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Factors related to students' psychological distress during COVID-19 disruption across countries

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Abstract

Background: The global outbreak of the novel COVID-19 virus presented a significant threat to students' well-being across the globe. In this paper, we construct a measure of student psychological distress related to COVID-19 disruption. We then examine the variation in students' psychological distress as a function of student demographic characteristics, home, school and student factors and compare the results across countries.

Methods: We use item response theory to construct a comparable scale for students' psychological distress across participating countries. Furthermore, we employ linear regression to explore the association of student characteristics and other student and school factors.

Results: An internationally comparable scale for students' psychological distress was constructed using the model assuming equal item parameters across countries. This enables us to compare the levels of students' psychological distress and its relationships with the construct across countries. The most important factors contributing to students' psychological distress were school support, school belonging, disrupted sleep, difficulties in learning after the disruption and preparedness for future disruptions. In some countries, we find suggestive evidence that boys exhibited lower psychological distress than girls. We do not find any meaningful relationship between home resources and the students' psychological distress scale.

Conclusions: Students across participating countries expressed negative feelings about schooling and events happening during the disruption and their effects on their future. We find indication that some school and student factors had a significant relationship with students' psychological distress in many countries. This was especially the case in countries where remote learning took place during the disruption. In addition, differences across countries are found. The key finding is that high psychological distress is present in all countries studied around the world. However, it is important to note that the factors contributing to this distress are not the same everywhere. Therefore potential interventions must consider country specific factors.

Keywords: Psychological distress, Lower secondary students, Home resources, School support, Student characteristics

Introduction

In March 2020, in response to the global outbreak of the novel COVID-19 virus, many countries across the world started to put measures in place to prevent its rapid spread. These measures heavily affected the public and private daily life of people around the world. Restricting the movement of people was central to cut down the transmission of COVID-19. For example, numerous countries introduced working from home mandates, non-essential travel was limited, and governments implemented policies to minimize contact between people. Education, like many other sectors, was also affected, as face-to-face schooling was limited. Many education systems switched to online schooling and remote learning, while, in others, teaching and learning completely stopped for a significant period. This, along with the uncertainty about the duration and constant changes of the implemented measures, likely affected the students and their well-being during and after the disruption.

Psychological distress

Facing the global outbreak of COVID-19, even mature minded adults have difficulties in adapting to it, let alone adolescents who are at a critical stage of their physical and mental development. Stresses are part of life, almost everyone at certain point experiences stress regardless of the age, gender, or their circumstances (Currie et al., 2008). Major life events like the COVID-19 disruption are more likely to trigger stress (Yasmin et al., 2020). Despite the fact that stress is a normal human experience, the definitions of stress can be very diverse (Yasmin et al., 2020). Stress can be defined as "the nonspecific response of the body to any demand" (Fink, 2016; Yasmin et al., 2020) and researchers say "that stress is a force or event that impairs normal stability, balance or functioning" (Yasmin et al., 2020). There are multiple factors related to school children's stress: conflicts with teachers and classmates, insufficient parents' attention, deficient sleeping and unhealthy eating habits due to their low self-regulation (Dustin et al., 2013; Yasmin et al., 2020).

Specifically in the context of COVID-19, adolescents were forced to study from home, isolated from their classmates and peers. Their lives became more monotonous and they were more likely to indulge themselves into social media, making them more prone to stress. On top of that, adolescents share similar concerns with adults like fear of infection for themselves and their loved ones, family finance, limited private space at home, interrupted daily routine, constant news exposure, and uncertainty about the future (Ellis et al., 2020; Lakhan et al., 2020). The pandemic created many stressors that had significant consequences for mental health of adolescents.

Stress is not limited to people's physical reaction but also has an impact on their emotions and cognition (Dangi and George, 2020; Yasmin et al., 2020). Ellis et al. (2020) have found that adolescents experiencing COVID-19 stress were more likely to suffer from loneliness and depression because at this age, they have greater needs for peer connection and belonging (Brown and Larson, 2009). Studies have pointed out an increase in mental health issues (Organization, 2020); many people, including school age children, were affected by overwhelming stress brought by the impact of COVID-19 (Lakhan et al., 2020).

Psychological distress and its correlation with other constructs

The academic literature suggests that negative emotions are associated with other important constructs, such as with social, cognitive, and health factors. Lyubomirsky et al. (2005) report that positive emotions foster sociability and activity, altruism, liking of self and others, strong bodies and immune systems, and effective conflict resolution. Hoyt et al. (2012) find that positive feelings during adolescence were significantly associated with better reports of perceived general health during young adulthood and fewer risky health behaviors.

Furthermore, emotions have also been studied in the school context. Researchers have found that higher levels of negative emotions are associated with lower cognitive capacity (Isen, 1990) and academic achievement (Hashim et al., 2012). Gutman and Vorhaus (2012) document that emotional, behavioural, social, and school well-being at ages 10 and 13 are significantly correlated with concurrent academic achievement and, predominantly, with future academic achievement. Berger et al. (2011) report that in the primary school context, socio-emotional variables, and particularly teachers' ratings of their students' self-esteem, are associated with academic achievement. In their review (Kutsyuruba et al., 2015) suggest that positive school climate, safe school environment and well-being of students are significant and strongly interrelated antecedents of meeting students' academic, emotional and social needs. On the other hand, school-level factors, measured in terms of teaching style, did not demonstrate significant direct impacts on student well-being (Govorova et al., 2020). Similarly, Ruus et al. (2007) find an association between the school value system and teachers' attitudes toward students, as perceived by them on students' psychological and physiological well-being, and academic success.

Social support is one of the important factors as well. Perceived social support was found to be negatively correlated with depression, anxiety and stress (Vungkhanching et al., 2017; Hyseni Duraku and Hoxha, 2018; Zhang et al., 2016). Moreover, schools are increasingly perceived as playing an important support role in students' mental health (March et al., 2022). In addition, the benefit of school belonging seems to be recognized for academic and psycho-social outcomes of students. Fostering higher levels of school belonging may prevent mental health problems (Arslan et al., 2020; Zhang et al., 2018).

Relationships between students' background characteristics and their well-being have been studied as well. Studies suggest that higher anxiety levels were found for girls (Bakhla et al., 2013; McLean and Anderson, 2009; Schwartz et al., 2021). In addition, higher generalized anxiety was found in adolescents than in children (Orgilés et al., 2012). Matud et al. (2019) examine the association of gender and psychological well-being in adults and find that men exhibited higher self-acceptance and autonomy, and women scored higher in personal growth and positive relations with others. In summary, the findings of research on gender suggest higher negative emotions for girls and older children. Furthermore, the link between socio-emotional well-being and socioeconomic status is not consistent; Bradley and Corwyn (2002) report that they find a rather weak relationship.

Research of student psychological distress during disruption

Since the beginning of the COVID-19 pandemic, educational researchers have prioritized the study of its impact on teaching and learning. The focus was to examine the breadth and depth of its impact, to find solutions to offset the negative effects, and to propose recommendations for future adjustment and preparedness for similar events.

Grajek and Sobczyk (2021) studied the level of well-being and emotions during the pandemic in Polish university students and found high risk of depression as reported by the respondents. Al-Sabbah et al. (2021) investigated biological, psychological and social well-being of university students in United Arab Emirates and Jordan, and Alfawaz et al. (2021) studied psychological well-being of university students in Saudi Arabia. They reported that many respondents have suffered from anxiety, depression and insomnia during the COVID-19 lockdown. Furthermore, Ryerson (2022) investigated alcohol consumption in relation to psychological well-being of college students in Pennsylvania. She found an increase in alcohol consumption related to a decline in psychological health. Van de Velde et al. (2021) describe how students across 26 countries in higher education reacted to the pandemic by collecting data about their living conditions before and during the pandemic, mental well-being, perceived stressors, resources, knowledge related to COVID-19, and their attitudes towards measures implemented during the disruption. Similarly, Schwartz et al. (2021) collected data on 12 to 18-year-olds in Alberta Canada. They report on students' experience of stress, behaviour, affect and cognitive functioning when returning to school after the disruption period. The authors find that students expressed concern for their health, family confinement, and maintaining social contact. In addition, stress levels of girls were higher compared to boys.

Studies report an increase in depression and anxiety symptoms during the COVID-19 pandemic (Śniadach et al., 2021), along with more sleep disturbances (Lavigne-Cerván et al., 2021). Children exposed to social distancing, especially those with parents in essential jobs, those living with more people, and those with guardians having a lower education level, experienced higher levels of depression and anxiety (Garcia de Avila et al., 2020). Furthermore, a positive relationship between coping style and negative emotions was found. Several studies showed that effective coping strategies are negatively related to experiencing more severe psychological distress (Akbar and Aisyawati, 2021; Yu et al., 2020; Li et al., 2022).

In the context of the COVID-19 global outbreak, the International Association for the Evaluation of Educational Achievement (IEA) and the United Nations Educational, Scientific and Cultural Organization (UNESCO) launched the Responses to Educational Disruption Survey (REDS). REDS was an international joint effort to gather information and describe how students, teachers, and schools responded to the COVID-19 pandemic across the world. Overall, 11 countries spanning four continents, including Africa (Burkina Faso, Ethiopia, Kenya, Rwanda), Asia (India, Uzbekistan), the Arab region (the United Arab Emirates), Europe (Denmark, the Russian Federation, Slovenia), and Latin America (Uruguay) participated in the study. Data were collected systematically to ensure internationally comparable results, providing researchers a unique opportunity to expand their understanding of the pandemic across and within different educational systems (Meinck et al., 2022a). One of the topics of interest in REDS was students' well-being. Within the well-being a special focus was on student psychological distress

regarding the COVID-19 changes in schooling and happenings in closer and distant environments.

Most of the previous studies during the disruption relied on regional data. However, Yüurekli et al. (2022) analyzed the student data from REDS including eight diverse countries. They first construct a well-being scale and then with data mining techniques determine the most influential factors in student well-being. These were related to students' worries about getting infected with COVID-19, their learning progress during the disruption, their motivation to learn when school reopened, and their excitement to see their classmates after returning to school. In their study, the authors compare heterogeneous populations in international surveys, however, little work has been done to examine the quality and comparability of the well-being measure used in Yüurekli et al. (2022)'s work.

Research aim and Questions

We aim to complement the findings from REDS which show that students perceived negative effects of the educational disruption on their emotional well-being but also experienced supportive conditions (Meinck et al., 2022a). We purposely examine the countries that participated in REDS and test the quality of the scale corresponding to students' psychological distress. Although students' psychological distress during the COVID-19 disruption has been investigated in different settings and contexts by researchers, the majority of this research focuses their attention on university students in Europe, America and Asia (Ryerson, 2022; Van de Velde et al., 2021; Grajek and Sobczyk, 2021; Al-Sabbah et al., 2021). With the exception of Yüurekli et al. (2022) the majority of these studies applied regional data or homogeneous populations.

In addition, Schneider et al. (2021) point out that many studies of mental health during COVID-19 focused on anxiety and depressive disorders specifically and fewer relate to more generalized and non-pathological distress. With this paper we aim to close this gap and study students' general psychological distress in lower secondary students across eight heterogeneous populations, including African countries. Furthermore, we evaluate the cross-cultural comparability of the students' psychological distress scale. Our study seeks to describe students' psychological distress related to the disruption. The psychological distress captures feelings of anxiety, worry, and being overwhelmed. In addition, the students' psychological distress is specifically related to COVID-19 disruption. We aim to understand how students' psychological distress is associated with their background characteristics, home resources, physical health, self-perceived school support, school belonging, number of experienced stressful family events, difficulties in learning after the disruption and preparedness for future disruptions. The study also explores whether these associations varied across REDS participating countries. These variables were selected based on the literature review and their availability in the REDS datasets.

The countries that participated in REDS span Africa, Asia, the Arab region, Europe, and Latin America. Naturally, this poses challenges for developing and constructing measures for a heterogeneous set of countries. We therefore begin our study by investigating whether comparable measures of students' psychological distress related to worry and being overwhelmed during the pandemic can be constructed. This is central to our study, as internationally comparable results can only be reached if the measures used are

comparable across countries. Additionally, we aim to describe the correlates of students' psychological distress across countries to (1) identify whether certain students are more at risk and (2) examine whether school support and belonging, home resources, physical health, disrupted sleep, number of stressful events, difficulties in learning after the disruption and preparedness for future disruptions mitigated the impact of the disruption.

The paper focuses on the following research questions:

- Can a comparable scale of students' psychological distress related to COVID-19 disruption be constructed across all participating countries?
- How does students' psychological distress vary across countries?
- What is the relationship between students' psychological distress, their characteristics and home resources across countries?
- What is the relationship between students' psychological distress, school support and belonging, physical health, disrupted sleep, number of stressful family events, difficulties in learning after the disruption and preparedness for future disruptions across countries?

Method

Data

To investigate students' psychological distress and the correlates during the disruption we use data from REDS (Meinck et al., 2022b). REDS used a two-stage sampling design to study how educational systems reacted to the COVID-19 global outbreak. The target population of the survey was associated to schools offering Grade 8. In a first step, a random sample of schools offering Grade 8 was selected in each participating country. In participating schools, principals were asked to provide information about their schools via a school-level questionnaire. In a second sampling stage, students or teachers were randomly selected to participate in the study. To ensure sufficient representation, a minimum of 150 schools were selected from each country. Within each selected school, 20 eligible students and 20 teachers were randomly sampled. In cases where the number of eligible individuals was less than the required sample size, all were still included in the study. In Denmark and Slovenia the second sampling stage involved a random selection of an intact class and all students from that class were asked to participate. Participating students (teachers) were asked to respond to a student-level (teacher-level) questionnaire (UNESCO and IEA, 2022).

In this study, we use data from countries that collected student-level information. These countries are Burkina Faso, Denmark, Ethiopia, Kenya, the Russian Federation, Slovenia, the United Arab Emirates, and Uzbekistan. Overall, the REDS database contains information about 21,208 students across 1,140 participating schools. The information about the number of participating schools and students, percentage of girls, average age and average scale value of home resources is presented in Table 1.

The percentage of girls in participating countries ranged from 46% to 55%. The student's age across countries ranged from 10 to 18.5 years old. The age range in each country is 3.42 years (SD = 0.38) in Denmark, 5.33 (SD = 0.43) in Uzbekistan, 7.42 (SD = 0.38) in Slovenia, 7.67 (SD = 0.69) in the United Arab Emirates, 7.83 (SD = 1.44) in

Table 1 Information about the sample across participating countries

Country	Number of schools	Number of students	Percentage of girls	Average Age	Average home resources
Burkina Faso†	124	2474	55	14.99	18.64
Denmark†	75	1534	54	14.71	53.65
Ethiopia†	186	3630	46	13.77	26.77
Kenya†	107	1603	51	14.65	28.80
Russian Federation	192	3516	50 (0.01)	14.48 (0.01)	51.12 (0.37)
Slovenia	136	2552	49 (0.01)	13.79 (0.01)	52.42 (0.38)
United Arab Emirates	171	2988	52 (0.02)	13.45 (0.02)	53.56 (0.41)
Uzbekistan	149	2911	50 (0.01)	14.63 (0.01)	46.67 (0.31)

Standard errors appear in parentheses

† Data may not be representative of target population

Burkina Faso, 7.83 (SD = 1.38) in Kenya, 7.84 (SD = 0.45) in the Russian Federation, and 7.92 (SD = 1.82) in Ethiopia, respectively. Average home resources ranged from 18 points in Burkina Faso to 53 points in the United Arab Emirates.

The data derived from REDS represent a great opportunity to learn about how educational systems faced the COVID-19 disruption. However, the survey was designed, and the data collected, in unusual and adverse circumstances. We find it therefore relevant to underline the important limitations of the data. First, Denmark exhibited low response rates of students (38%), which implies that inference about the population parameters could be done only when maintaining very strong assumptions. Second, Burkina Faso, Ethiopia and Kenya were not able to provide all information needed to accurately compute the selection probabilities of students. This attribute of their data collection makes it impossible to justify their data as derived from a probabilistic sample. Therefore, as recommended by REDS's managing consortium, our analyses for Burkina Faso, Denmark, Ethiopia, and Kenya are not considered representative of their respective population and hence we do not use sampling weights in our estimation. The deviations in the Russian Federation, Slovenia, the United Arab Emirates, and Uzbekistan are minor and are described in more detail in Meinck et al. (2022b).

Variables

Students participating in REDS responded to a questionnaire with items covering a large spectrum of constructs and demographic information. A large part of the questionnaire relates to questions about remote learning. REDS asked students about the location where they attended school lessons during the COVID-19 disruption. The possible response options included students *did not do any schoolwork* (only available in Burkina Faso, Kenya and Ethiopia), students *continued to come to school for all of their lessons, or students came to school for a certain number of lessons (i.e., no, some, most, and half) and attended the rest of the lessons in a place away from school*. According to the international REDS report (Meinck et al., 2022a) about 85% students in Burkina Faso, 21% in Kenya, and 44% in Ethiopia reported that they did not do any schoolwork during the COVID-19 disruption. These students skipped the part of the questionnaire related to

Table 2 Items comprising the construct of students' psychological stress

To what extent do you agree or disagree with the following statements about how you felt during the COVID-19 disruption? (0=Strongly disagree;1=Disagree;2=Agree;3=Strongly agree)	
I felt anxious about the changes in my schooling.	IS1G24A
I felt overwhelmed by what was happening in the world due to the COVID-19 pandemic.	IS1G24B
I felt overwhelmed by what was happening in my local area due to the COVID-19 pandemic.	IS1G24C
I was worried about how the disruption affected my learning.	IS1G24D
I was worried about how this disruption will affect my future education.	IS1G24E
I missed my usual contact with my classmates.	IS1G24F
I was worried about catching COVID-19.	IS1G24K

Table 3 Items comprising the construct of students' difficulties in learning after the disruption (items were taken from two questions)

To what extent do you agree or disagree with the following statements about how you felt during the COVID-19 disruption? (0=Strongly disagree;1=Disagree;2=Agree;3=Strongly agree)	
I was more motivated to learn when school reopened than at any other time.	IS1G27A*
I found it hard to concentrate during class time.	IS1G27D
I felt that I had fallen behind in my learning compared to other students.	IS1G27E
I had to complete more assessments than usual.	IS1G27F
To what extent do you agree or disagree with the following statements about your school experiences after the [COVID-19 disruption]? (0=Strongly disagree;1=Disagree;2=Agree;3=Strongly agree)	
My teachers went over the work we did during the [COVID-19 disruption].	IS1G28B*
We rushed through a lot of new schoolwork.	IS1G28C
Extra tuition was available to catch up on schoolwork.	IS1G28G*

* Items were reverse coded

remote teaching and learning. In other countries it was assumed that students continued with remote or face-to-face learning, and they responded to all of the questions in the questionnaire.

We wanted to be as inclusive as possible, and focused on questions that were administered to all students, including the ones that did not do any schoolwork during the disruption. This limited the choice of variables to those unrelated to schoolwork during the disruption. In our analyses, we select seven items with the aim to measure the construct of students' psychological distress during the disruption. With these items, we construct a combined variable as the dependent variable in regression analyses. We identified another seven items that were combined to a scale, focusing on reported difficulties in learning after the disruption. Additionally, our analyses included demographics such as age, gender and student background characteristics related to their home resources and socioeconomic background (SES). Furthermore, we include items related to feeling fit and healthy, sleeping during the disruption, perceived school support, school belonging, the number of stressful family events and how prepared students feel for future disruptions. The wording of items used for constructing students' psychological distress and difficulties in learning after the disruption, along with the corresponding response

options, are presented in Tables 2 and 3, respectively. The wording of the selected covariates is presented in Table 7.

In the next section, we describe the process of constructing the comparable scales across countries reflecting the construct of students' psychological distress during COVID-19 disruption and difficulties in learning after the disruption. For *psychological distress* we use the question prompting students to express their agreement with selected feelings during the COVID-19 disruption. For example, the question items asked students to report their anxiety about the changes introduced by the COVID-19 pandemic in their schools and the extent to which they were worried about their present learning and future education. Students were asked to indicate their level of agreement (ranging from "strongly agree" to "strongly disagree") for each statement. For *difficulties in learning* we used the question inquiring about students' agreement to items related to schooling after the disruption. Example items are asking about students finding it hard to concentrate during class time, or that they rushed through a lot of new schoolwork after the disruption. Similar to the psychological distress scale, students indicated their level of agreement (ranging from "strongly agree" to "strongly disagree") for each of the seven statements.

The number of stressful situations students experienced during the disruption was based on the question that asked students if they were affected by any of the following situations during the COVID-19 disruption: whether one or both of their parents/ guardians lost their job; whether their family had to be more careful with money than usual; whether one or both of their parents/ guardians had to work from home; whether one or both of their parents/ guardians were stressed about their job; whether their family had to move to live in a new location; whether the students had to live away from my parents/ guardians. Students could respond "Yes" or "No" to each of these situations. We counted the number of situations students experienced at individual level.

In addition, the SES measure in REDS was constructed at the international level using the IRT Rasch model. The SES scores were standardized to have a mean of 50 and a standard deviation of 10 across the participating countries (UNESCO and IEA, 2022). The scale includes the following variables: number of books at home, parents' highest level of education, parents' highest occupational status, language spoken at home most of the time, and resources (internet at home, having a quiet space to work with a desk and chair, and number of desktop or laptop computers, tablets and smartphones at home). For more details on the SES measure see UNESCO and IEA (2022). As this scale includes material and social resources available in students' home we refer to it in our study as home resources.

Statistical analysis

Scale construction

We first identified items from the REDS student questionnaire that map onto essential components for psychological distress and difficulties in learning after the disruption (COVID-19), respectively (Tables 2 and 3). Given that the observed responses to the items come from the selection of ordered categorical (ordinal) response scale, namely *strongly agree*, *agree*, *disagree*, and *strongly disagree*, the analysis considered the items as categorical data. All items were reversed so that the higher value corresponds to a higher

level of agreement. Consequently, if the response to an item is positive (reverse coded as a higher integer numerically), then it corresponds to a positive association with students' psychological distress related to worry and being overwhelmed during the COVID-19 disruption. The same procedure was applied to the scales of difficulties in learning after the disruption (COVID-19). Both scales were constructed using item response theory (IRT), specifically the Generalized Partial Credit Model (Muraki, 1992). The scale scores were calculated as weighted likelihood estimates (WLE). To ensure cross-group comparability, we examined the root mean square deviation (RMSD) item-fit statistic, a widely employed IRT-based approach in contemporary large-scale assessments like PIAAC, PISA, and TIMSS (e.g., Buchholz and Hartig (2019); von Davier and Bezirhan (2023); Yamamoto et al. (2013); Fährmann et al. (2022)). The RMSD quantifies the discrepancy between the observed item characteristic curve (ICC) and the model-based ICC for each item, making it sensitive to both location and discrimination. Values close to zero indicate a good item fit, meaning that the international item parameters describe the responses in the specific country very well. We followed the standard employed in other large-scale assessment studies for questionnaire constructs and set a cutoff value of 0.3 to define noninvariance. When this cutoff criterion was exceeded, it suggested that the international item parameters might not be suitable for this country, and group-specific item parameters should be assigned. The reliability indices (Cronbach's alpha and McDonald's omega) were estimated using a polychoric correlation matrix. The IRT analysis was performed using the R-package TAM (version 4.1–4; (Robitzsch et al., 2023)).

Regression Analysis

Our empirical approach to the research question is to look at the conditional association between students' psychological distress and other relevant factors. We use linear regression analysis to quantify this association. We present two different models. First, we use home resources, age and gender to explain differences in students' psychological distress. Equation 1 describes this model. In our second set of results, we expand the model by adding number of negative family events, school support, school belonging, feeling fit and healthy, disrupted sleeping, difficulties in learning after the disruption and preparedness for future disruptions, as predictors. Equation 2 describes this second model.

$$PsychologicalDistress_{is} = \beta_0 + \beta_1 * Gender_{is} + \beta_2 * Age_{is} + \beta_3 * HomeResources_{is} + \epsilon_{is} \tag{1}$$

$$\begin{aligned} Psychological\ Distress_{is} = {} & \beta_0 + \beta_1 * Gender_{is} + \beta_2 * Age_{is} + \beta_3 * Home\ Resources_{is} \\ & + \beta_4 * Number\ Of\ Events + \beta_5 * School\ Support_{is} + \beta_6 * School\ Belonging \\ & + \beta_7 * Physical\ Health_{is} + \beta_8 * Disrupted\ Sleep_{is} + \beta_9 * Difficulties\ In\ Learning_{is} \\ & + \beta_{10} * Preparedness\ For\ Future\ Disruptions_{is} + \epsilon_{is} \end{aligned} \tag{2}$$

We estimate regression coefficients for each country separately. For countries where weights were available, standard errors were computed using the jackknife repeated replication (JRR) method to take into account the clustered nature of the data. All regression analyses were done using IEA International Database (IDB) Analyzer version 5.0.12.0 (IEA, 2022) and SPSS version 24 (IBM Corp, 2016).

Results and discussion

We begin this section by summarizing how the scale reflecting our main outcome variable was constructed. We report on scale reliability and scale construction. Further, we present results from two different regression models. The first model includes students' psychological distress as outcome variable and uses student demographics and background information as predictors. That is, the model aims to explain students' psychological distress with student characteristics that were unlikely to change due to the pandemic in the short run. In the second model, we include seven additional predictors which represent indicators related to physical health, disrupted sleep, number of stressful events student's family experienced, difficulties in learning after the disruption and preparedness for future disruptions, and school factors related to perceived school support and belonging. The second group of variables is more susceptible for potential interventions.

Constructing the scales for students' psychological distress and difficulties in learning after the disruption

The RMSD examines the measurement invariance and cross-country comparability of the participating countries. The RMSD measures the difference between the observed item characteristic curve (ICC) and the model-based ICC for each item. It is sensitive to both location and discrimination. When values are close to zero, it indicates a strong fit, meaning that the international item parameters describe the responses in a specific country effectively. To establish consistency, we adopted the standard from other large-scale assessment studies for questionnaire constructs. We set a cutoff value at 0.3 to define noninvariance. If this threshold was exceeded, it signaled that the international item parameters may not be suitable for the country in question, and we should consider using group-specific item parameters instead.

The distribution of RMSD values across countries for each scale is summarized in Fig. 1, with a solid line at RMSD = 0.3 indicating the cutoff value for assigning unique

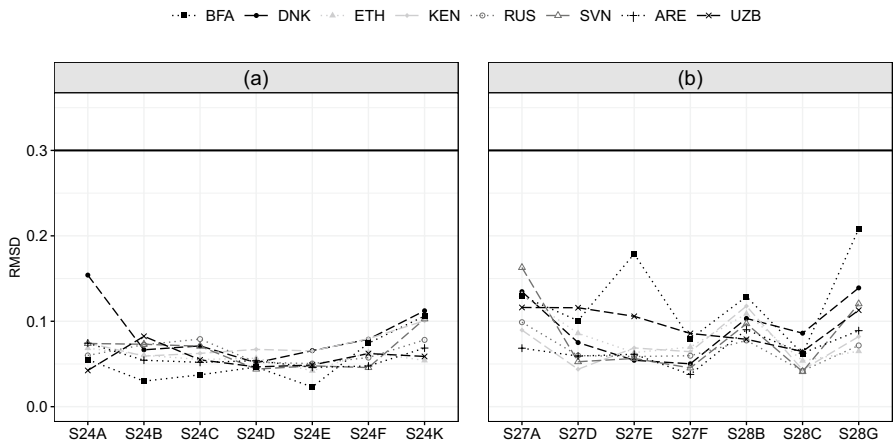

Fig. 1 Distribution of RMSD across countries for (**a**) student's psychological distress scale and (**b**) student's difficulties in learning after the disruption

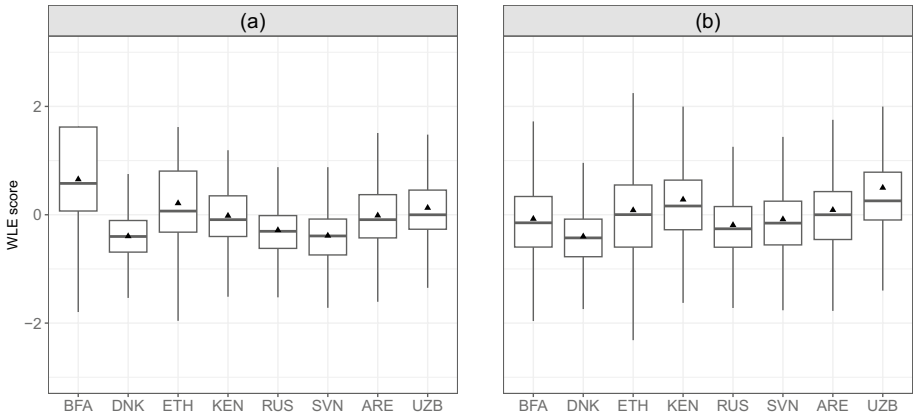

Fig. 2 Distribution of (**a**) student's psychological distress scale and (b) students' difficulties in learning after the disruption scale. *BFA* Burkina Faso, *DNK* Denmark, *ETH* Ethiopia, *KEN* Kenya, *RUS* the Russian Federation, *SVN* Slovenia, *ARE* the United Arab Emirates, *UZB* Uzbekistan

Table 4 Cronbach alpha and omega reliability coefficients

Country	Psychological Distress		Difficulties in Learning	
	Alpha	Omega	Alpha	Omega
Burkina Faso	0.90	0.90	0.90	0.90
Denmark	0.84	0.84	0.84	0.84
Ethiopia	0.88	0.88	0.88	0.88
Kenya	0.83	0.84	0.83	0.84
Russian Federation	0.86	0.86	0.86	0.86
Slovenia	0.87	0.88	0.87	0.88
United Arab Emirates	0.86	0.87	0.86	0.87
Uzbekistan	0.82	0.83	0.82	0.83
International pooled data	0.88	0.88	0.88	0.88

parameters to a particular country. Panel (a) presents the RMSD for the student's psychological distress scale, and Panel (b) presents the RMSD for the scale of difficulties in learning after the disruption. Following these criteria, none of the RMSD values exceeded this threshold, indicating that both scales are comparable for all participating countries.

Having supported the measurement invariance of the student's psychological distress and difficulties in learning after the disruption scales, means of both scales can be compared across countries. Figure 2 provides two panels: Panel (a) presents the distribution of student's psychological distress, while Panel (b) displays the distribution of students' difficulties in learning after the disruption. The country average scores are represented by triangles. All items were reversed so that the higher value corresponds to a higher level of students' psychological distress related to worry and being overwhelmed during the COVID-19 disruption. Similarly, as with the scale of difficulties in learning after the disruption, a high value indicates that students encountered more difficulties.

In Panel (a), Burkina Faso had the highest scale value (0.65), indicating that students in this country experienced more psychological distress during the disruption. In contrast,

Denmark, Slovenia, and the Russian Federation stood out with notably low values on the psychological stress scale (−0.40, −0.37, and −0.28, respectively). Moving to Panel (b), it allows for the comparison of means on the students' difficulties in learning after the disruption scale across countries. Here, students from Uzbekistan showed that they experienced more difficulties in learning after the disruption (0.50), while Denmark had the lowest average values on the scale (−0.40).

We reviewed the reliability coefficients using Cronbach's alpha and McDonald's omega by country and international pooled data (Table 4). Cronbach's alpha and McDonald's omega are the estimates of the internal consistency of each scale, for which values above 0.7 indicate satisfactory reliability and values above 0.8 are typically regarded as high reliability. The scale reliabilities for students' psychological distress scale are high, being 0.88 for the international pooled data with coefficients from 0.82 to 0.90 in all populations.

Comparison of students' psychological distress across countries

The student-level outcome of interest in our study is students' psychological distress related to the COVID-19 disruption. We begin this section by investigating the variation in the average psychological distress experience by students across countries. The outcome of the measurement invariance analysis indicate that the means of the scale scores exhibit comparability across the participating countries. Therefore, we first examine the distribution of psychological distress in the scale across these countries. The distribution of individual item responses, organized by item and country, is presented in Table 8 in the Appendix (the distribution of other variables included as predictors is also presented in Tables 9, 10, 11, 12, 13 and 14 in the Appendix).

The distribution of students' psychological distress scale across countries is presented in Fig. 2 in the left panel. As mentioned before the highest scale scores across the participating countries are observed in Burkina Faso, indicating that students in this country experienced greater psychological distress during the disruption. From the participating countries, students in Denmark, Slovenia, and the Russian Federation exhibited relatively lower scale scores on the psychological stress scale.

A similar pattern can be observed in the results of individual items included in the scale. Across all countries, with the exception of Denmark, more than half of the students and participating students agreed or strongly agreed with feeling anxious about the changes in schooling. Students in Kenya revealed higher levels of concern, while students in Denmark expressed lower levels. Similarly, about 60% or more of students or participating students across the countries agreed or strongly agreed that they were worried how the disruption affected their learning.

A cross-country comparison shows that participating students in Burkina Faso and Kenya expressed the highest levels of concern regarding how the disruption affected their learning and its potential impact on their future education. In contrast, students in Denmark appeared to be relatively less concerned, although they still showed concern about the effects of the disruption on their learning and education. Participating students from Burkina Faso and students from Uzbekistan missed their usual contact with their classmates the most, while students from the Russian Federation and Slovenia showed the least concern in this regard.

In many countries, students were feeling overwhelmed due to the global and local events caused by the COVID-19 pandemic. Participating students from Denmark, along with students from the Russian Federation and Slovenia expressed slightly less concern compared to students from other countries. And in general students seemed to be a bit more overwhelmed by global events than those closer to their local area. The highest levels of worry about catching COVID-19 were reported in Burkina Faso, Ethiopia, Kenya, the United Arab Emirates and Uzbekistan, where more than 73% of students and participating students agreed with the statement.

Overall, our results suggest some tendencies across countries. Participating students from Burkina Faso expressed the most concern related to learning and schooling across all items. At the same time, in this country about 85% of responding students reported that they did not do any schoolwork during the disruption (Meinck et al., 2022b). Conversely, students from the Russian Federation and participating students from Denmark seemed to be less affected emotionally by the disruption compared to other participating countries. In general, we observe a high level of agreement with items related to students' psychological distress. Students expressed being worried, overwhelmed and anxious about the changes and events related to the COVID-19 disruption across all countries. This finding is in line with results from other studies that report an increase in depression and anxiety symptoms on children and adolescents during the COVID-19 pandemic (Śniadach et al., 2021; Jiao et al., 2020; Segre et al., 2021).

Students' psychological distress and demographic characteristics

Our results show a substantial cross-country variation in the distribution of item responses related to the construct of students' psychological distress. Moreover, this variation is also reflected on a cross-country comparison of the derived scale. We proceed to examine whether the student-level demographics can explain the observed variation in students' psychological distress. For this we estimate the model described in Eq. 1. The variable $gender_{is}$ was coded as 1 if a student responded as being a boy, and as 0 if a student responded as being a girl. Therefore, $\hat{\beta}_1$ can be interpreted as the conditional difference in students' psychological distress scale between gender. The variable age_{is} is represented by students age at the time of the survey. Negative values would suggest that older students show less psychological distress. The variable $HomeResources_{is}$ was

Table 5 Estimated coefficients for the regression of students' psychological distress on gender, age, and home resources

Variable	BFA	DNK	ETH	KEN	RUS	SVN	ARE	UZB
β_1 Gender (boy)	0.02	−0.27	−0.04	0.08	**−0.13**	**−0.11**	**−0.08**	0.03
					(0.02)	(0.02)	(0.02)	(0.02)
β_2 Age	−0.03	−0.02	0.06	−0.05	0.00	−0.03	**−0.05**	−0.01
					(0.02)	(0.03)	(0.02)	(0.02)
β_3 Home resources	−0.05	−0.01	− 0.02	0.02	**−0.08**	**−0.06**	**−0.06**	−0.01
					(0.03)	(0.02)	(0.02)	(0.02)
R^2	0.1	7.2	0.4	0.6	2.2	1.4	1.3	0.1
N	2272	1200	3075	1448	3432	2470	2792	2896

The statistical significance is indicated in bold text. Standard errors appear in parentheses. *BFA* Burkina Faso, *DNK* Denmark, *ETH* Ethiopia, *KEN* Kenya, *RUS* the Russian Federation, *SVN* Slovenia, *ARE* the United Arab Emirates, *UZB* Uzbekistan

constructed in a way that students scoring higher in the scale indicate more resources available at home. Negative values of $\hat{\beta}_3$ would suggest that that students with more home resources showed less psychological distress.

We present our results for this model in Table 5. Inspecting $\hat{\beta}_1$, our findings suggest that in half of the countries there was a significant difference between boys and girls in terms of their self-reported psychological distress. Although the coefficients are small, we can see a gender association in Denmark, the Russian Federation, Slovenia and the United Arab Emirates. In other countries the size of the coefficient is negligible. In five out of eight countries we observe that girls express higher psychological distress than boys, if we keep age and home resources constant. Our construct of students' psychological distress includes feelings of worry and anxiety and the results are therefore in-line with research findings suggesting an association between negative emotions and gender. Several studies reported that girls tend to have higher anxiety levels than boys (Bakhla et al., 2013; McLean and Anderson, 2009; Schwartz et al., 2021).

For the variable age, we find small and insignificant coefficients in all countries except the United Arab Emirates, where the coefficient is small, negative, and significant. We have to keep in mind that the age of the students does not vary that much within countries as they were in the same grade. Similarly, the coefficient related to home resources was close to zero in all countries. Although it was significant in the Russian Federation, Slovenia and in the United Arab Emirates its magnitude was very small. The negative direction suggests that students with fewer home resources tend to have higher values on the students' psychological distress scale, while holding gender and age fixed. However, it is important to note that a robust relationship between socioeconomic status and socio-emotional well-being has not been confirmed in other studies (Bradley and Corwyn, 2002).

Finally, we observe that gender, age, and home resources explain a small portion of the total variance associated with students' psychological distress related to the COVID-19 disruption. The highest predictive power of the model was found in Denmark, where about 7% of the variance in students' psychological distress is explained by these three variables. In other countries the explained variance ranges between 0 and 2%.

Students' psychological distress, demographic characteristics, home, student and school factors

In the second regression model, we explore the association between factors that were likely to be affected by the pandemic and students' psychological distress. Namely, we include factors reflecting home dynamics (number of stressful events in the family), factors capturing student characteristics (feeling fit and healthy, disrupted sleep, difficulties in learning after the disruption and preparedness for potential future disruptions), and factors suggesting students' relation with the school (perceived school support and school belonging). With the exception of the number of stressful events, responses to the other items are based on a four-point scale, where higher values indicate a greater degree of the factor.

We summarize our estimation results from Eq. 2 in Table 6. As in the previous model, these results suggest no clear association between the outcome of interest and student's gender, age and home resources. In contrast to the previous model, home resources

Table 6 Estimated coefficients for the regression of students' psychological distress on gender, age, home resources, number of stressful events, school belonging, school support, physical health, disrupted sleep, difficulties in learning, and preparedness for future disruptions

Variable	BFA	DNK	ETH	KEN	RUS	SVN	ARE	UZB
β_1 Gender (boy)	0.02	− 0.28	− 0.04	0.08	**− 0.08**	**− 0.10**	**− 0.05**	0.01
					(0.02)	(0.02)	(0.02)	(0.02)
β_2 Age	− 0.04	− 0.02	0.02	− 0.05	− 0.02	**− 0.04**	− 0.03	−0.01
					(0.03)	(0.04)	(0.02)	(0.03)
β_3 Home resources	− 0.03	0.04	− 0.01	0.08	−0.02	0.01	−0.01	−0.01
					(0.02)	(0.02)	(0.02)	(0.02)
β_4 Number of stressful situations	0.05	0.05	0.02	− 0.05	**0.10**	**0.08**	**0.09**	**0.10**
					(0.02)	(0.02)	(0.02)	(0.02)
β_5 School belonging	0.15	0.08	0.37	0.18	**0.20**	**0.26**	**0.14**	**0.26**
					(0.02)	(0.02)	(0.02)	(0.02)
β_6 School support	− 0.06	0.14	0.10	0.00	**0.15**	**0.22**	**0.23**	**0.22**
					(0.03)	(0.02)	(0.02)	(0.02)
β_7 Physical health	− 0.02	− 0.13	− 0.01	0.00	−0.01	**− 0.05**	**− 0.13**	0.03
					(0.03)	(0.02)	(0.02)	(0.02)
β_8 Disrupted sleep	0.08	0.16	0.18	0.01	**0.12**	**0.18**	**0.19**	**0.08**
					(0.02)	(0.02)	(0.02)	(0.02)
β_9 Difficulties in learning	0.06	0.25	−0.02	0.31	**0.26**	**0.22**	**0.23**	**0.23**
					(0.03)	(0.03)	(0.03)	(0.02)
β_{10} Preparedness for future disruptions	− 0.14	− 0.18	− 0.07	−0.08	**−0.16**	**− 0.14**	**− 0.15**	**− 0.06**
					(0.02)	(0.02)	(0.02)	(0.02)
R^2	5.4	31.1	23.0	16.0	30.9	37.0	26.1	32.4
N	2141	1127	2633	1225	3334	2381	2631	2861

The statistical significance is indicated in bold. Standard errors appear in parentheses. *BFA* Burkina Faso, *DNK* Denmark, *ETH* Ethiopia, *KEN* Kenya, *RUS* the Russian Federation, *SVN* Slovenia, *ARE* the United Arab Emirates, *UZB* Uzbekistan

are no longer significant in any of the countries, while the gender coefficients are a bit smaller but still significant. In the Russian Federation, Slovenia, the United Arab Emirates and Uzbekistan the number of stressful events student's experienced within the family is weakly but positively related to their psychological distress. In other words, students who experienced more stressful situations at home expressed more psychological distress. The relation between family situation and negative emotions during the disruption was also found in other studies. For example, Garcia de Avila et al. (2020) reported that children whose parents had essential jobs and who lived with more people during the pandemic expressed higher levels of anxiety.

Further, our estimates suggest a consistent association between school factors and students' psychological distress across many countries. The association between self-reported school support during the disruption and psychological distress is positive but shows a small magnitude in Denmark, Ethiopia, the Russian Federation, Slovenia, the United Arab Emirates, and Uzbekistan. Similarly, the association between self-reported school belonging during disruption and psychological distress is positive but small or medium in magnitude in Burkina Faso, Ethiopia, Kenya, the Russian Federation, Slovenia, the United Arab Emirates, and Uzbekistan.

This positive association suggests that students reporting higher support at school and higher belonging to school during the disruption also reveal higher levels of

psychological distress. This result seems counter-intuitive and not in line with the expectation that schools play a supportive role in students' mental health. Also it is not in line with previous research suggesting that adolescents with high levels of the school belonging have low levels of the emotional distress (Gökmen, 2018). At this point, it is worth mentioning that we investigate a very specific aspect of psychological distress in a very particular situation. Our outcome represents students' psychological distress related to the COVID-19 disruption. All the items included in the scale are closely related to the feelings about the disruption. As the disruption presents a very specific event, the psychological distress regarding the disruption is also very specific. In addition, during the disruption schools in many countries were closed and students could not continue schooling as usual. This is why schools could not be available to support students in a way they would be without the disruption. We offer two possible interpretations of this positive association. First, it is plausible that schools were more supportive to students expressing higher levels of psychological distress related to schooling because they had limited resources. This interpretation would suggest that school support is the outcome of psychological distress, which is opposite to the direction as we suggest in Eq. 2. Note that we are not providing a causal interpretation of the results in any way, but rather interpreting the results as a conditional association.

Our second interpretation is that school support and a sense of belonging raised student awareness about the pandemic and its consequences, leading to higher levels of psychological distress related to COVID-19. For example, it is reasonable that students who felt more belonging to school recognized the potential deficits of the disruption more and therefore they expressed higher psychological distress related to schooling or vice versa. We see that the effect of school support in Burkina Faso, where most students did not do any schoolwork, is negligible. The results suggest an analogous pattern in Kenya.

Our results provide mixed evidence about the association between feeling fit and healthy and students' psychological distress. The direction of the relationship differs across the countries, but the coefficients are rather small. We confirmed the negative association between physical health and less psychological distress, as found in other studies (Hoyt et al., 2012) but the relationship is rather weak. Our results suggest a more consistent pattern when it comes to the variable capturing disrupted sleep. We observe a positive association across the countries with the highest coefficients being found in the United Arab Emirates, followed by Ethiopia, Slovenia, and Denmark and smaller coefficients being found in the Russian Federation, Burkina Faso and Uzbekistan. The positive association here means that students who reported more disrupted sleep during the disruption expressed higher psychological distress. This finding is in line with other studies investigating the relationship between sleeping patterns and emotions (Lavigne-Cerván et al., 2021; Alfawaz et al., 2021).

Furthermore, self-reported difficulties in learning after returning to school was included in the model. The results show that the construct is positively related to the psychological distress, the coefficients range between 0.22 to 0.31 in all countries but Burkina Faso and Ethiopia. This finding shows that higher psychological distress during

the COVID disruption is also related to larger difficulties in learning when the schooling continued. Students with higher worries related to the COVID disruption report about more difficulties in the school related to catching up with the learning material after the schooling continues. This finding shows that the psychological distress experienced during COVID-19 disruption seems to have consequences also for schooling after the disruption. Psychological distress is defined as "a state of emotional suffering characterized by symptoms of depression and anxiety" (Drapeau et al., 2012). In other studies they found that higher levels of negative emotions are associated with lower cognitive capacity (Isen, 1990) and academic achievement (Hashim et al., 2012).

The last variable included in the model is related to self-reported preparedness for future disruptions. We find a consistent negative relationship across the countries with the highest coefficients in Denmark, the Russian Federation and the United Arab Emirates. A negative association in this case means that students who expressed being more prepared for a potential future disruption had lower values on the students' psychological distress scale. A relationship between coping and psychological distress was found in other studies, where coping strategies are associated with less psychological distress (Tindle et al., 2022; Yan et al., 2021).

The explanatory power of the model estimated in Eq. 2 is the highest in Slovenia, where the included variables explain 37% of the total variance in students' psychological distress scale. In Denmark, the Russian Federation, and Uzbekistan the model explains more than 30% of the variance and in the United Arab Emirates 26%. In Burkina Faso and Kenya the variables included in the model do not seem to be highly associated with students' psychological distress, as they explain only about 5–16% of total variation in the outcome. Interestingly these two countries together with Ethiopia include many students who did not do any schooling during the disruption.

Due to the very diverse countries included in our study it is challenging to observe consistent results. For example, in Denmark, the Russian Federation, Slovenia, the United Arab Emirates and Uzbekistan schooling continued during the disruption for all students. In Burkina Faso, Ethiopia and Kenya there was a significant proportion of students reporting that they did not do any schooling during the disruption. Also the policies implemented to prevent the spread of COVID-19 were highly diverse. Despite this variation, we do observe some results that appear consistent within the same region.

Finally, it is worth highlighting that REDS questionnaires collected a rich set of information from students. In our study, we were limited to the variables that were available for all participating students; particularly when it comes to countries that did not continue with remote schooling during the disruption. Our study therefore focuses on one aspect related to emotional well-being, namely students' psychological distress during the disruption.

Conclusions

REDS was an international effort to investigate how teaching and learning were affected during the educational disruption across and within countries. The countries participating in REDS spanned Africa, Asia, the Arab region, Europe, and Latin America. REDS found

that students reported declines in their well-being during the disruption. The survey collected rich information about students' access to support, resources, and their perceptions of the impact of the COVID-19 disruption on aspects of their personal well-being. Data were collected on students' reported access and use of well-being support information from their school, students' reported feelings of psychological distress during the disruption, the degree to which students felt supported by and connected to their school during the disruption, students' engagement in physical and social well-being maintenance behaviors, changes to students' family circumstances during the disruption, and the availability of and use of additional resources for students with special needs (Meinck et al., 2022b). The study found that, in most countries, over half of students agreed that they were feeling overwhelmed by what was happening in the world due to the COVID-19 and that they felt anxious about the changes to their schooling (Meinck et al., 2022b).

In this paper, we explored what factors are associated with students' psychological distress during the COVID-19 disruption. Our results suggest that the scale we construct to measure students' psychological distress met the criteria necessary to compare scale scores between countries. Thus, the constructed scores enable us to compare the averages and relationships across countries for this construct.

Students across participating countries expressed their concerns about schooling during the disruption and its potential effects for the future. The highest values of these feelings were found in Burkina Faso, where schooling was severely disrupted for most students. We found gender to be associated with students' psychological distress in more than half of the participating countries with girls showing higher values of psychological distress. Our results suggest no important association between students' psychological distress about schooling during the disruption and students' age and home resources. However, we found a consistent association between students' psychological distress and school support and belonging, disrupted sleep difficulties in learning after the disruption and preparedness for the future disruptions. Our results indicate that students with higher psychological distress perceived higher levels of school support and belonging. We provide two potential explanations for this association. In addition, we find that students who expressed higher psychological distress reported more disrupted sleep and felt less prepared for possible future disruptions. In addition, we find that students with higher psychological distress reported more difficulties in learning after the disruption. That is, our results suggest a relatively consistent association between students' psychological distress with school and student factors. Finally, the association we report in this study suggests that students who express feeling more prepared for future disruptions show less psychological distress.

We observe a tendency of different results in countries where more students were not doing any schooling during the disruption. In addition, we observe that certain factors have a relatively high relationship with psychological distress and are country specific. For example, gender has the strongest relationship with psychological distress in Denmark, school belonging in Ethiopia, and difficulties in learning after the disruption in Kenya, while all the included factors have the largest influence on psychological distress in Slovenia. This leads to the conclusion that the results presented here should be complemented by country-specific information and should be seen within a national context. The universal finding that high psychological distress was found in all included countries across the globe was complemented by the finding that factors related to psychological distress

are not universal and therefore the potential interventions have to consider the country specific factors. Our research significantly contributes to identifying these country specific factors, presenting an opportunity to reduce psychological distress levels in students facing stressful situations.

Appendix

Table 7 Description of predictor variables

Variable	Question Stem	Item	Variable Name	Response Scale
Stressful situations*	Were you affected by any of the following situations during the COVID-19 disruption?	One or both of my parents/ guardians lost their job.	IS1G26A	0 = No; 1 = Yes
		Our family had to be more careful with money than usual.	IS1G26B	
		One or both of my parents/ guardians had to work from home.	IS1G26C	
		One or both of my parents/ guardians were stressed about their job	IS1G26D	
		Our family had to move to live in a new location.	IS1G26E	
		I had to live away from my parents/ guardians.	IS1G26F	
School support	To what extent do you agree or disagree with the following statements about how you felt during the COVID-19 disruption?	I felt supported by my school.	IS1G24G	0 = Strongly disagree; 1 = Disagree; 2 = Agree; 3 = Strongly agree
School belonging		I still felt part of the school.	IS1G24J	
Physical health	To what extent do you agree or disagree with the following statements about your well-being during the COVID-19 disruption?	I felt fit and healthy.	IS1G25C	
Disrupted sleep		I did not sleep as well as before the COVID-19 disruption.	IS1G25J	
Preparedness for future disruptions	Overall, how prepared do you feel for learning from home if your school building closed for an extended period in the future?		IS1G30	1 = Not prepared at all; 2 = Not very prepared; 3 = Well prepared; 4 = Very well prepared

The variable stressful situations was created by summing up the number of situations students experienced

Table 8 Item percentages for students' psychological distress measure

Country	Strongly agree		Agree		Disagree		Strongly disgree	
	pct	(s.e.)	pct	(s.e.)	pct	(s.e.)	pct	(s.e.)
I felt anxious about the changes in my schooling								
Burkina Faso	63		23		10		4	
Denmark	7		23		53		17	
Ethiopia	47		26		16		11	
Kenya	28		43		18		11	
Russian Federation	20	0.9	35	1.2	35	1.0	9	0.8
Slovenia	22	0.9	37	1.1	30	1.2	12	0.7
United Arab Emirates	27	1.0	42	1.0	24	1.2	7	0.6
Uzbekistan	30	1.3	40	1.2	25	1.3	5	0.4
I felt overwhelmed by what was happening in the world due to the COVID-19 pandemic								
Burkina Faso	66		24		7		3	
Denmark	13		45		32		10	
Ethiopia	42		28		18		12	
Kenya	30		38		18		15	
Russian Federation	24	0.7	45	1.0	22	0.8	9	0.8
Slovenia	13	0.9	37	1.2	35	1.2	15	0.9
United Arab Emirates	32	1.1	43	1.0	18	0.9	6	0.6
Uzbekistan	39	1.3	51	1.1	8	0.6	2	0.2
I felt overwhelmed by what was happening in my [local area] due to the COVID-19 pandemic								
Burkina Faso	59		28		9		4	
Denmark	8		39		43		11	
Ethiopia	41		31		17		10	
Kenya	23		41		21		15	
Russian Federation	12	0.7	31	1.0	44	1.2	13	0.9
Slovenia	14	0.8	40	1.2	34	1.3	12	0.7
United Arab Emirates	25	1.0	40	1.0	28	1.0	7	0.6
Uzbekistan	29	1.2	49	1.4	19	1.4	3	0.3
I was worried about how the disruption affected my learning								
Burkina Faso	63		26		8		3	
Denmark	20		47		25		8	
Ethiopia	53		29		10		8	
Kenya	41		39		10		10	
Russian Federation	19	0.7	45	1.3	27	1.0	9	0.8
Slovenia	19	1.0	40	1.2	28	1.1	13	0.9
United Arab Emirates	29	1.1	44	0.9	21	1.1	6	0.5
Uzbekistan	35	1.3	46	1.1	15	0.9	5	0.4
I was worried about how this disruption will affect my future education								
Burkina Faso	66		24		8		2	
Denmark	19		38		35		7	
Ethiopia	49		32		11		8	
Kenya	40		41		10		9	
Russian Federation	23	0.8	44	1.3	25	0.9	7	0.7
Slovenia	22	1.0	41	1.3	26	1.0	11	0.8
United Arab Emirates	33	1.1	41	1.0	21	0.9	5	0.5
Uzbekistan	36	1.3	44	1.1	16	1.0	5	0.4
I missed my usual contact with my classmates								
Burkina Faso	55		31		9		4	

Table 8 (continued)

Country	Strongly agree		Agree		Disagree		Strongly disgree	
	pct	(s.e.)	pct	(s.e.)	pct	(s.e.)	pct	(s.e.)
Denmark	46		37		12		5	
Ethiopia	50		30		12		8	
Kenya	34		46		14		7	
Russian Federation	33	1.1	40	1.1	19	0.9	8	0.7
Slovenia	34	1.2	39	1.1	17	0.9	11	0.7
United Arab Emirates	41	1.0	37	0.9	17	0.8	5	0.4
Uzbekistan	51	1.2	42	1.2	5	0.6	2	0.3
I was worried about catching COVID-19								
Burkina Faso	75		17		4		4	
Denmark	10		31		40		19	
Ethiopia	48		29		12		10	
Kenya	45		36		10		9	
Russian Federation	19	0.8	34	1.1	31	31	16	0.9
Slovenia	11	0.7	27	1.0	35	0.9	26	1.0
United Arab Emirates	35	1.4	38	1.0	19	1.1	8	0.5
Uzbekistan	39	1.2	39	1.1	16	0.9	6	0.5

Table 9 Item percentages for stressful situations

Country	0		1		2		3		4		5		6	
	pct	(s.e.)	pct	(s.e.)	pct	(s.e.)	pct	(s.e.)	pct	(s.e.)	pct	(s.e.)	pct	(s.e.)
Number of stressful situations														
Burkina Faso	15		27		34		18		5		1		1	
Denmark	24		38		26		8		3		0		1	
Ethiopia	11		13		20		28		16		7		5	
Kenya	3		8		17		27		31		10		3	
Russian Federation	37	1.2	30	1.0	17	0.7	11	0.8	2	0.3	1	0.1	1	0.2
Slovenia	36	1.0	36	1.1	17	0.9	8	0.5	2	0.3	0	0.1	1	0.2
United Arab Emirates	24	1.1	25	0.9	23	0.7	18	0.8	7	0.5	1	0.2	2	0.3
Uzbekistan	13	0.9	19	1.3	23	1.0	23	1.1	15	0.9	3	0.4	4	0.5

Table 10 Item percentages for school support

Country	Strongly agree		Agree		Disagree		Strongly disgree	
	pct	(s.e.)	pct	(s.e.)	pct	(s.e.)	pct	(s.e.)
I felt supported by my school								
Burkina Faso	16		16		37		31	
Denmark	8		52		32		8	
Ethiopia	31		29		23		17	
Kenya	11		23		43		22	
Russian Federation	14	0.7	45	1.5	30	1.0	11	0.9
Slovenia	11	0.7	41	1.3	33	1.1	15	1.0
United Arab Emirates	29	1.0	51	1.0	17	0.9	3	0.4
Uzbekistan	45	1.1	45	1.1	7	0.6	2	0.3

Table 11 Item percentages for school belonging

Country	Strongly agree		Agree		Disagree		Strongly disgree	
	pct	(s.e.)	pct	(s.e.)	pct	(s.e.)	pct	(s.e.)
I still felt part of the school								
Burkina Faso	29		25		24		22	
Denmark	12		60		23		6	
Ethiopia	41		36		14		10	
Kenya	15		46		27		12	
Russian Federation	16	0.7	48	1.2	28	0.9	9	1.0
Slovenia	13	0.7	52	1.2	25	1.0	10	0.7
United Arab Emirates	28	1.2	51	1.1	16	0.9	5	0.4
Uzbekistan	41	1.5	47	1.5	9	0.7	2	0.3

Table 12 Item percentages for physical health

Country	Strongly agree		Agree		Disagree		Strongly disgree	
	pct	(s.e.)	pct	(s.e.)	pct	(s.e.)	pct	(s.e.)
I felt fit and healthy								
Burkina Faso	34		31		25		10	
Denmark	13		47		32		8	
Ethiopia	35		28		24		13	
Kenya	20		37		32		12	
Russian Federation	28	0.9	47	1.0	20	0.8	5	0.4
Slovenia	26	1.0	49	1.2	20	0.8	5	0.5
United Arab Emirates	19	0.8	43	1.2	29	1.2	8	0.6
Uzbekistan	44	1.2	46	1.4	8	0.6	2	0.2

Table 13 Item percentages for disrupted sleep

Country	Strongly agree		Agree		Disagree		Strongly disgree	
	pct	(s.e.)	pct	(s.e.)	pct	(s.e.)	pct	(s.e.)
I did not sleep as well as before the COVID-19 disruption.								
Burkina Faso	26		25		30		19	
Denmark	13		24		41		22	
Ethiopia	24		25		32		19	
Kenya	12		25		39		24	
Russian Federation	13	0.7	16	0.8	46	1.2	25	1.0
Slovenia	17	0.8	22	0.9	33	1.1	28	1.3
United Arab Emirates	20	0.7	27	1.0	37	1.0	16	0.8
Uzbekistan	17	0.8	26	1.1	42	1.2	15	0.7

Table 14 Item percentages for preparedness for future disruptions

Country	Not prepared at all		Not very prepared		Well prepared		Very well prepared	
	pct	(s.e.)	pct	(s.e.)	pct	(s.e.)	pct	(s.e.)
Overall, how prepared do you feel for learning from home if your school building closed for an extended period in the future?								
Burkina Faso	59		20		13		8	
Denmark	6		12		51		31	
Ethiopia	27		23		30		19	
Kenya	38		27		20		15	
Russian Federation	9	0.7	19	1.0	43	0.9	30	1.3
Slovenia	7	0.6	14	0.7	43	1.0	36	1.1
United Arab Emirates	11	0.7	18	1.0	41	1.1	30	1.2
Uzbekistan	19	1.1	26	0.9	34	1.2	21	0.9

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