimensions.

Behavioral engagement includes factors such as students' conduct in school, effort, task completion, attendance, persistence, concentration, and contributions in class (Hazel et al., 2014; Lam et al., 2014). *Emotional engagement* includes a sense of belonging, interest in learning, students' attachment to their teachers and peers, and feelings about academics and school in general (Hazel et al., 2014; Lam et al., 2014). *Cognitive engagement* includes motivation, the use of learning strategies, the execution of a particular work style, and self-regulated learning (Hazel et al., 2014; Lam et al., 2014).

Studies have shown that areas such as grades, conduct at school, level of self-esteem, well-being, and socially appropriate behaviors seem to be associated with the level of school engagement (Hazel et al., 2014; Lam et al., 2014). High engagement in school is associated with positive outcomes such as academic success, physical and mental health, and social connectedness, whereas low school engagement is associated with negative outcomes such as school attendance problems, academic failure, mental health problems, and impaired socioemotional development (Allison et al., 2019; Ansari & Gottfried, 2021; Kearney, 2022). Being a boy and having a low socioeconomic status have also been linked with low engagement (Li & Lerner, 2011). Furthermore, early research anticipated increased school attendance problems following the COVID-19 pandemic (Nathwani et al., 2021). We considered it important to measure change in school engagement because of this anticipated increase and the general overlap between risk factors related to COVID-19 and factors involved in school engagement.

Risk Factors Associated with Schooling During the COVID-19 Pandemic

The COVID-19 pandemic was not only disadvantageous for individuals with genetic factors, such as asthma (López-Tiro et al., 2022) or being overweight (Rajiva et al., 2021), which put them particularly at risk of experiencing more severe symptoms (López-Tiro et al., 2022; Nickerson & Sulkowski, 2021; Rajiva et al., 2021). The risks of COVID-19, combined with disruptions of everyday life and general uncertainty, affected families in several ways (Gassman-Pines et al., 2022; Nickerson & Sulkowski, 2021). Changes in the socioeconomic status of families because of employment and unstable earnings became a reality for many (Gassman-Pines et al., 2022). The impact of the pandemic also led to changes in social and academic functioning (Gassman-Pines et al., 2022; Lessard & Puhl, 2021; Nickerson & Sulkowski, 2021) and a decrease in mental health because of, among other things, increased stress (Clemens et al., 2020).

Many of the negative consequences of the pandemic overlap with risk factors for low school engagement. For example, research indicates that levels of anxiety, depression, and panic symptoms have increased in children and adolescents when we compare pre-COVID-19 to postconfinement results (Shoshani & Kor, 2022). Among adolescents, especially girls, there was a significant increase in internalizing symptoms during (and after) the pandemic (Kiviruusu et al., 2024) and an increase in externalizing symptoms, especially among boys (Levante et al., 2023). Somatic symptoms, often found in conjunction with both internalizing and externalizing symptoms (reviewed in, among others, Bohman et al., 2018), increased during the pandemic among Finnish adolescents who experienced school closure (Rimpelä et al., 2023) and are important previously identified risk factors (PIRFs) to consider, also because of the association with absence from school (Pijl et al., 2021). Students with disabilities were reported to have gained the most from receiving social support for their learning engagement during the pandemic; however, not all students received such support (Smith et al., 2023).

These trends are concerning since anxiety, depression, and conduct disturbances were previously linked to poor attendance at school (Allison et al., 2019; Finning et al., 2019; Li & Lerner, 2011). Youth with pre-existing mental health challenges and transgender youth were identified as being at a greater risk of disruption during the COVID-19 pandemic (Hawke et al., 2021).

Another concerning consequence of the pandemic lay in the alterations to social connectedness. In an early meta-analysis, loneliness increased during the COVID-19 pandemic among students and adults (Ernst et al., 2022). A later meta-analysis on child and adolescent loneliness during the pandemic reported that over half of the population displayed at least moderate levels of loneliness during the pandemic, and that levels had increased significantly (Farrell et al., 2023).

Furthermore, the COVID-19 pandemic may also have been particularly disadvantageous for individuals already

experiencing significant adversities prior to the pandemic, such as those mentioned above (Nickerson & Sulkowski, 2021).

The Present Study

The present study explores the effects of the COVID-19 pandemic on school engagement in Finnish youth with prior known risk factors. We wanted to add to the research in this field by analyzing data collected in Finnish schools in the spring of 2021, while the pandemic was ongoing. Previous research has identified several risk factors for lowered school engagement and attendance problems. We hypothesized that students experiencing previously identified risk factors for school attendance problems during the COVID-19 pandemic would negatively affect their school engagement. This study focuses on the impact of PIRFs on school engagement during the COVID-19 pandemic, while also controlling for other known factors, such as socioeconomic background. The PIRFs included in the data collection were the following: ADHD, autism, cancer, diabetes, asthma, being overweight, having allergies, depression, anxiety, conduct problems, stress, stomach issues, headaches, trouble sleeping, hearing impairments, mobility impairments, and visual impairments. Because of the low occurrence of single PIRFS, we grouped these PIRFS into the following: neurodivergent, anxiety/depression, externalizing symptoms, severe illness, somatic symptoms, other conditions, and physical impairments (see Method for details). We expected that many students might report no significant change, at least partly because they did not experience any prior known risk factors.

Method

Participants

The collected sample had N = 2,137 completed responses. However, 349 participants were excluded, 25 because of deviating age, and 324 because of too many missing values. The final sample size was thus N = 1,788 (see Data Analyses for how we handled missing data). The participants had an average age of 14.95 (SD = 0.86). Their self-reported gender was boy (46.3%, n = 827), girl (51.2%, n = 916), or other (2.5%, n = 45). The students also self-reported the highest level of education of each parent: comprehensive school (level 1, 2.7%, n = 49), upper secondary, high school, vocational school or equivalent (level 2, 35.3%, n = 632), university or university of applied sciences or other higher education institution (level 3, 61.1%, n = 1,093), or none of the above (0.8%, n = 14). For the statistical analyses, we used the level of whichever parent had the highest educational level. Living arrangements were reported as living with both parents in the same household (76.2%, n = 1,363), with one parent (9%, n = 161), interchangeably with both parents (13.6%, n = 244), residential childcare community (0.6%, n = 10), or other (0.6%, n = 10).

Procedure

The current study is based on data from the project "School Absence in Finland." The participants were recruited through middle schools in Finland during the spring of 2021, with the data collection occurring in May 2021. We approached the schools through email, starting in January 2021.

The 15 schools participating in the study stem from western and southern Finland. We collected the student data in the schools during the school day; we informed their parents about the study via the school's email. Parents were asked to give their informed consent for their child to participate, which was collected and checked by the school staff at the time of data collection. Students also gave their consent, and students older than 15 years did not need parental consent. We collected the survey data from youths during school time, in May 2021. To obtain the data on persistently absent students, the school personnel contacted absent students, went to their houses if needed, and filled in the questionnaires together with the students, if they needed help. In total, 42 responses were collected this way.

Ethical permission was obtained from the Åbo Akademi University Ethical Board (26 June 2019).

Design, Instruments, and Measures

The current study is a cross-sectional study with self-reported data. In the survey, students in middle school reported whether they had any PIRFs for low school engagement. We then examined whether these PIRFs or other known predictors of low school engagement were linked to change in school engagement during the COVID-19 pandemic.

The outcome variables consisted of 10 items designed to tap into the three dimensions of school engagement, in other words, behavioral engagement, emotional engagement, and cognitive engagement (see Figure 1). Behavioral engagement variables are related to, for instance, absence from school (I attend school), emotional feelings about liking school or feelings related to school ("I feel lonely"), and cognitive performance ("My test results"). We then used a Likert scale with the following options – *much more before*, *somewhat more before*, *as much now as before*, *somewhat more now*, and *much more now* – to measure the perceived change in school engagement from pre-COVID levels to the level

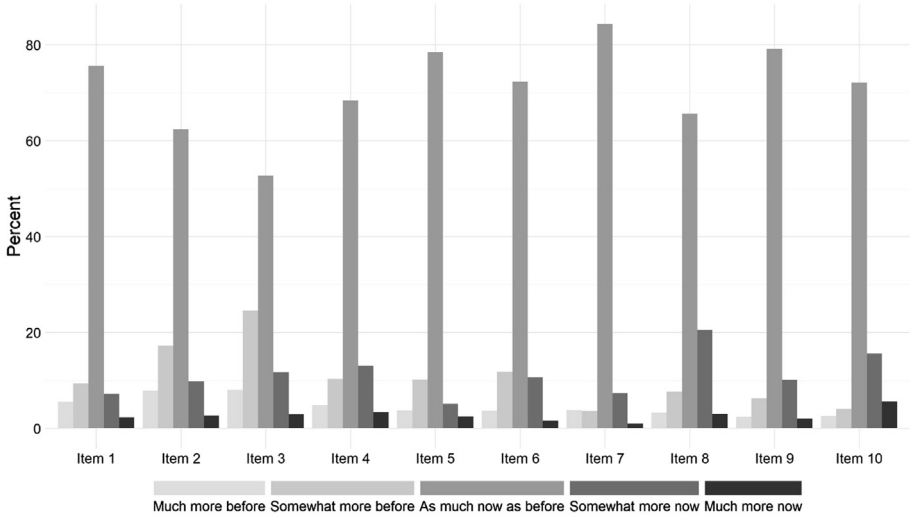

Figure 1. Distribution of replies per outcome variable. We created 10 items for this study to measure change in school engagement. This figure presents the distribution of replies per item. Item 1 = At least one adult in school cares about me, item 2 = I like it in school, item 3 = My test results, item 4 = I feel lonely, item 5 = I attend school, item 6 = I am ill, item 7 = I skip school, item 8 = I skip school because of symptoms of illness/quarantine, item 9 = I am absent because of other reasons, item 10 = I find it difficult to attend school because I get anxious/sad/stressed out.

on the day of data collection. We measured change since we could not access a prepandemic data collection.

The predictors in our study were the PIRFs and other previously identified factors associated with low school engagement and/or with more severe COVID-19 symptoms, which we hypothesized would affect school engagement.

Previously Identified Risk Factors (PIRFs)

The PIRFs included in the data collection were the following: ADHD, autism, cancer, diabetes, asthma, being overweight, having allergies, depression, anxiety, conduct problems, stress, stomach issues, headaches, trouble sleeping, hearing impairments, mobility impairments, and visual impairments. When presented in the survey, the respondents were asked to tick a box for each PIRF that was relevant to them.

The PIRFs yielded relatively small groups on their own; as an example, only 10 participants reported only autism spectrum disorder (ASD), 96 attention-deficit hyperactivity disorder (ADHD), and 8 both ASD and ADHD (see Table 1). To enable statistical analyses, we grouped PIRFs. Below, we present the PIRF groups created and the reasoning behind them. We needed larger sample sizes for the analyses, but, unfortunately, natural groups were difficult to form in some cases. We grouped ADHD and ASD, since both are neurodivergent and sometimes comorbid conditions (Ronald et al., 2014). We grouped depression and anxiety together, as both are internalized symptoms of mental health issues and are often comorbid (Cummings et al., 2014). We analyzed conduct problems on their own, and we categorized conduct problems as externalized symptoms. We grouped hearing impairments and mobility impairments together as physical impairments. We did not know what level of impairments or disabilities the students had. Visual impairments were excluded from this group, because the questionnaire did not distinguish between having corrected for the impairment with glasses or contact lenses and more severe impairments such as blindness. We chose to group cancer together with diabetes as severe illnesses, to distinguish them from milder conditions such as stress, allergies, or asthma. Stress and somatic symptoms such as stomach issues, headache, and trouble sleeping we grouped as somatic symptoms (Berg et al., 2022).

Asthma, being overweight, and having allergies were grouped as other conditions. When the COVID-19 pandemic first broke out, the initial hypothesis was that allergies and asthma could increase the risk of COVID-19 infection (De Filippo et al., 2021). According to the Finnish Institute for Health and Welfare (2023), having asthma and being overweight are associated with an increased risk of severe COVID-19 symptoms. We reason that, since all of these three PIRFs have at some point been hypothesized to be linked to more severe symptoms of COVID-19, and since both having allergies and asthma are chronic conditions, they could be argued to cause similar kinds of distress during the pandemic. For this reason, we chose to group them together (see Table 1 for the complete PIRF groups).

Other Known Risk Factors

We controlled for socioeconomic factors such as living arrangements and parental level of education in the analyses. We further studied whether gender or grades could explain some of the variance, since previous research has linked gender (Li & Lerner, 2011) and grades (Hazel et al., 2014) with school engagement.

Ethics and Consent

Participation in the study was voluntary. We provided information about the study aims and data security and obtained informed consent from parents and children. The personal

Table 1. Distribution of previously identified risk factors in sample

PIRF	Yes		No	
	n	%	*n*	%
ADHD/ASD	114	6.8	1,674	93.2
ADHD	*96*			
ASD	*10*			
Both	*8*			
Anxiety/depression	343	23.7	1,445	76.3
Anxiety	*225*			
Depression	*38*			
Both	*80*			
Externalizing symptoms	37	2.1	1,751	97.9
Severe illness	16	0.9	1,772	99.1
Cancer	*1*			
Diabetes	*11*			
Both	*4*			
Somatic symptoms	715	66.6	1,073	33.4
Stress	*193*			
Stomach	*23*			
Headache	*129*			
Sleep	*59*			
Multiple	*311*			
Other conditions	556	45.1	1,232	54.9
Asthma	*42*			
Overweight	*42*			
Allergies	*367*			
Multiple	*105*			
Physical impairments	53	3.1	1,735	96.9
Hearing	*38*			
Mobility	*9*			
Both	*6*			

Note. Distribution of answers regarding previously identified risk factors (PIRFs) in our sample. When filling out the questionnaire, the adolescents were asked whether they had any PIRFs linked to school attendance problems. This table shows the total size of the PIRF groups after grouping similar PIRFs under "Yes" and the total size of the group that did not report having any PIRFs included in a group under "No." The group called severe illness includes students reporting that they have cancer and/or diabetes. The group called somatic symptoms include stress, stomach issues, headaches, and trouble sleeping. Other conditions include allergies, asthma, and being overweight. Physical impairments include mobility impairments and hearing impairments. The reasoning behind the groups can be found under Design, Instruments, and Measures.

identity of the students remains confidential. We present all gathered data in an anonymous form. Parents and children were offered the option to not participate.

Statistical Analyses

We performed all data preparation and analyses using R version 4.0.2, utilizing R-Studio version 1.3. We used the R package *tidyverse* (Wickham et al., 2019) for data handling and plotting. We handled missing data using the *mice* package (van Buuren and Groothuis-Oudshoorn, 2011) and the *VIM* packages (Kowarik & Templ, 2016). Data were missing at random, so we conducted multivariate imputation, which is the preferred method of dealing with missing data over listwise deletion (removing participants that have any missing data on any variable), as listwise deletion leads to unnecessary loss of statistical power and may introduce bias in the results (van Ginkel et al., 2020; Woods et al., 2024).

We imputed missing values using polytomous logistic regression for highest education, gender, and age and predictive mean matching for all other variables, to create a complete dataset. The final sample size after imputation was N = 1,788; 975 respondents had no missing values, 142 had one, 591 had two, and 80 participants had 3–10 missing values.

We used linear mixed effects models to compare the chosen predictors (PIRF groups) on the ten school engagement items using the *ImerTest* package (Kuznetsova et al., 2017). We included living arrangements, gender, grades, and the highest level of education for the parent and age in all models. The adolescent's school was included as a random intercept to control for variations between schools. The variance of the random effect of school was negligible, ranging from 0.00 to 0.03 (intraclass correlation, ICC: 0.00–0.03). Thus, we found no substantial differences between schools. We determined statistical significance using a threshold of $p < .05$. We applied Bonferroni corrections to adjust for multiple comparisons by multiplying the original p-values with the number of tests used, ten in total.

Results

The most frequent reply on all items was that no change had occurred, as Figure 1 presents. This affected the likelihood of statistically significant results of change. First, we present statistically significant ($p < .05$) results for the PIRFs, then we move on to results for gender and grades. For detailed statistical results, see Table 2. Regarding the PIRFs, we compared students who reported having a PIRF and the group of students who reported not having one. A total of 16 different predictors yielded statistically significant results on at least one outcome variable (see Table 2). We do not report results that were not statistically significant because of the large number of predictors and outcome variables that make it unfeasible.

Statistically Significant PIRF Results

Students who reported having ADHD or ASD and those who did not did not differ on any of the outcome variables. Students who reported having anxiety and/or depression and those who did not differ in the following fields: "I am ill, I skip school, I am absent for other reasons, I find it

Table 2. Significant results, when controlled for multiple testing

Variable	*b*	*SE*	95% CI		*p*
			LL	*UL*	
At least one adult in school cares about me					
Grades					
First language	−0.06	0.02	−.10	−.02	.02
Mathematics	.0.05	0.02	.02	.08	.03
I like it in school					
PIRF groups					
Externalizing	−0.50	0.14	−.78	−.22	.005
My test results/grades					
Grades					
Mathematics	0.10	0.02	.06	.14	<.001
I feel lonely					
PIRF groups					
Anxiety/depression	0.15	0.05	.05	.25	.04
I attend school					
PIRF groups					
Externalizing	−0.51	0.11	−.72	−.29	<.001
I am ill					
PIRF groups					
Anxiety/depression	0.13	0.05	.04	.22	.05
I skip school					
PIRF groups					
Anxiety/depression	0.13	0.04	.05	.20	.01
Parents' highest educational level					
Level 2	0.42	0.15	.13	.71	.05
Level 3	0.47	0.15	.18	.76	.01
I am absent from school because of symptoms of illness/quarantine					
Parents' highest educational level					
Level 3	0.60	0.19	.22	.98	.02
I am absent because of other reasons					
PIRF groups					
Anxiety/depression	0.14	0.04	.06	.22	.01
I find it difficult to attend school because I get anxious/sad/stressed out					
PIRF groups					
Anxiety/depression	0.38	0.05	.29	.47	<.001
Somatic symptoms	0.12	0.04	.05	.19	.01
Severe illness	−0.62	0.17	−.96	−.28	.004
Gender					
Female	0.17	0.04	.10	.24	<.001

Note. *b* = unstandardized regression coefficient, *LL* = lower limits; *UL* = upper limits of the 95% confidence interval (CI). Outcome variables in **bold**, followed by the predictors that yielded statistically significant results on that outcome variable. Under "Parents' highest educational level" Level 1 = comprehension school or equivalent, Level 2 = upper secondary school or equivalent, and Level 3 = university or equivalent.

difficult to attend school because I get anxious/sad/stressed out." Students who reported having depression or anxiety reported that they are ill more often now than before the pandemic, that they skip school more often now than before, and they also reported finding it more difficult to attend school because they get anxious, feel sad, or stressed out more during the pandemic than before.

Students with externalizing symptoms differed significantly from those without such symptoms on the following items: "I like it in school, and I attend school." Students with externalizing symptoms liked it better in school before the pandemic and had greater school attendance before the pandemic than during it compared to students without externalizing symptoms.

The PIRF of physical impairments did not yield any significant results when compared to students without physical impairments.

Students with a severe illness reported significant results "I find it difficult to attend school because I get anxious/sad/stressed out." Students with severe illness reported that they found it more difficult to attend school during the pandemic than before because of feeling anxious, sad, or stressed out, compared to students without an illness.

Students who reported having somatic symptoms (stress, stomach issues, headaches, or problems sleeping) had significant results "I find it difficult to attend school because I get anxious/sad/stressed out." Students with somatic symptoms reported that they found it more difficult to attend school during the pandemic than before because of feeling anxious, sad, or stressed out.

Students who reported having other conditions, such as asthma, being overweight, or having allergies, did not differ from respondents without one.

Statistically Significant Results for Gender and Grades

In our analyses, we compared students who reported their gender as "girl" against students who reported their gender as "boy." We found significant results for girls "I find it difficult to attend school because I get anxious/sad/stressed out." Girls reported finding it difficult to attend school because they get anxious, feel sad, or stressed out more than before the pandemic compared to boys.

We found statistically significant results regarding grades in the student's first language (either Finnish or Swedish) for the following item: "At least one adult in school cares about me." The result indicates that, the better the grade in a student's first language, the less likely they were to feel that they had at least one adult in school who cared about them during the pandemic than before it.

Regarding mathematics, we found significant results for the following items: "At least one adult in school cares about me" and "My test results/grades." These results went in the opposite direction of the first language. The better the grades in mathematics, the more the students reported having at least one adult in school who cared about them during the pandemic than before it. Students also reported having worse test results during the pandemic than before it.

Statistically Significant Results for Parent's Educational Level

We divided the educational levels into comprehensive school or equivalent (level 1), upper secondary school or equivalent (level 2), and university or equivalent (level 3). We found significant results for students with parents at levels 2 and 3 on the following outcome variables: "I skip school, I skip school because of symptoms of illness or quarantine." The results indicate students skipping school more often and reporting increased difficulties attending school during the pandemic than before it. These results are similar for the parents' educational levels 2 and 3, indicating that the higher the parents' educational level, the more students of these parents skipped school and were more absent because of symptoms of illness, compared to students with parents at educational level 1.

Discussion

This study explored which Finnish middle school students' school engagement was affected during the COVID-19 pandemic. Our sample consisted of 1,788 students with an average age of 14.95 (SD = 0.86). Most students reported no change in their school engagement during the COVID-19 pandemic compared to pre-pandemic times. Among the students who reported a change in school engagement, we found that the statistically significant results supported our hypothesis. That is, students already at risk for developing school disengagement had an increased risk of doing so during the COVID-19 pandemic. These results are exploratory, and we need to understand them in greater detail through further research.

Most results concerned school attendance, either in the form of skipping, not participating because of anxiety, or another form of nonattendance. Many of our items pertained to attendance, which partly explains this finding. However, it also seems that the largest effect of the pandemic on school engagement was on the dimension of behavioral engagement.

Students who reported having anxiety and/or depression seem to have had their school engagement negatively affected during the COVID-19 pandemic. All the significant results for this group support this hypothesis, and students with anxiety or depression were vulnerable to disengagement from school during the pandemic. Prior mental health problems might have rendered the students less resilient to handling the changes of the disruption. For instance, health or family-related worries may have affected these students' functional level, affecting their school engagement. Especially the behavioral level of engagement was affected for these students, resulting in reporting of increased absence for various reasons.

Students with externalizing symptoms, students with severe illnesses, and students with somatic symptoms all yielded a significant result in the direction of increased

disengagement during the pandemic compared to before, and there were no results in the other direction. For students with externalizing symptoms, especially the emotional and behavioral components of engagement were affected, so they reported liking school better and attending more before. Daily routines are significant for all students, but students with either internalizing or externalizing symptoms may be especially vulnerable to the changes brought forth by the pandemic. Furthermore, students may have used self-diagnosed problems as an excuse to report more disengagement.

Students who reported having ADHD or ASD did not differ statistically from students who reported being neurotypical. However, we did find a trend for neuroatypical students to report feeling less lonely during the pandemic than before compared to students without ADHD or ASD, which suggests an increase in school engagement. This trend also aligns with anecdotal evidence during the pandemic, as students who may have social challenges, feel lonely or left outside of school, or become overwhelmed during the school day might have had fewer negative experiences during the lockdown and hybrid schooling period. It is also possible, for instance, that students with ASD or ADHD were exposed to fewer social situations during the pandemic in which they felt lonely.

However, caution must be taken when interpreting these results since the two diagnoses were grouped. We do not know whether any variation occurred within the group nor to which extent either of the diagnoses contributed to this result.

We found no statistically significant results in this study for students with physical impairments, suggesting that they might have been equally as vulnerable as students without physical impairments.

Girls reported more difficulties than boys attending school during the pandemic because of anxiety, feeling sad, or stressed out. There was also a trend for students reporting "other" as their gender to report more distress; however, these results did not reach statistical significance. The scope of the current study did not enable us to analyze how school engagement affected students across genders, that is, we do not know, for instance, whether all genders felt an increased difficulty attending school during the pandemic, but that it was significantly more difficult for girls and students reporting their gender as "other" than for boys. Or if boys reported no change, whereas girls and others did. However, the results showed that girls reported increased school disengagement during the pandemic compared to boys. Previous studies suggested that boys are at greater risk of disengagement than girls, which suggests that girls might have been more vulnerable to school disengagement during the pandemic than boys.

Limitations

There are limitations to this study. For instance, we had many predictors and ten different outcome variables. We applied Bonferroni corrections to adjust for multiple comparisons, but some results may still occur because of chance. For this reason, we recommend interpreting the results with caution. We would also like to remind the reader that most of our tests did not yield significant results, which should be considered when interpreting the result.

For this study, we assumed that the ten items created to measure school engagement do measure school engagement. We created these items for this study, which have not been previously validated. For this reason, we may have measured something other than school engagement.

The data collection occurred in the spring of 2021, and the pandemic continued well into 2022. This means that the results of this study do not account for any potential changes in school engagement that occurred later. Studies conducted later in the timeline of the COVID-19 pandemic might produce varying results for this reason.

Because this study relies on self-reported data, we cannot be sure that students answered all the questions truthfully or understood them. For instance, we cannot guarantee that students who ticked the "ADHD" or "anxiety" boxes were not self-diagnosing. Also, because we asked students to reflect on the pandemic period and the changes that occurred during it, there is a risk of memory bias. We also do not know whether students ticked the correct boxes concerning their parents' highest educational levels. This may render some difficulties when interpreting the results.

Implications for Further Research

The present study is an explorative study of the effects of the COVID-19 pandemic on the school engagement of Finnish youth. We were interested in whether the school engagement of students experiencing previously identified risk factors for school attendance problems was negatively affected during the COVID-19 pandemic. We propose that the items used in this study to measure change in school engagement should be validated in future research. The results of this study might also serve to indicate which groups of adolescents might have been more vulnerable to school disengagement during the COVID-19 pandemic, and it might serve as inspiration for future researchers when considering which PIRFs to focus on.

Conclusion

The results show that, on a group level, certain PIRFs and gender could indicate a higher possibility of school

disengagement during the COVID-19 pandemic. This aligns with our original hypothesis that the school engagement of students holding previously identified risk factors for school attendance problems would be negatively affected during the COVID-19 pandemic. However, it is essential to remember that this is an explorative study with a limited dataset. Each result must be interpreted with caution.

We hope the results of this study can inspire or help future researchers develop hypotheses about how different PIRFs affect school engagement. For teachers or others working with adolescents, the results of this study could help identify adolescents who theoretically might be at higher risk of school disengagement. However, it is noteworthy that we did not run an analysis that compared students with a PIRF against those who did not report any of the other PIRFs. Instead, we compared each PIRF group against students who did not report having that exact PIRF.

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