Article

The Impact of COVID-19 on Mental Health: Psychosocial Conditions of Students with and without Special Educational Needs

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Abstract: Given the pandemic-induced school lockdown in Germany in the spring of 2020, COVID-19 evidently had a negative impact on child and adolescent mental health and wellbeing. However, there is no evidence regarding the specific problems of students with special educational needs in emotional and behavioral disorders (E/BD) during or after the school lockdown. Thus, this study bridges the gap. A sample of 173 students across Germany was included in the analysis. The students were rated by their teachers in an online survey via a standardized teacher-report form for emotional and behavioral problems and competencies, as well as perceptions of inclusion. Several student- and teacher-level predictors were applied in a stepwise regression analysis. The results showed that the school lockdown marginally impacted E/BD, with small differences between student groups. The strongest predicting variable was students' psychosocial situation. Hence, the psychosocial situation of students should be monitored by teachers and school psychologists to provide sufficient support during lockdown.

Keywords: COVID-19; lockdown; externalizing problems; internalizing problems; positive school-related behavior

1. Introduction

During the COVID-19 pandemic, schools in Germany canceled in-person teaching in March 2020. The lockdown was eased systematically following the Easter break in April, and, at least since the end of the summer break, schools have completely re-opened. Research has shown the impact of the pandemic situation on children's and adolescents' wellbeing and mental health. Although the research base is small for students with special educational needs (SEN) in the area of emotional and behavioral disorders (E/BD), the negative impacts of school closures can also be assumed for them.

1.1. Special Educational Needs and Emotional and Behavioral Disorders

Since the current study was conducted in Germany, it is important to introduce the terminology used for SEN and E/BD. According to the *Standing Conference of the Ministers of Education and Cultural Affairs of the Länder in the Federal Republic of Germany* [Kultusministerkonferenz], which is responsible for coordinating the school system across the sixteen federal states in Germany, SEN students are defined as children and young people who either have disabilities or face the threat of disablement (Kultusministerkonferenz 2019, p. 251). SEN is used as an administrative category to allocate and legitimize resources for individualized remedial support or special accommodations, either in regular classrooms or in special schools. Since there are no general guidelines for SEN diagnoses across Germany, regulations for diagnosing SEN (and therefore the number of SEN students) vary across the federal states (Scheer and Melzer 2020).

The term "special educational needs in emotional and behavioral disorders" (SEN-E/BD) describes "a particularly severe education problem caused by particularly pronounced emotional-social developmental and behavioral disorder or characterized by an accumulation of severe risk factors for development" (Blumenthal et al. 2020, pp. 12–13). Following this definition, SEN-E/BD refers to the international term of emotional and behavioral disorders (E/BD) (see Forness and Kavale 2000), which differentiates between externalizing problems (EP; for example, aggressive behavior, defiant and oppositional behavior, and hyperactivity) and internalizing problems (IP; for example, anxiety disorders or depression).

In the school year 2018–2019, 1.3% of all students in Germany were diagnosed as SEN-E/BD, and 0.56% of all students were attending a special school for SEN-E/BD (Scheer and Melzer 2020). Whereas, studies on child and adolescent mental health indicated a prevalence of E/BD between 16% and 21% (Baumgarten et al. 2018).

1.2. Effects of the Pandemic Situation on Children and Adolescents

In a rapid umbrella review of several previous reports, Baumann (2020) summarized evidence of mental health and psychosocial problems among children and adolescents due to quarantine measures during the pandemic (Brooks et al. 2020; Graber et al. 2020; Henssler et al. 2020; Hossain et al. 2020; Imran et al. 2020; Röhr et al. 2020; Sharan and Rajhans 2020). The consequences of quarantine measures seemed to correspond with the socioeconomic situation of families. Although quarantine conditions are stricter than Germany's overall lockdown measures, the latter may have similar effects (Chawla et al. 2021; Lee 2020; Sharma et al. 2020; Ron and Cuéllar-Flores 2020; Singh et al. 2020). Despite acknowledging the possible negative effects of school lockdowns on mental health, Chawla et al. (2021) assumed that the lockdown could mean an absence of bullying or school pressure for SEN students; thus, it might have a somewhat positive effect on their psychological wellbeing. It was found that parental stress during the lockdown may be transferred to children, where the lockdown situation might induce higher in-family violence, emotional neglect, or isolation (Clemens et al. 2020; Fontanesi et al. 2020; Mechili et al. 2021; Spinelli et al. 2020). This further underpins the assumption of the pandemic's negative impact on child wellbeing. Furthermore, the pandemic challenged the system of public child welfare. Moreover, although child welfare practitioners appear to have adjusted to the new situation, the long-term effects of the lockdown on the public child welfare system remain unknown (Baginsky and Manthorpe 2021; Jentsch and Schnock 2020).

Empirical research shows that the pandemic induced higher psychological and mental health issues for students (Chen et al. 2020; Idoiaga Mondragon et al. 2021; Ravens-Sieberer et al. 2020, 2021; Xie et al. 2020; Langmeyer et al. 2020; Pearcey et al. 2020). Although Pearcey et al. (2020) reported an increase in primary school-aged children's emotional, behavioral, and attentional challenges from a parent-carer perspective, they found a reduction in such problems for secondary school-aged children or adolescents and those with SEN or pre-existing mental health issues. Further, they found no changes regarding adolescents' self-reported difficulties, whereas, an increase in behavioral difficulties was reported for high-income households. Langmeyer et al. (2020) found that about a third of parents reported problems in coping with the lockdown, which was correlated with conflicts and chaos within the family. They also found that more children seemed to suffer from loneliness in low-income households. However, according to Langmeyer et al. (2020), children's constant or frequent contact with teachers or kindergarten educators had a protective effect on their mental health.

Research on schooling during the lockdown in Germany shows that distance teaching and learning, and parental support for learning, were challenging for all those involved (Huber et al. 2020; Wacker et al. 2020; Wildemann and Hosenfeld 2020). Although students acknowledged more flexibility and individualization of learning, they also lacked communication with and feedback from teachers (Wacker et al. 2020). Children and adoles-

cents with lower socio-economic status faced greater challenges with distance learning or homeschooling (Wildemann and Hosenfeld 2020).

Casale et al. (2020a) found that most German federal states had no further regulations and documentation about the continuation of special education services for SEN students during the school lockdown. In an online survey, SEN teachers analyzed the actual implementation of and obstacles and conditions for SEN support and digital learning during the school lockdown (Börnert-Ringleb et al. 2021; Casale et al. 2020b).

However, from an international and German perspective, prior studies present insufficient empirical evidence on (1) the specific effects of the pandemic school lockdown on SEN students with emotional and behavioral disorders (E/BDs) and (2) predictors for such effects from the teachers' perspective.

2. Research Questions

Therefore, this study considers the following questions:

- (Q1) After the re-opening of schools, did E/BDs differ between students with and without SEN-E/BD?
- (Q2) Were there any differences in psychosocial threats and coping with distance learning between students with and without SEN-E/BD during the school lockdown?
- (Q3a) Did teachers perceive changes in their students' E/BD after lockdown?
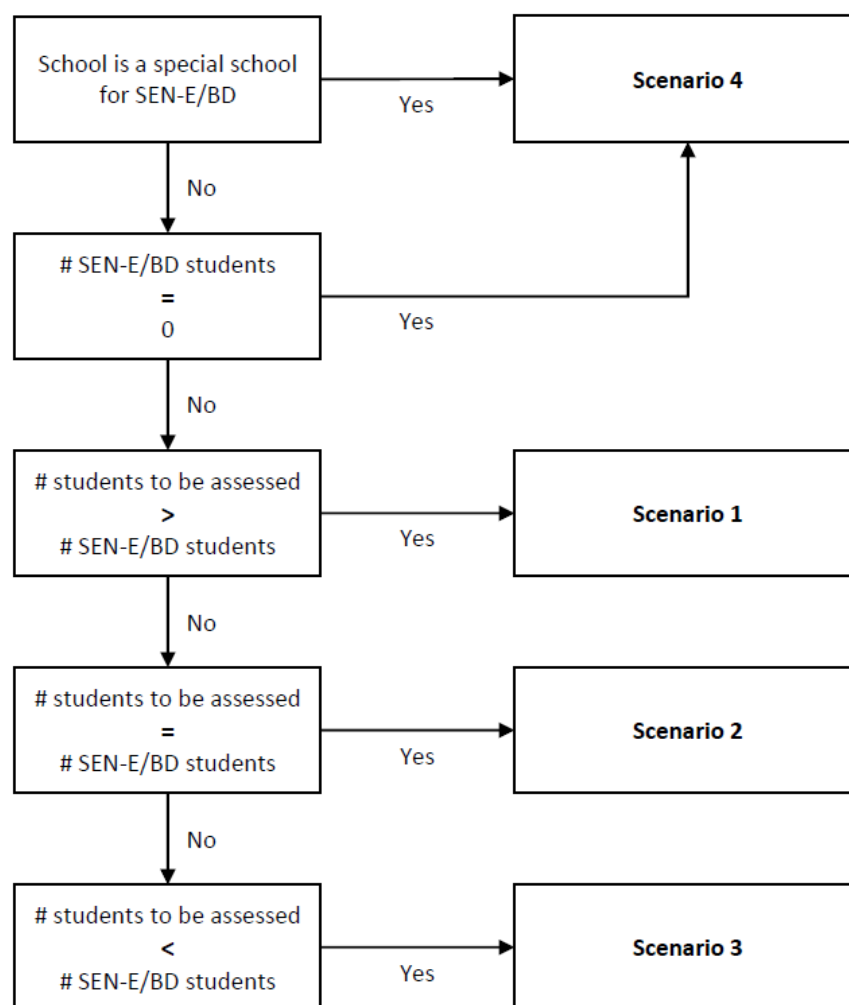- (Q3b) Which student-teacher-level predictors affected these changes?

3. Methods

3.1. Procedure

The present study employed a retrospective cross-sectional design to investigate teachers' perceptions of changes in students' E/BD. Teachers from across Germany were invited to participate in an online survey. The invitation was advertised on social media (Twitter and Facebook), mailing lists of teacher associations and unions, and press releases. Two federal states (Baden-Wuerttemberg and Rhineland-Palatinate) gave explicit permission to contact schools officially. The survey was conducted using LimeSurvey Version 3.17.16 (LimeSurvey 2019), and hosted by the second author's university. Before the survey, participants were provided information about the study to grant conclusive informed consent for participation. Therefore, given the ad-hoc sample, we could not determine our sample size a priori.

In the first part of the survey, participants were required to disclose the schools in which they taught, the number of students in each class, and how many students were diagnosed with SEN-E/BD. They were also required to state the number of students they were willing to assess during the survey (two, three, four, or five). Figure 1 illustrates how scenarios are chosen from the answers provided in this part, which determined the next step for participants and the randomization procedure characteristics. The instructions that participants were given in each of the four scenarios displayed in Figure 1 can be found in Appendix A (Appendices A.1–A.4). The full structure of the survey is provided via OSF as a LimeSurvey structure file (*.lss) and as an Excel spreadsheet to make the procedure replicable.

After completing the questionnaire (measurements described below), participants were asked if they were willing to (a) participate in a repeated survey in case of new lockdowns, and (b) participate in qualitative interviews for further in-depth insights (qualitative interviews with 22 teachers have been conducted in early 2021 and are currently being analyzed).

Figure 1. Path diagram to determine the correct scenario of the questionnaire.

3.2. Measurements

In this paper, we only report those variables that were included in the data analysis. The full set of variables measured can be obtained from the dataset and its documentation on OSF.

The scale ranges are transformed as per their 0 starting point, except for the retrospective scales which range from −2 to +2 (see Section 3.2.3). Due to technical reasons, scale ranges (answer codes) in the questionnaire deviate from this structure.

3.2.1. Students' Sociodemographic Data

Teachers were required to provide students' gender, grade, age, and living environment conditions. Further, they provided information on any official diagnosis of SEN.

3.2.2. DBR-PUTSIE

To assess students' internalizing problems (IP), externalizing problems (EP), and positive school-related behavior (P-SRB), we employed the DBR-PUTSIE (Schurig et al. 2020), a standardized instrument for directly assessing behavior in schools. It is published under a CC BY-NC-SA 4.0 license and is free to use for research purposes. The DBR-PUTSIE is based on well-established instruments, such as the Strengths and Difficulties Questionnaire (SDQ) (Goodman 2005, 1999), and on the behaviors described by the Diagnostic and Statistical Manual of Mental Disorders, fifth edition (DSM-5). Development of the DBR-PUTSIE is strongly related to that of the Direct Behavior Rating and Multi-Item

Scales by Gebhardt et al. (2018). Thus, we assumed comparable psychometric properties (Gebhardt et al. 2019). The DBR-PUTSIE covers the three dimensions of EP (oppositional defiant behavior (4 items), inattention (6 items), impulsiveness (6 items)), IP (emotional problems (5 items), peer problems (3 items)), and P-SRB (5 items). The items are rated on a seven-point scale with verbalized endpoints (1 = never, 7 = always).

The DBR-PUTSIE was preferred over the SDQ because a seven-point rating scale is preferable for direct behavior ratings (Christ et al. 2009). Furthermore, the SDQ is not licensed for online survey use.

The items are displayed in Appendix B Table A1. We observed acceptable to good internal consistency, with α = 0.85 to 0.95, and a corrected item-total correlation of $r_{it} > 0.5$ for all items, with only five items falling below an r_{it} of 0.6.

3.2.3. Retrospective Ratings

After participants assessed the current state of social/emotional development with the original DBR-PUTSIE instructions, they were asked to assess the current situation relative to the situation before school lockdown on a fully verbalized five-point scale (-2 = much lower than before, -1 = somewhat lower than before, 0 = no change, +1 = somewhat higher than before, +2 = much higher than before). As shown in Appendix B Table A2, the internal consistency ranged from 0.82 to 0.92. The corrected item-total correlation was slightly lower than for the rating of the current situation, with two items falling below an r_{it} of 0.5. Four items showed an r_{it} between 0.5 and 0.6.

3.2.4. Students' Coping with Distance Learning and Psychosocial Threats during the Lockdown

A scale measuring how students addressed distance learning during school lockdown ("coping with distance learning", 6 items) was developed following Huber et al. (2020). The items were rated on a fully verbalized five-point scale (0 = not true at all, 1 = somewhat not true, 2 = yes and no, 3 = somewhat true, 4 = very true). Along with the scale on students' coping with distance learning, five items on psychosocial threats were presented to be assessed on the same rating scale. Table A3 in the Appendix B indicates acceptable internal consistency for both scales (α = 0.83 and 0.81, respectively). For the scale on coping with distance learning, one item had a poor r_{it} of 0.256, one item had a good r_{it} of 0.551, and the other items were all above 0.7. For the scale on psychosocial threats, one item had an r_{it} = 0.365, while all other items were above 0.6.

3.2.5. Teacher Variables

Using a five-point rating scale (1 = never, 5 = almost always), we asked teachers how often they employed analogue and digital teaching or instruction for distance teaching during the school lockdown. The two questions were taken from the SOLVE-questionnaire (Casale et al. 2020b) in Börnert-Ringleb et al. (2021).

Using the SOLVE-questionnaire, we employed a scale to measure the teachers' perception of their student-teacher relationship following Pianta et al. (2008). The scale consists of nine items to be rated on a fully verbalized five-point scale (0 = not true at all, 1 = somewhat not true, 2 = yes and no, 3 = somewhat true, 4 = very true). Since the original scale has yet to be published, we cannot provide the full text of the items here. The internal consistency was acceptable (α = 0.78). Three items showed an $r_{it} < 0.5$.

3.3. Data Inclusion and Data Availability

Only complete cases were included in the data analysis. The raw data from LimeSurvey, the final data set used for analysis, and the R input are available via OSF.

3.4. Participants

In total, 94 teachers (28 from primary schools, 37 from secondary schools (including comprehensive schools, academic high schools, and vocational schools), and 29 from special

schools) participated in the survey. The average number of students (with SEN-E/BD and total) in the participants' classes is displayed in Table 1. From the secondary schools, 2 participants were from a lower secondary school, 3 from a middle secondary school, 6 from an integrated secondary school, 12 from an academic high school, 9 from a comprehensive school, and 5 from a vocational school.

Data were included from 173 (55 female) students, of which 82 (11 female) were officially diagnosed with SEN-E/BD, and 27 (10 female) with other types of SEN. Table 2 presents a summary of the students' sociodemographic data. It was observed that students with SEN-E/BD were more likely to be living in foster families or youth welfare facilities than students without SEN-E/BD.

Table 1. Teachers participating in the survey.

	Overall	Primary School	Secondary School	Special School
N	94	28	37	29
Students in class (mean (SD))	19.41 (8.82)	20.64 (3.95)	25.59 (8.26)	10.34 (4.28)
Students in class with SEN-E/BD (mean (SD))	2.44 (4.19)	1.25 (1.94)	1.56 (3.06)	6.50 (6.48)

Note. SEN represents "Special Educational Needs", E/BD represents "Emotional and Behavioral Disorders".

Table 2. Students' sociodemographic data.

	Overall	SEN-E/BD	Other SEN	No SEN	*p*
N	173	82	27	64	
Gender = female (%)	55 (31.8)	11 (13.4)	10 (37.0)	34 (53.1)	<0.001
Age (mean (SD))	12.09 (3.74)	11.89 (2.62)	13.89 (6.15)	11.58 (3.47)	0.021
Grade (mean (SD))	6.23 (3.02)	6.07 (2.64)	7.04 (3.31)	6.09 (3.32)	0.321
Living environment (%)					0.005
Parents/family of origin	148 (85.5)	62 (75.6)	25 (92.6)	61 (95.3)	
Foster family	4 (2.3)	4 (4.9)	0 (0.0)	0 (0.0)	
Children's home/group accommodation facilities	14 (8.1)	13 (15.9)	1 (3.7)	0 (0.0)	
Other	5 2.9)	1 (1.2)	1 (3.7)	3 (4.7)	
Missing	2 (1.2)	2 (2.4)	0 (0.0)	0 (0.0)	

3.5. Data Analysis

Data analyses were performed in the R language (R Core Team 2020), using the R Studio Environment (RStudio 2020). Descriptive statistics were analyzed using the describe() and describeBy() commands from the package "psych" (Revelle 2020).

In the first step of the analysis, we compared social and emotional development, coping with distance learning, and psychosocial threats during lockdown across SEN-E/BD students, other SEN students, and students without SEN. One-way ANOVAs were computed using the lm()-function along with the apa.1way.table()-function from "apaTables" (Stanley 2018).

Predictors for social and emotional problems and the effect of school lockdown were analyzed using stepwise regression analysis. Hence, we incorporated students' SEN status as predictors in block one (Step 1). Students' coping with distance learning and psychosocial threats during lockdown were added in Step 2. Step 3 included the teachers' perception of the student-teacher relationship. Stepwise regression was conducted for each dependent variable (effects of the lockdown on EP, IP, and P-SRB), using the lm() command from the base functions of R and the apa.reg.table() function from "apaTables".

4. Results

Table 3 shows the descriptive statistics for EP, IP, P-SRB, psychosocial threats, and students' coping with distance learning. The changes in EP, IP, and P-SRB that teachers reported as an effect of the lockdown were rather marginal. However, students with SEN seemed to show a higher increase in EP than students without SEN. Furthermore, students

with SEN seemed to show an increase in IP during lockdown, while students without SEN showed a decrease in IP. Additionally, teachers reported similar decreases in P-SRB in all groups.

Table 3. Descriptive statistics categorized by SEN.

	SEN−E/BD			Other SEN			No SEN		
	M	**SD**	**SE**	**M**	**SD**	**SE**	**M**	**SD**	**SE**
Current Situation									
School Related Behavior (P−SRB)	2.58	1.15	0.1270	3.30	1.51	0.2897	4.07	1.45	0.1812
Externalizing Problems (EP)	3.30	1.08	0.1194	2.61	1.61	0.3095	1.48	1.15	0.1442
Internalizing Problems (IP)	2.49	1.18	0.1301	1.77	1.05	0.2026	1.32	1.00	0.1245
Lockdown Situation									
Psychosocial Threats	0.92	0.85	0.0939	0.81	0.82	0.1580	0.56	0.66	0.0830
Coping with Distance Learning	1.57	0.89	0.0984	1.78	0.89	0.1704	2.43	0.95	0.1192
Effect of Lockdown									
School Related Behavior (P−SRB)	−0.16	0.50	0.0552	−0.10	0.38	0.0727	−0.12	0.56	0.0697
Externalizing Problems (EP)	0.18	0.40	0.0441	0.14	0.36	0.0684	0.02	0.49	0.0614
Internalizing Problems (IP)	0.09	0.34	0.0374	0.06	0.19	0.0368	−0.08	0.41	0.0507

4.1. Current EP, IP, and P-SRB

As shown in Table 4, students' current EP, IP, and P-SRB were significantly different across the groups, as were psychosocial threats and coping with distance learning during lockdown, with partial η^2 ranging from 0.20 (IP) up to 0.33 (EP). However, as displayed in Table 5, for current EP and P-SRB, all pairwise group comparisons were significant. For current IP, only students with SEN-E/BD differed significantly from each of the other groups.

Table 4. ANOVA with current situation (EP, IP, P-SRB) and lockdown situation (PST, CDL) as criteria.

	SS	**Df**	**MS**	**F**	**p**	**Partial η^2**	**95% CI of η^2**
Externalizing Problems (EP)							
(Intercept)	183.35	1	183.35	126.80	<0.001		
SEN	119.50	2	59.75	41.32	<0.001	0.33	[0.21, 0.42]
Error	245.82	170	1.45				
Internalizing Problems (IP)							
(Intercept)	84.57	1	84.57	70.58	<0.001		
SEN	49.96	2	24.98	20.85	<0.001	0.20	[0.10, 0.29]
Error	203.72	170	1.20				
School Related Behavior (P-SRB)							
(Intercept)	293.37	1	293.37	167.09	<0.001		
SEN	79.77	2	39.88	22.72	<0.001	0.21	[0.11, 0.31]
Error	298.48	170	1.76				
Psychosocial Threats (PST)							
(Intercept)	17.93	1	17.93	29.35	<0.001		
SEN	4.73	2	2.37	3.87	0.023	0.04	[0.00, 0.11]
Error	103.84	170	0.61				
Coping with Distance Learning (CDL)							
(Intercept)	85.33	1	85.33	102.21	<0.001		
SEN	27.09	2	13.54	16.23	<0.001	0.16	[0.07, 0.25]
Error	141.93	170	0.83				

Table 5. Pairwise comparisons from ANOVA.

Comparison	Difference	95% CI		p
		LL	**UL**	
SEN-E/BD vs. Other SEN	0.69	0.06	1.32	0.028
No SEN vs. Other SEN	−1.13	−1.78	−0.48	<0.000
No SEN vs. SEN-E/BD	−1.82	−2.30	−1.35	<0.000
Internalizing Problems (IP)				
SEN-E/BD vs. Other SEN	0.72	0.14	1.29	0.010
No SEN vs. Other SEN	−0.45	−1.05	0.14	0.174
No SEN vs. SEN-E/BD	−1.17	−1.60	−0.74	<0.000
School Related Behavior (P-SRB)				
SEN-E/BD vs. Other SEN	−0.71	−1.41	−0.02	0.043
No SEN vs. Other SEN	0.78	0.06	1.49	0.031
No SEN vs. SEN−E/BD	1.49	0.97	2.01	<0.000
Psychosocial Threats				
SEN-E/BD vs. Other SEN	0.10	−0.31	0.51	0.818
No SEN vs. Other SEN	−0.26	−0.68	0.17	0.331
No SEN vs. SEN-E/BD	−0.36	−0.67	−0.05	0.017
Coping with Distance Learning				
SEN-E/BD vs. Other SEN	−0.21	−0.68	0.27	0.569
No SEN vs. Other SEN	0.65	0.16	1.15	0.006
No SEN vs. SEN-E/BD	0.86	0.50	1.22	<0.001

Note. SEN represents "Special Educational Needs", E/BD represents "Emotional and Behavioral Disorders", 95% CI represents the 95% confidence interval, LL represents the lower limit, UL represents the upper limit.

4.2. Psychosocial Threats and Coping with Distance Learning

Students' psychosocial threats and coping with distance learning during lockdown varied across the groups (Table 4). Students with SEN-E/BD had higher psychosocial threats during lockdown than students with no SEN, and students without SEN coped significantly better with the distance learning situation than students with SEN (Table 5).

4.3. Effect of COVID-19-Induced School Lockdowns

As mentioned above, teachers reported a negative effect of the lockdown on P-SRB across all groups, as well as a negative effect on EP and IP in students with SEN (Table 3). To test for predictors of these effects, stepwise regression analysis was conducted for these measurements (Tables 6–8). Step 1 contained students' SEN only. SEN was dummy coded into the two dichotomous variables, SEN-E/BD and Other SEN. In step 2, psychosocial threats and coping with distance learning during lockdown were added. Step 3 additionally contained teachers' perception of student-teacher relationship work. However, step 1 resulted in a poor R^2 for all three scales (EP, IP, P-SRB). Adding the predictors in step 2 led to a significant increase in R^2, while step 3 did only for P-SRB as the criterion.

The lockdown effect on EP was best predicted by the regression model specified in step 2 (see Table 6), which explained 11.7% of the variance. However, the only predictor with a significant contribution here was students' psychosocial threats during lockdown (β = 0.21). This means that students who were confronted with a higher number of psychosocial threats during the lockdown were also at a higher risk of increased EP after the lockdown. Similarly, the best model for the lockdown effect on IP was step 2 (see Table 7) with 10.5% of explained variance. Students with SEN-E/BD (β = 0.19) and those who were confronted with more psychosocial threats during lockdown (β = 0.22) were at a higher risk of increased IP after lockdown.

Adding teachers' self-perceived student-teacher relationship as a predictor in step 3 led to a significant increase in explained variance for the lockdown effect on P-SRB (R^2 = 0.181, see Table 8). When teachers reported a stronger focus on the student-teacher relationship, the decrease in their students' P-SRB was reduced (β = 0.20). Such a protective

effect on P-SRB was also apparent for students' coping with distance learning as a predictor (β = 0.27). However, psychosocial threats during lockdown were predictive as a risk factor for decreased P-SRB after the lockdown (β = −0.24).

Table 6. Regression results using the lockdown effect on EP as the criterion.

Predictor	*b*	95% CI	β	95% CI	*sr*^{2}	95% CI	*r*	Fit	Difference
Step 1:									
(Intercept)	0.02	[−0.10, 0.14]							
SEN−E/BD = Y	0.16 *	[0.01, 0.32]	0.18	[0.01, 0.34]	0.03	[0.00, 0.10]	0.14		
Other SEN = Y	0.12	[−0.05, 0.30]	0.10	[−0.05, 0.25]	0.01	[0.00, 0.05]	0.03		
								R^2 = 0.029 [0.00, 0.10]	
Step 2:									
(Intercept)	0.12	[−0.13, 0.37]							
SEN−E/BD = Y	0.06	[−0.10, 0.22]	0.07	[−0.13, 0.24]	0.00	[0.00, 0.04]	0.14		
Other SEN = Y	0.05	[−0.14, 0.25]	0.04	[−0.13, 0.19]	0.00	[0.00, 0.03]	0.03		
CDL	−0.07	[−0.14, 0.00]	−0.15	[−0.32, 0.00]	0.02	[0.00, 0.07]	−0.28 **		
PST	0.11*	[0.02, 0.20]	0.21	[0.04, 0.37]	0.03	[0.00, 0.10]	0.30 **		
								R^2 = 0.117 ** [0.06, 0.22]	ΔR^2 = 0.088 ** [0.03, 0.20]
Step 3:									
(Intercept)	0.51	[−0.10, 1.09]							
SEN-E/BD = Y	0.07	[−0.10, 0.25]	0.08	[−0.13, 0.27]	0.00	[0.00, 0.05]	0.14		
Other SEN = Y	0.04	[−0.16, 0.22]	0.03	[−0.13, 0.18]	0.00	[0.00, 0.03]	0.03		
CDL	−0.07	[−0.14, −0.00]	−0.16	[−0.33, −0.00]	0.02	[0.00, 0.07]	−0.28 **		
PST	0.11 *	[0.03, 0.20]	0.21	[0.05, 0.36]	0.03	[0.00, 0.09]	0.30 **		
Student-teacher relationship	−0.12	[−0.30, 0.07]	−0.11	[−0.25, 0.08]	0.01	[0.00, 0.06]	−0.06		
								R^2 = 0.127 ** [0.07, 0.25]	ΔR^2 = 0.011 [0.00, 0.06]

Note. A significant *b*-weight indicates that the β-weight and semi-partial correlation is also significant. *b* represents unstandardized regression weights. β indicates the standardized regression weights. *sr*^{2} represents the semi-partial correlation squared; *r* represents the zero-order correlation. The amount of 95% CI represents the 95% confidence interval. Square brackets are used to enclose the lower and upper limits of a confidence interval. EP represents "Externalizing Problems", SEN represents "Special Educational Needs", E/BD represents "Emotional and Behavioral Disorders", CDL represents "Coping with Distance Learning", PST represents "Psychosocial Threats". * indicates *p* < 0.05, ** indicates *p* < 0.01.

Table 7. Regression results using the lockdown effect on IP as the criterion.

Predictor	*b*	95% CI	β	95% CI	*sr*^{2}	95% CI	r	Fit	Difference
Step 1:									
(Intercept)	−0.08	[−0.19, 0.01]							
SEN-E/BD = Y	0.18 **	[0.06, 0.30]	0.25	[0.10, 0.37]	0.05	[0.01, 0.11]	0.19 *		
Other SEN = Y	0.14	[0.02, 0.26]	0.15	[0.03, 0.25]	0.02	[0.00, 0.05]	0.04		
								R^2 = 0.055 ** [0.01, 0.12]	
Step 2:									
(Intercept)	−0.13	[−0.32, 0.07]							
SEN-E/BD = Y	0.14 *	[0.01, 0.28]	0.19	[0.01, 0.34]	0.03	[0.00, 0.08]	0.19 *		
Other SEN = Y	0.12	[−0.02, 0.25]	0.12	[−0.02, 0.24]	0.01	[0.00, 0.04]	0.04		
CDL	−0.00	[−0.06, 0.05]	−0.01	[−0.18, 0.13]	0.00	[0.00, 0.02]	−0.20 *		
PST	0.10 **	[0.04, 0.17]	0.22	[0.10, 0.35]	0.04	[0.01, 0.09]	0.27 **		
								R^2 = 0.105 ** [0.05, 0.20]	ΔR^2 = 0.051 ** [0.01, 0.14]

Table 7. *Cont.*

Predictor	*b*	95% CI	β	95% CI	sr^2	95% CI	*r*	Fit	Difference
Step 3:									
(Intercept)	0.10	[−0.36, 0.54]							
SEN-E/BD = Y	0.14 *	[−0.01, 0.30]	0.20	[−0.02, 0.37]	0.03	[0.00, 0.09]	0.19 *		
Other SEN = Y	0.11	[−0.03, 0.23]	0.11	[−0.03, 0.23]	0.01	[0.00, 0.04]	0.04		
CDL	−0.01	[−0.06, 0.05]	−0.02	[−0.19, 0.13]	0.00	[0.00, 0.03]	−0.20 *		
PST	0.10 **	[0.03, 0.17]	0.22	[0.09, 0.36]	0.04	[0.01, 0.10]	0.27 **		
Student-teacher relationship	−0.07	[−0.23, 0.09]	−0.08	[−0.23, 0.12]	0.01	[0.00, 0.05]	−0.04		
								R^2 = 0.111 ** [0.06, 0.22]	ΔR^2 = 0.005 [0.00, 0.05]

Note. A significant *b*-weight indicates that the β-weight and semi-partial correlation are also significant. *b* represents unstandardized regression weights. β indicates the standardized regression weights. sr^2 represents the semi-partial correlation squared; *r* represents the zero-order correlation. The amount of 95% CI represents the 95% confidence interval. Square brackets are used to enclose the lower and upper limits of a confidence interval. IP represents "Internalizing Problems", SEN represents "Special Educational Needs", E/BD represents "Emotional and Behavioral Disorders", CDL represents "Coping with Distance Learning", PST represents "Psychosocial Threats". * indicates $p < 0.05$, ** indicates $p < 0.01$.

Table 8. Regression results using the lockdown effect on P-SRB as the criterion.

Predictor	*b*	95% CI	β	95% CI	sr^2	95% CI	*r*	Fit	Difference
Step 1:									
(Intercept)	−0.12	[−0.25, 0.01]							
SEN-E/BD = Y	−0.04	[−0.20, 0.12]	−0.04	[−0.20, 0.12]	0.00	[0.00, 0.04]	−0.05		
Other SEN = Y	0.01	[−0.18, 0.21]	0.01	[−0.13, 0.16]	0.00	[0.00, 0.02]	0.03		
								R^2 = 0.002 [0.00, 0.04]	
Step 2:									
(Intercept)	−0.34 *	[−0.59, −0.06]							
SEN-E/BD = Y	0.12	[−0.06, 0.30]	0.12	[−0.05, 0.29]	0.01	[0.00, 0.06]	−0.05		
Other SEN = Y	0.13	[−0.07, 0.34]	0.10	[−0.05, 0.25]	0.01	[0.00, 0.05]	0.03		
CDL	0.13 **	[0.05, 0.19]	0.25	[0.09, 0.39]	0.04	[0.01, 0.10]	0.32 **		
PST	−0.15 **	[−0.26, −0.05]	−0.24	[−0.39, −0.08]	0.04	[0.00, 0.11]	−0.34 **		
								R^2 = 0.158 ** [0.08, 0.28]	ΔR^2 = 0.156 ** [0.07, 0.28]
Step 3:									
(Intercept)	−1.01 **	[−1.76, −0.33]							
SEN-E/BD = Y	0.11	[−0.06, 0.29]	0.11	[−0.06, 0.30]	0.01	[0.00, 0.06]	−0.05		
Other SEN = Y	0.16	[−0.03, 0.35]	0.11	[−0.03, 0.25]	0.01	[0.00, 0.05]	0.03		
CDL	0.14 **	[0.06, 0.21]	0.27	[0.12, 0.41]	0.05	[0.01, 0.11]	0.32 **		
PST	−0.15 **	[−0.26, −0.05]	−0.24	[−0.39, −0.09]	0.04	[0.01, 0.11]	−0.34 **		
Student-teacher relationship	0.20 *	[0.01, 0.43]	0.16	[0.01, 0.30]	0.02	[0.00, 0.08]	0.11		
								R^2 = 0.181 ** [0.10, 0.31]	ΔR^2 = 0.023 * [0.00, 0.08]

Note. A significant *b*-weight indicates that the β-weight and semi-partial correlation are also significant. *b* represents unstandardized regression weights. β indicates the standardized regression weights. sr^2 represents the semi-partial correlation squared; *r* represents the zero-order correlation. The amount of 95% CI represents the 95% confidence interval. Square brackets are used to enclose the lower and upper limits of a confidence interval. P-SRB represents "Positive School Related Behavior", SEN represents "Special Educational Needs", E/BD represents "Emotional and Behavioral Disorders", CDL represents "Coping with Distance Learning", PST represents "Psychosocial Threats".* indicates $p < 0.05$, ** indicates $p < 0.01$.

5. Discussion

Differences between the three groups in the current situation were to be expected, given the underlying construct of SEN-E/BD presented in prior research (e.g., Dasioti and Kolaitis 2018; DeVries et al. 2018; Schwab et al. 2016). Furthermore, our results indicate that SEN-E/BD students were confronted with more psychosocial threats during the school lockdown than other students, and had fewer individual resources to cope with distance learning. However, there was no evidence for the severe effects of the school lockdown on social and emotional variables. Moreover, the difference was marginal between SEN-E/BD students, other SEN students, and students without SEN regarding the teacher-rated effects of school lockdown. Hence, further research must focus on a wider variety of factors

influencing the effect of school lockdown, instead of focusing exclusively on SEN-E/BD. Since the findings were partly contrary to the self-reported or parent-reported effects of the lockdown situation (Ravens-Sieberer et al. 2020, 2021; Langmeyer et al. 2020; Pearcey et al. 2020), an explanation of these discrepancies has yet to be analyzed. Therefore, several hypotheses might be possible. First, there could be general discrepancies between parent-, self-, and teacher-reports. This situation might be the case for the DBR-PUTSIE, since the SDQ parent- and self-reported scores differed slightly (Arman et al. 2013), and the SDQ teacher- and parent-reports showed only low to moderate agreement (Cheng et al. 2018; Stone et al. 2010). Second, this study analyzed the situation after the school lockdown period, while other studies (Ravens-Sieberer et al. 2020, 2021; Langmeyer et al. 2020) analyzed the situation during the lockdown. Third, Langmeyer et al. (2020) did not compare their results to the situation before the lockdown, and Ravens-Sieberer et al. (2020; 2021) based their comparison on neither retrospective data nor longitudinal data but on a comparison of their cross-sectional data with data from prior cross-sectional studies. Fourth, as these studies (Ravens-Sieberer et al. 2020, 2021; Langmeyer et al. 2020) mostly considered children and adolescents without addressing SEN, the finding that the lockdown had only mild effects for SEN students is consistent with Pearcey et al. (2020) and Chawla et al. (2021). Hence, results from several perspectives must be triangulated and completed via in-depth insights from qualitative research.

As expected, the psychosocial threats students faced in their living environment during the lockdown were the most prevalent risk factor for the negative effects of the lockdown on social and emotional problems. Moreover, having the inner resources to master the distance-learning situation was a protective factor for many aspects of social and emotional development. However, the teacher-level predictors did not have the expected effect from a theoretical perspective, and student-teacher relationships had marginal protective effects.

The finding that psychosocial threats during lockdown are a strong predictor for an impact on the social-emotional problems of children and adolescents is consistent with prior findings and research-based assumptions, as mentioned in the introduction (Clemens et al. 2020; Fontanesi et al. 2020; Mechili et al. 2021; Spinelli et al. 2020). However, according to prior research (Lee 2012; Pianta and Stuhlman 2004; Wanders et al. 2020), the student-teacher relationship scale had a surprisingly small impact. This situation can be explained in two ways. First, psychosocial threats and other student-level predictors might have such an impact that teachers' student-teacher relationships cannot compensate for them, especially when a lockdown makes the situation more complicated. Second, the student-teacher relationship scale seeks teachers' perspectives (students' perspectives might be different).

5.1. Limitations

Several methodical limitations must be considered. First, our sample size was small, with 94 teachers. Furthermore, it was an ad-hoc sample recruited via social media, the local press, and mailing lists. Several factors of teacher variables may confound the willingness to participate in this online survey and their perception of students' EB/D. Hence, the influence of a selection bias must be considered, which limits the external validity of our findings when addressing students in general. Second, as discussed, the findings employed teachers' perspectives, which may under- or overestimate emotional problems relative to self- or parent-reports (Arman et al. 2013; Cheng et al. 2018; Stone et al. 2010; Langmeyer et al. 2020). This also indicates a further limitation that we could not sufficiently collect data on students' socioeconomic situation and their families' situations. Third, to evaluate changes in the dependent variables, we used retrospective ratings. Thus, we have no longitudinal data and must consider that a recall bias may influence teachers' retrospective perceptions. Finally, the adequate psychometric quality of the DBR-PUTSIE was assumed based on findings from similar instruments but was not evaluated for this measurement;

however, the PUTSIE-scales demonstrated good reliability in our study (see Appendix B Tables A1 and A2).

Although we were interested in comparing the period before and after school lockdown, we could not distinguish between the effects of the school lockdown and the pandemic. It is reasonable to assume that IP would be affected by several factors related to the pandemic (e.g., the fear of getting infected or losing beloved family members to a fatal COVID-19 infection). Thus, we cannot posit any causal effect of the school lockdown but only the coincidence.

5.2. Conclusions

This study found evidence for marginal effects of the school lockdown on students' E/BD rather than for severe issues. However, our findings suggest that the psychosocial situation of children and adolescents during the pandemic is a potential risk factor that should be monitored by teachers, school social workers, and school psychologists. Moreover, measures should be taken to strengthen student-teacher relationships even over a distance. Hence, where necessary, opportunities for personal accompaniment and support for students, and even parents, must be provided.

As indicated above, further research is required that triangulates the perspectives of teachers, students, and parents. Additionally, it would be helpful to implement a longitudinal design to evaluate the continuing effects of repeated lockdowns. Further, we gathered qualitative data providing in-depth insights into the teachers' perspectives in a follow-up inquiry via qualitative interviews. The interviews are currently under preparation for analysis.

Appendix A. Instructions for the Survey Scenarios

Appendix A.1. Instructions for Scenario 1

Prepare class list for anonymous student selection.

1. Please have a copy or a printout of your class list in hand. You should have the following information ready during the survey:
   - Age and gender of the students;
   - Grade level;
   - Existence of an official diagnosis of special educational needs (with all types of SEN assigned to the student);
   - Presence of one or more of the following diagnoses: autism spectrum disorder, ADD, ADHD, auditory processing and perception disorder, learning disabilities.
2. Please number all students on your class list who have no official diagnosis of special educational needs in emotional and behavioral disorders. Start with '1'.

Selection of students to be assessed.

1. On the next page you will see which students from your class list you should anonymously assess during the survey.

2.　Please mark these students on your list so that you can find them more quickly afterwards.

Appendix A.2. Instructions for Scenario 2

Prepare class list for anonymous student selection.

Please have a copy or a printout of your class list in hand. You should have the following information ready during the survey:
- Age and gender of the students;
- Grade level;
- Existence of an official diagnosis of special educational needs (with all types of SEN assigned to the student);
- Presence of one or more of the following diagnoses: autism spectrum disorder, ADD, ADHD, auditory processing and perception disorder, learning disabilities.

Selection of students to be assessed.

1.　On the next page you will see which students from your class list you should anonymously assess during the survey.
2.　Please mark these students on your list so that you can find them more quickly afterwards.

Appendix A.3. Instructions for Scenario 3

Prepare class list for anonymous student selection.

1.　Please have a copy or a printout of your class list in hand. You should have the following information ready during the survey:
    - Age and gender of the students;
    - Grade level;
    - Existence of an official diagnosis of special educational needs (with all types of SEN assigned to the student);
    - Presence of one or more of the following diagnoses: autism spectrum disorder, ADD, ADHD, auditory processing and perception disorder, learning disabilities.
2.　Please number all students on your class list who have an official diagnosis of special educational needs in emotional and behavioral disorders. Start with '1'.
3.　Please strike out all students on your class list who have no official diagnosis of special educational needs in emotional and behavioral disorders. Start with '1'.

Selection of students to be assessed.

1.　On the next page you will see which students from your class list you should anonymously assess during the survey.
2.　Please mark these students on your list so that you can find them more quickly afterwards.

Appendix A.4. Instructions for Scenario 4

Prepare class list for anonymous student selection.

1.　Please have a copy or a printout of your class list in hand. You should have the following information ready during the survey:
    - Age and gender of the students;
    - Grade level;
    - Existence of an official diagnosis of special educational needs (with all types of SEN assigned to the student);
    - Presence of one or more of the following diagnoses: autism spectrum disorder, ADD, ADHD, auditory processing and perception disorder, learning disabilities.
2.　Please number your entire class list. Start with '1'.

Selection of students to be assessed.

1. On the next page you will see which students from your class list you should anonymously assess during the survey.
2. Please mark these students on your list so that you can find them more quickly afterwards.

Appendix B. Measurements

Table A1. Item and scale properties of the measurements for the current situation of EP, IP, and P-SRB.

Item	N	M	SD	Min	Max	SE	r_{it}
Positive School Related Behavior (P-SRB: α = 0.88)							
Raises hand before speaking in class	173	3.12	1.79	0	6	0.1362	0.630
Follows rules for speaking in class (i.e., raises hand)	173	3.36	1.82	0	6	0.1387	0.775
Concentrates on schoolwork	173	3.04	1.76	0	6	0.1341	0.905
Works quietly at desk	173	3.40	1.85	0	6	0.1410	0.819
Participates in classes	173	3.30	1.79	0	6	0.1360	0.860
Externalizing Problems (EP: α = 0.95)							
Is easily annoyed	173	2.94	2.08	0	6	0.1581	0.733
Refuses to obey rules	172	2.03	1.80	0	6	0.1373	0.839
Resists instructions from authority figures	173	1.91	1.87	0	6	0.1425	0.821
Annoys others on purpose	172	2.26	1.92	0	6	0.1462	0.664
Makes careless mistakes in schoolwork	172	3.31	1.73	0	6	0.1318	0.584
Has trouble maintaining level of concentration while performing tasks	173	3.32	1.96	0	6	0.1489	0.786
Does not seem to listen when being addressed by others	173	2.23	1.85	0	6	0.1404	0.718
Frequently quits tasks early	173	2.98	1.93	0	6	0.1470	0.640
Has difficulty getting organized	172	3.15	2.13	0	6	0.1624	0.751
Easily distracted	172	3.52	2.01	0	6	0.1533	0.845
Fidgets with hands and feet	173	2.05	2.06	0	6	0.1567	0.803
Stands up in situations where sitting is expected	173	1.65	1.91	0	6	0.1450	0.823
Acts as if they are "driven"	172	1.60	1.93	0	6	0.1470	0.758
Talks a lot	172	2.59	1.88	0	6	0.1433	0.568
Has difficulty waiting for their turn	173	2.23	1.98	0	6	0.1507	0.770
Internalizing Problems (IP: α = 0.85)							
Often seems sad	172	1.94	1.84	0	6	0.1400	0.720
Shows decreased interest in activities	173	2.08	1.84	0	6	0.1401	0.775
Has trouble making decisions	173	2.23	1.73	0	6	0.1315	0.673
Is afraid of social situations	172	2.06	1.94	0	6	0.1477	0.729
Complains of physical discomfort	173	1.45	1.75	0	6	0.1328	0.597
Works mostly alone, prefers to be alone	173	2.58	1.70	0	6	0.1291	0.579
Plays mostly alone, prefers to be alone	173	1.75	1.54	0	6	0.1169	0.584
Teased or bullied by classmates	173	1.47	1.52	0	6	0.1152	0.610

Note. r_{it} represents the corrected item-total correlation. α represents Cronbach's α as a measure of reliability.

Table A2. Item and scale properties of the measurements for the lockdown effect on EP, IP, and P-SRB.

Item	N	M	SD	Min	Max	SE	r_{it}
Positive School Related Behavior (P-SRB: α = 0.82)							
Raises hand before speaking in class	173	−0.10	0.63	−2	2	0.0476	0.530
Follows rules for speaking in class (i.e., raises hand)	173	−0.09	0.58	−2	1	0.0440	0.620
Concentrates on schoolwork	173	−0.23	0.75	−2	2	0.0569	0.846
Works quietly at desk	173	−0.14	0.64	−2	2	0.0490	0.734
Participates in classes	173	−0.12	0.71	−2	2	0.0537	0.782
Externalizing Problems (EP: α = 0.92)							
Is easily annoyed	173	0.14	0.71	−2	2	0.0542	0.693
Refuses to obey rules	173	0.12	0.71	−2	2	0.0537	0.792
Resists instructions from authority figures	173	0.09	0.71	−2	2	0.0543	0.840
Annoys others on purpose	173	0.07	0.70	−2	2	0.0529	0.638
Makes careless mistakes in schoolwork	173	0.12	0.48	−1	2	0.0365	0.472
Has trouble maintaining level of concentration while performing tasks	173	0.19	0.68	−2	2	0.0514	0.673
Does not seem to listen when being addressed by others	173	0.09	0.50	−2	1	0.0383	0.688
Frequently quits tasks early	173	0.18	0.67	−2	2	0.0512	0.673
Has difficulty getting organized	173	0.21	0.70	−2	2	0.0533	0.740
Easily distracted	173	0.28	0.70	−2	2	0.0533	0.786
Fidgets with hands and feet	173	0.06	0.55	−2	2	0.0416	0.672
Stands up in situations where sitting is expected	173	0.06	0.57	−2	2	0.0432	0.740
Acts as if they are "driven"	173	0.02	0.56	−2	2	0.0426	0.711
Talks a lot	172	0.08	0.59	−1	2	0.0452	0.357
Has difficulty waiting for their turn	173	0.04	0.50	−2	2	0.0379	0.609
Internalizing Problems (IP: α = 0.84)							
Often seems sad	173	0.13	0.62	−2	2	0.0471	0.687
Shows decreased interest in activities	173	0.13	0.55	−2	2	0.0418	0.699
Has trouble making decisions	173	0.01	0.42	−2	2	0.0317	0.599
Is afraid of social situations	173	0.06	0.49	−2	2	0.0373	0.764
Complains of physical discomfort	173	0.04	0.50	−2	2	0.0379	0.564
Works mostly alone, prefers to be alone	173	0.00	0.52	−2	2	0.0393	0.522
Plays mostly alone, prefers to be alone	173	−0.09	0.56	−2	2	0.0428	0.639
Teased or bullied by classmates	173	−0.10	0.49	−2	1	0.0373	0.648

Table A3. Item and scale properties of the measurements for students' coping with distance learning and psychosocial threats during lockdown.

Item	N	M	SD	Min	Max	SE	r_{it}
Coping with Distance Learning (α = 0.83)							
(-) The student seemed to believe they were on vacation.	173	2.07	1.34	0	4	0.1019	−0.726
(-) The student felt very stressed in the situation.	171	1.95	1.15	0	4	0.0881	−0.256
The student had enough opportunities to work on the computer/laptop/tablet at home.	172	2.39	1.49	0	4	0.1135	0.551
The student was looking forward to the other learning styles/learning methods (e.g., e-learning).	173	1.57	1.26	0	4	0.0960	0.836
The student actively worked on the tasks at home.	173	1.98	1.41	0	4	0.1072	0.740
The student managed to get involved in the other learning styles/learning methods.	173	1.65	1.37	0	4	0.1042	0.951
Psychosocial Threats (α = 0.81)							
The student is at risk of psychological or physical violence in the out-of-school living environment.	172	0.69	0.96	0	4	0.0731	0.859
The student witnesses violence in the out-of-school environment.	171	0.61	0.94	0	3	0.0715	0.789
(-) The student's basic needs are ensured during the school closure.	173	3.49	0.91	0	4	0.0689	−0.365
The student is at risk of emotional neglect in the out-of-school environment.	172	0.94	1.17	0	4	0.0889	0.838
The student is threatened with social isolation outside of school.	172	1.11	1.27	0	4	0.0970	0.618

Note. r_{it} represents the corrected item-total correlation. α represents Cronbach's α as a measure of reliability. (-) indicates that the item was recoded for building the overall scale.

Table A4. Item and scale properties of the measurements for teachers' perception of student-teacher relationship ($\alpha = 0.78$).

Item	N	M	SD	Min	Max	SE	r_{it}
Item_01	173	3.41	0.59	2	4	0.0449	0.298
Item_02	173	3.40	0.60	2	4	0.0455	0.545
Item_03	173	3.10	0.77	1	4	0.0586	0.403
Item_04	173	3.51	0.60	2	4	0.0454	0.670
Item_05	173	2.98	0.74	1	4	0.0559	0.596
Item_06	170	2.56	0.73	1	4	0.0559	0.779
Item_07	173	3.46	0.52	2	4	0.0397	0.454
Item_08	173	3.38	0.64	1	4	0.0487	0.541
Item_09	173	3.39	0.59	2	4	0.0445	0.657

Note. r_{it} represents the corrected item-total correlation. α represents Cronbach's α as a measure of reliability.

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