

Student resilience to COVID-19-related school disruptions: The value of historic school engagement

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Abstract

Does historic school engagement buffer the threats of disrupted schooling – such as those associated with the widespread COVID-19-related school closures – to school engagement equally for female and male high school students? This article responds to that pressing question. To do so, it reports a study that was conducted in 2018 and 2020 with the same sample of South African students ($n = 172$; 66.30% female; average age in 2020: 18.13). A moderated moderation model of the 2018 and 2020 data showed that historic levels of school engagement buffered the negative effects of disrupted schooling on subsequent school engagement ($R^2 = .43$, $\beta = -5.09$, $p < .05$). This protective effect was significant for female students at moderate and high levels of historic school engagement, but not at lower levels of historic school engagement. Disrupted schooling did not significantly affect school engagement for male students at any level of historic school engagement. In addition, student perceptions of teacher kindness were associated with higher school engagement and having experienced an adverse event at school with lower school engagement. The results point to the importance of facilitating school engagement and enabling school environments – also when schooling is disrupted.

Keywords: disrupted schooling; female students; resilience; school engagement; South African adolescents

Introduction

Across the globe, the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2 or COVID-19) pandemic disrupted schooling during 2020 and 2021. Schools in at least 180 countries closed for varying periods of time (Azevedo, 2020; Lee, 2020). Although such school closures were well-intended (i.e., to limit the spread of COVID-19), they were associated with multiple costs to school students' education, safety, and wellbeing (de Miranda et al., 2020; Van Lancker & Parolin, 2020). Even when empirical studies reported limited costs of school closures to students' mental wellbeing in the short term (e.g., Luthar et al., 2020), these studies cautioned that the long-term costs were likely to be substantive. Of additional concern is that school closures could cause students to disengage from schooling and prompt poor long-term outcomes, including challenges to students' future economic independence and mental wellbeing (Azevedo, 2020; Coker et al., 2020; World Bank, 2020). While these concerns apply to all students, students with experiences of marginalisation are likely more vulnerable to the costs of school closures (Dorn et al., 2021).

Rather than focus on the costs of school closures to student wellbeing, this article investigates students' capacity to remain school engaged in the face of COVID-19-related school closures. In specific, it investigates the capacity of a sample of South African high school students ($n = 172$), from a resource-constrained (i.e., marginalised) municipality, to remain school engaged following the closing of their schools in March 2020. It considers what could potentially buffer the negative effects of school closure on school engagement. The attention to buffering or protective factors — i.e., those factors that facilitate positive outcomes despite exposure to significant stress — fits with calls to advance child and youth resilience to COVID-19-related stressors (Dvorsky et al., 2020; Holmes et al., 2020), also in the school context

(Luthar et al., 2020). Children in disadvantaged contexts – such as those living in resource-constrained, marginalised municipalities – are particularly reliant on education to beat the odds of their circumstances (World Bank, 2020), and so it is crucial to better understand and enable/sustain their school engagement in the face of school closures.

School engagement

School engagement, which is considered fundamental to progress at school and/or academic achievement, is defined as a student's involvement in, or commitment to, their schooling (Fredricks et al., 2004). Typically, behavioural, emotional, and cognitive commitment to schooling epitomises school engagement (Fredricks et al., 2005). Put differently, school engagement is demonstrated in a student's school-related behaviour (e.g., actively participating in learning and other school activities); school-related emotion (e.g., appreciating learning opportunities or liking their peers/teacher); and school-related cognitive processes (e.g., being attentive in class or associating new learning with prior learning) (Fredricks et al., 2004; Lam et al., 2014; Sinatra et al., 2015). As summarised next, multiple factors are associated with a student's capacity for school engagement. Whilst these resources all matter for sustained school engagement, which matter more is likely to vary for specific groups of students in specific contexts at specific points in time (Wang et al., 2020).

Student factors. A student's capacity for school engagement can relate to sociodemographic factors (e.g., race, age, sex; Wang & Eccles, 2012). In particular, female sex and non-membership of marginalised racial/ethnic groups are associated with higher levels of school engagement (Fredericks et al., 2014). While no definitive reason is given for female sex being associated with higher school engagement, there is speculation that this relates to how girls are socialised (Roorda et al., 2011). Further, personal resources (e.g., grit, self-regulation skills,

executive functioning skills, or social functioning) are implicated in a student's capacity to be behaviourally, emotionally, and cognitively invested in their schooling (Fredricks et al., 2004).

Home environment factors. Higher school engagement is positively associated with material resources in the home environment (e.g., education-enabling resources; space to study). It is also positively associated with supportive parenting (e.g., warm caregiving) and parental capacity to scaffold learning tasks at home (Dickson et al., 2016; Sharkey et al., 2008; Wang & Eccles, 2012). Household routine and parental expectations that their children commit to their schooling are similarly enabling (Sharkey et al., 2008).

School context factors. Various school-related resources are associated with higher levels of school engagement (e.g., positive peers; positive classroom climate; Fredricks et al., 2004). When students feel safe and accepted at school, they tend to be more engaged in academic and extra-curricular activity (Bang et al., 2020). Teacher-student relationships can be especially pivotal to school engagement. Kind or caring teachers are positively associated with higher school engagement (Malindi & Machenjewe, 2012; Motti-Stefanidi & Masten, 2013; Quin, 2017; Roorda et al., 2011). Similarly, teacher competence (i.e., teachers who teach well) is associated with higher school engagement (Fredricks et al., 2004; Wang et al., 2020).

A resource mix. Typically, studies of school engagement point to a mix of resources that draws on strengths within students and their social ecologies (Fredricks et al., 2004). For example, a three-wave longitudinal study with 363 foster children (mean age: 11.30, SD=3.22) in the Netherlands reported that better grades, no absenteeism, demographics (female sex, younger age), and positive parenting predicted higher school engagement (Goemans et al., 2018). Similarly, a two-wave longitudinal study with 714 early adolescents in Korea reported that

students who reported high levels of teacher and peer support also reported high levels of current and subsequent school engagement (Shin & Chang, 2022).

The cost of school closures to the resources that inform school engagement

Essentially, COVID-19-related school closures have the potential to disrupt access to the individual, home-, and school-related resources that matter for behavioural, emotional and cognitive engagement in schooling. For instance, COVID-related school closures were associated with significant threats to many students' physical and mental health, more especially for students from disadvantaged households (Onyema et al., 2020; Rajmil et al., 2021). Reduced psychological wellbeing could jeopardise the personal resources (e.g., self-regulation; attentive involvement in learning; social functioning) implicated in higher levels of school engagement. Likewise, for students who depended on school feeding schemes, school closures probably resulted in hunger with negative knock-on effects for personal health and wellbeing resources (Clark et al., 2020). Likewise, there were concerns about student exposure to abuse/maltreatment and parental conflict during lockdown and students' wellbeing, social functioning, and role functioning (e.g., at home/school) (Clark et al., 2020; Rajmil et al., 2021). Similarly, COVID-related school closures created substantive stress for many teachers and parents, thereby potentially straining teacher capacity for kindness and competence and parent capacity for warm, supportive caregiving (Fontanesi et al., 2020; Kim & Asbury, 2020; Panagouli et al., 2021). Even when students were supported to learn remotely while their schools were closed, remote access could not compensate for in-person interaction with supportive peers or stem the boredom and reduced social functioning that many youngsters reported (Onyema et al., 2020).

Thus, in jeopardising student access to the individual, home-, and school-related resources that matter for commitment to schooling, school closure potentiates a direct threat to

school engagement. Put differently, lockdown-related interruptions to schooling could lessen students' behavioural, emotional, and cognitive commitment to schooling, especially for students from marginalised communities (Onyema et al., 2020). For example, a study with a large sample of school students ($n = 943$) and their parents and teachers in rural and disadvantaged parts of Indonesia reported school closure-related threats to school engagement (Indrawati et al., 2020). These included digital resource constraints that stymied student engagement with learning and prompted negative emotion (e.g., anxiety) toward schooling tasks. Students reported difficulty engaging in/completing academic tasks without the support of their teachers/peers. Additionally, economic constraints resulted in some students being engaged in domestic chores or child labour rather than remote learning and related declines in commitment to schooling.

The costs of school closures appear to be higher for girls, possibly because girls are expected to contribute to the running of their households and/or take on care duties (Clark et al., 2020). For instance, girls exposed to the Ebola epidemic and other crises (e.g., economic crises in Ethiopia and Brazil) were more likely to report experiences of abuse and less likely to resume their schooling when schools reopened (World Bank, 2020). Similar trends have been reported during the COVID-19-related school closures (Coker et al., 2020; Molek & Bellizzi, 2022), with particular concern voiced for girls in sub-Saharan countries. For them, school closures typically meant heightened involvement in domestic chores and care duties and related disengagement with schooling (Oppong Asante et al., 2021). Further, compared with male students, higher rates of lockdown-related depression and anxiety were reported for female students in America (Luthar et al., 2020), and elsewhere (e.g., Iceland; Halldorsdottir et al., 2021; India, Malaysia, Korea, Thailand, Israel, Iran, and Russia; Loades et al., 2020). Again, these higher costs to girls

might relate to how girls are socialized (e.g., to value relational resources; these resources were typically curtailed during lockdown).

2020 COVID-19-related school closures in South Africa

Shortly after the World Health Organisation (WHO) declared COVID-19 a global pandemic in March 2020, South Africa announced a state of emergency that resulted in a stringent, national lockdown with five alert levels (level 5 being the most stringent). It was described as “one of the most rigid and extreme lockdowns announced anywhere in the world” (Habib, 2020). The lockdown prompted school closures. In addition, human movement was curtailed, public gatherings were banned, and all non-essential services disallowed. In short, this meant that from 18 March to 8 June (alert levels 3-5) young people could not go to school, roam their neighbourhood, socialise with their peers, or engage in sport or other extramural activity (Fouché et al., 2020; Spaull & Servaas, 2020). This was followed by a staggered return to school, with students in Grade 7 and 12 returning first. However, in response to a COVID-19 spike, schools were closed for a second time from 27 July to 24 August 2020.

Although alert levels were adjusted downwards thereafter, public health requirements (e.g., maintenance of physical distance, face-masking) remained mandatory. Thus, even though schools were no longer officially closed, many schools could not accommodate all students simultaneously and so most South African students lost additional contact teaching days (Ardington et al., 2021; Soudien et al., 2021). Overall, it was estimated that depending on their age and grade, South African students lost between 30 and 59 school days in the 2020 school year (Timm, 2021), or 22%-65% of regular/contact school time (Spaull & Van den Berg, 2020; Soudien et al., 2021). Further, the reopening of schools did not eliminate high levels of insecurity

about when next schools would close or diminish adolescents' feelings of uncertainty about their present and future (Gittings et al., 2021).

As in other parts of the world, the closure of South Africa's schools generated censure. There was pronounced concern for the nine million South African children who rely on school feeding schemes. The hunger that disrupted access to school feeding schemes would inevitably induce for this vast population of students, led to some labelling school closure "a form of abuse or neglect" (van Bruwaene et al., 2020). Further, given that only a minority of South African students have access to technology (Spaull & Van den Berg, 2020), school closure was criticized for its disrespect of children's universal right to education and educational progress (Wolfson Vorster, 2020).

Th current study

The current study's aim was to investigate the school engagement of a sample of South African high school students whose schooling was disrupted in the course of 2020, with particular interest in factors that could have protected continued school engagement regardless of how school closures disrupt access to the resources that enable school engagement. In so doing, the study responded to the multiple calls to better understand and advance youth resilience in the face of COVID-19-related challenges (Dvorsky et al., 2020; Holmes et al., 2020; Luthar et al., 2020). School engagement is frequently associated with the resilience of youth from disadvantaged contexts in South Africa (Van Breda & Theron, 2018). A better understanding of what might support continued school engagement despite the challenges of repeated school closures (Spaull & Van den Berg, 2020), is crucial to sustaining that resilience.

The literature on the negative impacts of school closure on the individual, home- and school-related resources that are fundamental to school engagement (e.g., Clark et al., 2020;

Coker et al., 2020; de Miranda et al., 2020; Van Lancker & Parolin, 2020; World Bank, 2020) led us to expect that school engagement would be negatively impacted the longer the duration of disrupted schooling (i.e., number of days since schools were first closed). Simultaneously, this prompted our attention to the possible role of historic school engagement when access to the resources that typically sustain school engagement is jeopardized. However, our reading of the longitudinal studies of school engagement suggested that very little attention has been paid to the role of historic/prior levels of school engagement in predicting subsequent levels of school engagement. Exceptions included a study by Quin and colleagues with 719 Australian adolescents (average age: 16.96; $SD = 0.38$); they found that sex (being female), higher prior (i.e., Grade 10) engagement levels, and better prior academic grades predicted higher school engagement in Grade 11. Similarly, prior levels of school engagement, sex, race, and advantaged versus disadvantaged family circumstances predicted student membership in higher behavioral and emotional school engagement trajectories in a study with 1,977 American adolescents (Li & Lerner, 2011). In short, being male, a student of color, and having a less advantaged family background predicted lower behavioral and emotional engagement. Further, Li and Lerner (2011) found that higher school engagement over time predicted better academic, behavioral, and emotional outcomes.

Despite the paucity of studies documenting the role of historic school engagement on subsequent school engagement and achievement (Li & Lerner, 2011; Quin et al., 2018), their results let us expect that higher levels of historic school engagement might buffer the negative effects of exposure to disrupted schooling. On the contrary, lower levels of historic school engagement might be a risk factor for school engagement during school disruption. However, following broad understandings that biological sex is related to school engagement (i.e., girls are

likely to report higher school engagement than boys; Li & Lerner, 2011; Wang & Eccles, 2012), the buffering effects of lower/higher levels of historic school engagement might be dependent on the sex of a student.

Overall, therefore, the main aim of the current study was to investigate if lower levels of historic school engagement increase, and higher levels of historic school engagement decrease, the expected negative effect of the duration of COVID-related school closures on present school engagement, and if these effects differ for female and male students. We hypothesized that (H1) compared with male students, female students would show a stronger negative effect of school disruption on present school engagement at lower levels of historic school engagement. We also expected that (H2) there would be no significant difference between female and male students in the effect of school disruption on present school engagement at higher levels of historic school engagement.

Furthermore, we included multiple meaningful covariates in the analyses. Given the ‘resource mix’ that informs school engagement (e.g., Fredricks et al., 2004; Quin, 2017; Quin et al., 2018; Sharkey et al., 2008), we anticipated that resources at the level of individual students (i.e., mental health [fewer symptoms of depression]; intact social and role functioning), their households (harmonious functioning; family support; warm parenting), and school (teacher kindness; teacher competence; safe school environment) might matter for school engagement, even when access to schooling is disrupted.

Method

Procedure

The sample was drawn from the Resilient Youth in Stressed Environments (RYSE) study. As detailed elsewhere (Authors, 2021), RYSE investigated the multisystem resources that

supported youth resilience over time in Canadian and South African communities stressed by economic and ecological challenges. Given the marginalization of African youth in the school engagement literature (Lam et al., 2014), the sample reported on in this paper is from RYSE South Africa (SA).

RYSE SA was conducted in a semi-urban town and neighbouring township. Both are located in a resource-constrained municipality in one of South Africa's poorer provinces (i.e., Mpumalanga). Most households in this municipality report limited resources. Of relevance to school closures, 80.5% of households in this municipality have a television but only 24.3% have a computer; 62.3% report no internet access (StatsSA, 2011). Similar statistics are reported for most South African households and that could account for the national education department's use of television broadcasts to facilitate remote learning (also in COVID-19 times) (Spaull & Van den Berg, 2020).

The principal RYSE investigators' Institutional Review Boards provide ethical clearance [blinded-for-review]. A Community Advisory Panel (CAP) that was made up of local adults and adolescents guided the study and facilitated participant recruitment (Authors, 2021). Recruitment criteria were defined as: (a) residence/school attendance/employment in the town/township affiliated to RYSE; (b) 14- to 24-years-old; and (c) English literacy (English is the medium of instruction in most South African high schools and South Africa's official language of communication). Following prior resilience studies in South Africa (Van Rensburg et al., 2019) and the advice of the CAP, trained research assistants (RAs) administered the survey to small groups of participants. The RAs read an item aloud before participants self-completed it. This method was repeated in 2020, except that survey administration was one-on-one (as regulated by COVID-19 procedures). Each participant (and their parent/legal guardian if participants were

younger than 18) consented in writing prior to survey completion and received a supermarket voucher for their time (\$15 in 2018 and \$30 in 2020).

Measures

The reliabilities of the scales can be found in Table 1.

Student/Individual factors

Student/individual factors included demographic factors. Participants self-reported their biological sex (male/female) and age. Student/individual factors also included school engagement, mental health (depression symptoms), and social and role functioning.

School engagement was assessed via the 32-item School Engagement Scale (SES; Lam et al., 2014). The original, cross-cultural study showed sufficient internal consistency of the overall scale ($\alpha = .78$), sufficient concurrent validity (Lam et al., 2014), and that a second-order model fits the scale best with three subscales (i.e., affective, behavioral, cognitive) and one overarching school engagement factor. Sample items for each subscale include: 'I am happy to be at this school' (affective); 'If I have trouble understanding a problem, I go over it again until I understand it' (behavioral); and 'When I study, I figure out how the information might be useful in the real world' (behavioral). These items were summed into one overall SES score. Higher total scores indicated higher engagement. The scale uses a five-point Likert scale from 1= "strongly disagree" to 5= "strongly agree", which results in a potential range of 32-160.

Depressive symptomatology over the past two weeks (as an indicator for mental health) was assessed via the Beck Depression Inventory–II (BDI-II) (Beck, Steer, & Brown, 1996). The scale assesses 21 depression-related symptoms (e.g., sleep problems, depressive mood, loss of interest) and a higher sum-score indicated higher levels of depression. Psychometric studies with

high school students have shown adequate internal consistency (e.g., $\alpha = .92$) and validity (Osman et al., 2007).

A shortened version of the Short-Form Health Survey-20 (Ware et al., 1992) was used to assess social and role functioning. Both subscales have shown sufficient validity (McHorney et al., 1993) and role functioning sufficient reliability ($\alpha = .76$; Carver et al., 1999). Social functioning was assessed with one item (“How much of the time, during the past month, has your health limited your social activities, like visiting with friends or close relatives?”; [1 = “Limited for more than 3 months”, 2 = “Limited for 3 months or less”, 3 = “Not limited at all”]) and role functioning with two items (“Does your health keep you from working at a job, doing work around the house, or going to school?”, “Have you been unable to do certain kinds or amounts of work, housework, or schoolwork because of your health?”; [1 = “All of the time“ to 5 = “None of the time”]).

Home environment factors

Home environment factors related to the relationship between students and their parents/caregivers, as well as the parental relationship.

The Parental-Caregiver Warmth scale (which forms part of the Social and Health Assessment scale, Ruchkin et al., 2004) was used. It asks about the frequency of a participant experiencing that their parent/caregiver: “Is proud of me”, “Shows their love for me”, and “Makes me feel good when I am with them” (1 = “Never” to 4 = “Most of the time”). A higher sum-score indicated higher parental-caregiver warmth. This scale has shown sufficient internal consistency ($\alpha = .82$; Barbot et al., 2012).

Two items were used to indicate currently perceived family support: “My family stands by me during difficult times” and “I feel safe when I am with my family” (1 = “Not at all” to 5 =

“A lot”). Both were taken from the Child and Youth Resilience Measure (Ungar & Liebenberg, 2011), an instrument that covers 28 different social-ecological resources which have been shown to be essential for child and youth resilience across countries. A higher sum-score indicated higher family support.

Additionally, participants were asked if they lived in a home with fights (verbal or physical) or severe relationship problems between parents/parent-figures/caregivers (yes/no). They were also asked if the most upsetting or frightening event they experienced in the past year happened at home, school, in the neighborhood, or somewhere else (they could choose only one option). One dummy coded variable was included into the model for participants who had experienced this event at home (“Adversity at home”). In relation to this question, they had to indicate if this event caused problems for them at home (“Limited functionality at home”) (1 = “Not at all” to 5 = “A lot”).

School context factors

School context factors related to perceived teacher characteristics and the school environment.

An item assessed participants’ subjective perception of their teacher kindness (“My teachers treat me well (e.g., are friendly)”), and another assessed teacher competence (“My teachers teach well”). Both items were used in the Pathways to Resilience Youth Measure (PRYM; Resilience Research Centre, 2010) that was adapted for use with South African students during the Pathways study (Authors, 2018). These items were rated on a three-point Likert scale (1 = “agree”, 2 = “unsure”, 3 = “disagree”). Higher scores indicate little teacher kindness and competence, respectively.

Furthermore, one item investigated if participants had experienced their most upsetting or frightening event during the last year at school (“Adversity at school”). In relation to this question, they had to indicate if this event caused problems for them at school (“Limited functionality at school”) (1 = “Not at all” to 5 = “A lot”).

Days since first school closure (DSFSC)

This was calculated as time (in days) from first school closure because of COVID-19 lockdown measures (March 18th, 2020) to the date when the survey was conducted in 2020 (see Figure 1).

Participants

The 2018 sample consisted of $N = 340$ high school students. The analyses reported in this article include high school students who participated in 2018 and 2020, were still school attending in 2020, and completed the school engagement scales (i.e., $n = 172$; $n = 114$ female students; average 2020 age: 18.13 years [$SD = 1.73$]; 81.40% Black, 15.10% White, 3.50% Other). One student did not fill out the school engagement scale in 2018 and was therefore excluded. The mean score for total school engagement was 120.88 ($SD = 14.06$) and 123.24 ($SD = 13.36$) in 2018 and 2020 respectively. The period from the start of the first school closures (18 March 2020) to date of participation ranged from 77 to 215 days (see Figure 1). Please see Table 1 for further sample characteristics.

In comparison to the 2020 sample, those who only participated in 2018 ($n = 167$, 49% drop-out) were majority female (59.9%). Their average age, 16.84 years (range 14-22 years), was significantly higher [$t = 3.93$, $p < .01$]. Like the 2020 sample, most self-identified as Black (82%). Compared to the 2020 sample, those who dropped out did not show any significant differences regarding school engagement: total ($t = -.15$, $p > .05$), affective ($t = -.03$, $p > .05$),

behavioral ($t = -.77, p > .05$), and cognitive ($t = -.53, p > .05$) school engagement. However, they did show a significant difference regarding the grade they were in in 2018 (typically, a higher grade [$r = .23, p < .01$]).

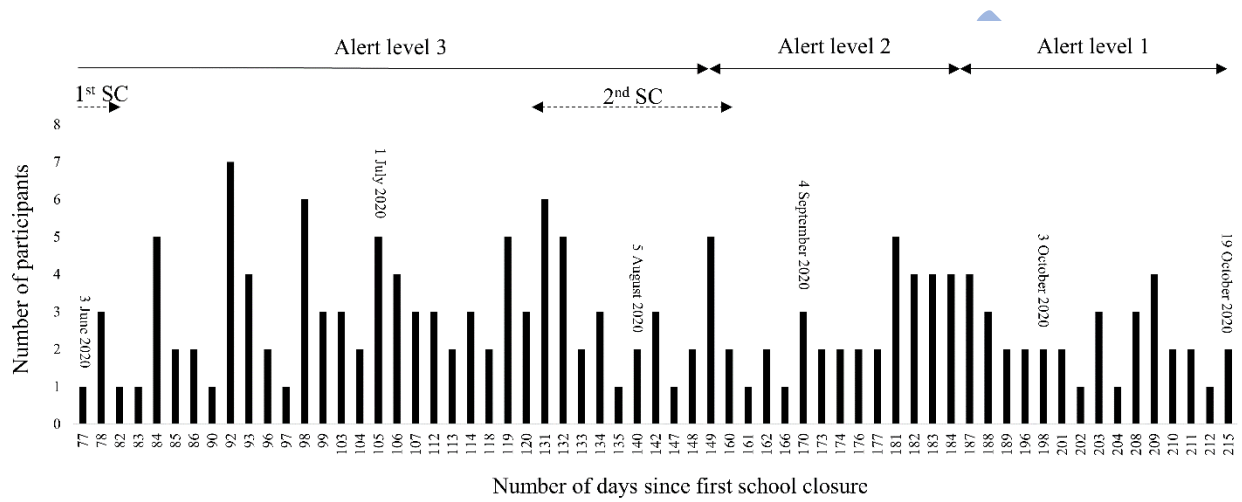


Figure 1 Study timeline.

Note. SC = school closure. Alert level in relation to Covid-19 regulations.

Table 1 Sample characteristics, reliabilities, and Spearman correlations.

Variables	<i>M</i> (<i>SD</i>)	ω	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
SE 2018	120.88 (14.05)	.92	-															
SE 2020	123.24 (13.63)	.93	.44*	-														
DSFSC	141.65 (42.35)	-	-.12	-.01	-													
Sex (female vs. male)	Female: 66.30%	-	.08	.06	-.06	-												
Age	18.13 (1.73)	-	-.09	-.05	-.29*	.18*	-											
Depression (BDI-II)	15.35 (11.05)	.91	-.15	-.26*	-.20*	-.16*	.08	-										
Role functioning	5.55 (.87)	.66 [#]	-.13	-.09	.17*	.05	-.13	-.30*	-									
Social functioning	4.99 (1.34)	-	-.00	.06	.10	.02	-.09	-.36*	.30*	-								
Adversity at home	Yes: 30.30%	-	-.00	-.00	.11	-.18*	-.02	-.06	-.02	-.16*	-							
Limited functionality at home	1.88 (1.26)	-	-.05	-.12	-.02	-.12	.10	.22*	-.16*	-.27*	.26*	-						
Family support	9.23 (1.45)	.74 [#]	.10	.22*	-.08	.20*	.14	-.36*	.16*	.23*	-.12	-.23*	-					
PC Warmth	11.51 (1.43)	.91	.14	.16*	-.20*	.14	.00	-.26*	.04	.14	-.09	-.21*	.36*	-				
Caregiver conflict	Yes: 22.10%	-	.15*	.12	-.15	.11	.02	-.29*	.22*	.16	-.17*	-.21*	.21*	.15	-			
Teacher competence	1.09 (.28)	-	-.18*	-.17*	-.00	-.05	-.21*	.18*	-.06	-.10	-.02	.10	-.11	-.14	-.13	-		
Teacher kindness	1.11 (.33)	-	-.10	-.18*	-.14	.00	-.03	.16*	-.08	-.08	-.10	-.07	-.10	.04	.05	.10	-	
Adversity at school	Yes: 23.80%	-	.06	-.13	-.02	.01	.06	-.01	.03	.19*	-.37*	-.16*	.01	.04	.10	.02	-.01	-
Limited functionality at school	1.82 (1.24)	-	-.10	-.16*	.14	-.16*	-.05	.26*	-.17*	-.12	.10	.48*	-.24*	-.14	-.23*	.11	-.10	-.02

Note. $N = 172$. ω = Omega coefficient for reliability. SE = school engagement, DSFSC = Days since first school closure at participation, PC = Parental/Caregiver. * $p < .05$. # Spearman-Brown coefficient for reliability of two items.

Analyses

A random forest approach was used to impute missing values using *missForest* (for details see Stekhoven & Bühlmann, 2012) via *R* 4.0.4 in *Rstudio* 1.4.1103 (R Core Team, 2020). Overall, one person had one missing value in the BDI-II. Furthermore, the following assumptions of regression were tested (Hayes, 2018): homoscedasticity and linearity via plotting the relationship between standardized residuals and standardized predicted values, normal distribution of the errors via the Shapiro-Wilk test, and independence of the residuals via the Durbin-Watson test.

The main model of interest was a moderated moderation model. A basic moderation analysis tests if the effect of a predictor on an outcome depends on the levels of a moderator, which is represented by a 2-way interaction between the predictor and moderator in the statistical model. A moderated moderation analysis tests if the influence of this first moderator itself depends on the levels of a second moderator, which is represented by a 3-way interaction. The respective effects of the predictor and moderators, as well as the 2-way interactions in the moderated moderation model must be interpreted as simple effects (and not main effects, for details see Hayes, 2018). The simple effect of a variable is its effect on the outcome when all other variables that are part of the interaction are zero. Hence, simple effects are only meaningful when the range of these variables includes zero.

According to Hayes (2018), two models need to be estimated and formally tested to select the better fitting model to the data. First, a baseline model without any interaction term between the variables of interest (i.e., days since first school closure, school engagement in 2018, and the participants' sex). The second model includes the interactions of interest (see Figure 2). In the case of this study, the moderated moderation model included three 2-way interactions

between the variables of interest, as well as one 3-way interaction between all of them. All other variables that are presented in the Measures section were included as covariates. A simple effect in this moderated moderation model indicates, for example, the effect of sex on school engagement in 2020 when days since first school closure and school engagement in 2018 are zero. However, both variables, as well as sex, do not include zero and, therefore, their simple effects should not be interpreted (Hayes, 2018).

The *PROCESS* 3.5 add-on (Hayes, 2018) for *IBM SPSS 26* (IBM Corp, 2020) was used to estimate the moderated moderation model and to test if the 3-way interaction term provided a significant increase in explained variance compared to a model without the term (i.e., test of highest order unconditional interaction).

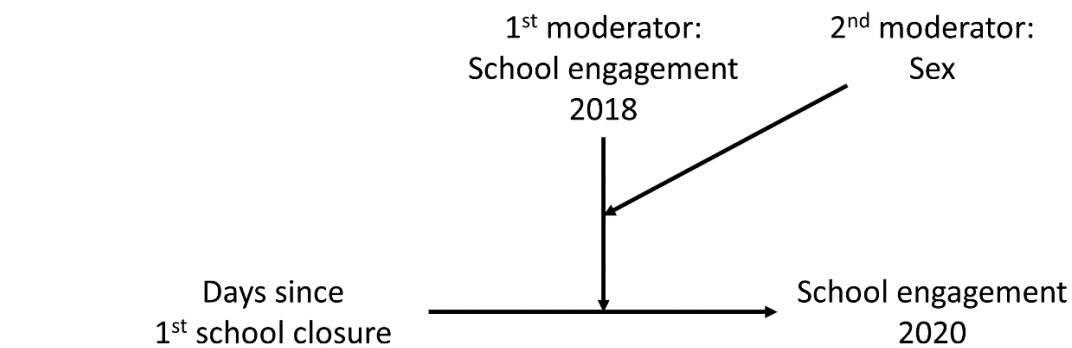


Figure 2 Conceptual model.

A Johnson-Neyman plot was used to identify regions of statistical significance in the case that the moderated moderation model fitted the data better than the baseline model and the 3-way interaction term was significant (Hayes, 2018; Johnson & Fay, 1950). This procedure shows if the effect of the predictor on the outcome is significant only at specific values of the moderator

by taking the whole range of the moderator into account. This procedure was done using *interactions* 1.1.3 (Long, 2020).

Results

Model fit

The preliminary analysis showed that the moderated moderation model ($R^2 = .43$, AIC = 1332, BIC = 1402) had a better fit to the data than the baseline model ($R^2 = .22$, AIC = 1375, BIC = 1425). The formal test showed a significant increase in R^2 ($\Delta R^2 = .21$, $F(6, 151) = 9.34$, $p < .01$).

The plotting of the relationship between the standardized residuals and standardized predicted values of the moderated moderation model was indicative of homoscedasticity and linearity (please see the supplementary material for the respective plot). Furthermore, a non-significant Shapiro-Wilk test indicated a normal distribution of the model's residuals ($S-W$ statistic = .99, $p > .05$). A non-significant Durbin-Watson test indicated that the residuals were statistically independent ($D-W$ statistic = 1.78, $p > .05$). Hence, all assumptions were met.

Moderated moderation model

The significant 3-way interaction ($\beta = -5.09$, $p < .05$, see Table 2) shows that the moderating effect of school engagement in 2018 on the effect of days since first school closure at participation on school engagement in 2020 was different for female and male pupils. The test of highest order unconditional interaction showed that this 3-way interaction significantly explained variance in school engagement in 2020 ($F(1,151) = 4.08$, $p < .05$, $\Delta R^2 = .05$). As Figure 3 shows, the moderating effect of school engagement 2018 was only found for female pupils.

Figure 3A shows the regions of significance for female students. A negative effect of days since first school closure on school engagement in 2020 was estimated for a score of school

engagement in 2018 between 74-115. Furthermore, a region of significance for a positive effect of days since first school closure on school engagement 2020 was also estimated for girls with a school engagement 2018 score between 135-147.

Male pupils did not show any significant moderating effect of school engagement 2018. As can be seen in Figure 3B, no significant effect of days since first school closure on school engagement 2020 was found at any level of historic school engagement. Furthermore, two school-related covariates (i.e., teacher kindness and the most upsetting/frightening adversity experienced at school) showed significant effects on school engagement in 2020 (see Table 2).

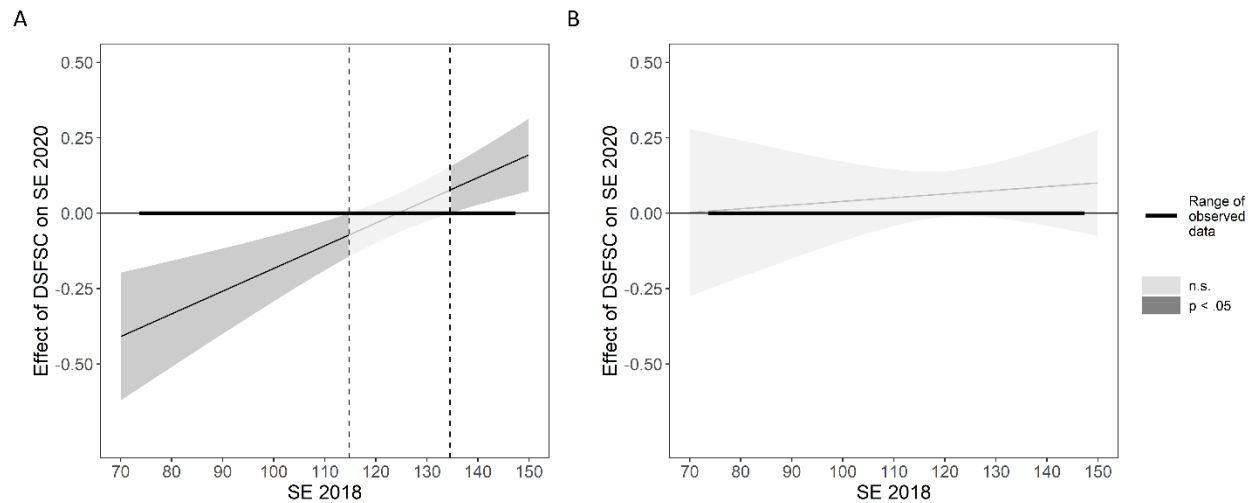


Figure 3 Johnson-Neyman plots for girls (A) and boys (B).

Note. SE 2018: school engagement in 2018, DSFSC: days since first school closure at participation, Effect of DSFSC on SE 2020: range of regression coefficients for the effect of DSFSC on school engagement in 2020. Dark grey areas indicate significant effects of DSFSC on SE 2020 in relation to the respective levels of SE 2018. The light grey area indicates non-significant effects of DSFSC on SE 2020 in relation to the respective levels of SE 2018.

Table 2. Results for the moderated moderation model.

	<i>b</i>	<i>SE(b)</i>	β	<i>p</i>	95% CI(<i>b</i>)
DSFSC [#]	-1.79	.56	-5.56	< .01	[-2.903, -.675]
SE 2018 [#]	-1.78	.72	-1.90	.01	[-3.189, -.362]
Sex (female vs. male) [#]	-138.46	61.40	-4.82	.03	[-259.780, -17.147]
Age	.13	.55	.02	.82	[-1.223, .969]
Depression	-.14	.12	-.11	.25	[-.373, .096]
Role functioning	-1.71	1.09	-.11	.12	[-3.854, .439]
Social functioning	-.67	.75	-.07	.37	[-2.146, .801]
Adversity at home	-3.89	2.14	-.13	.07	[-8.109, .334]
Limited functionality at home	-.41	.85	-.04	.63	[-2.099, 1.270]
Family support	1.025	.74	.11	.16	[-.425, 2.476]
PC Warmth	-.36	.82	-.04	.66	[-1.969, 1.259]
Caregiver conflict	.02	2.31	.00	.99	[-4.539, 4.574]
Teacher competence	-5.19	3.19	-.11	.11	[-11.501, 1.119]
Teacher kindness	-6.46	2.68	-.16	.02	[-11.760, -1.157]
Adversity at school	-6.47	2.19	-.20	< .01	[-10.796, -2.136]
Limited functionality at school	-1.28	.82	-.12	.12	[-2.899, .343]
SE 2018 * DSFSC [#]	.01	.00	5.55	< .01	[.005, .023]
SE 2018 * Sex [#]	1.03	.50	4.72	.04	[.055, 2.011]
DSFSC * Sex [#]	.85	.38	5.55	.02	[.094, 1.612]
SE 2018 * DSFSC * Sex	-.01	.00	-5.09	.04	[-.012, -.001]

Note. $R^2 = .43$. * indicate interaction terms. # simple effects. *b*: unstandardized effect, β :

standardized effect, *SE*: standard error, CI: confidence interval, SE = school engagement,

DSFSC: days since first school closure at participation.

Discussion

The current study investigated the school engagement of 172 South African high school students, from an economically marginalized municipality, who experienced COVID-19-related school disruptions in the course of 2020. The study's interest was in factors that could have protected (i.e., moderated) continued school engagement regardless of how school closures might disrupt access to the resources that enable school engagement. School engagement is frequently associated with the resilience of youth from disadvantaged contexts in South Africa (Van Breda & Theron, 2018). A better understanding of what might support continued school engagement, despite how repeated school closures are likely to disrupt the individual, home- and school-related resources that support school engagement (e.g., Clark et al., 2020; Coker et al., 2020; de Miranda et al., 2020; Spaull & Van den Berg, 2020; Van Lancker & Parolin, 2020; World Bank, 2020), is crucial to sustaining/advancing youth resilience in the face of COVID-19-related challenges.

Prior studies of the relationship between historic and subsequent levels of school engagement (i.e., Li & Lerner, 2011; Quinn et al., 2018) led us to expect that historic school engagement might have a significant effect on the negative impact of school disruption on present school engagement. However, this effect might not be the same for female and male students (Fredericks et al., 2004). Hence, it was the aim of this study to investigate if historic school engagement influences the expected negative effect of the duration of pandemic-related school closure on present school engagement, and if its influence shows differences between female and male students.

We anticipated that lower levels of historic school engagement would be a risk factor in that it enhances the negative effect of school disruption on present school engagement (Li &

Lerner, 2011; Quin et al., 2018), and that this interaction is stronger for female than male students (Fredericks et al., 2004; Wang & Eccles, 2012). In line with our first hypothesis, the analysis showed that prior levels of school engagement (i.e., as measured in 2018) mattered for school engagement in 2020 and only for female students. The longer the duration of COVID-19-related disruptions to schooling, the lower the 2020 levels of school engagement for female students who reported lower school engagement in 2018. Time since first school closure showed no effect on 2020 school engagement for female students who were moderately school engaged in 2018. However, no significant moderating effect of historical school engagement was found for male students. For male students, the time since the first school closure on present school engagement in 2020 had no significant effect at low as well as moderate levels of historic school engagement in 2018. Hence, this model confirmed that historic levels of school engagement operate differently for female and male students.

Our second hypothesis expected that female and male students would show no significant differences in the effect of school disruption on present school engagement at higher levels of historic school engagement. When girls reported higher levels of 2018 school engagement, the time since the first school closure showed a significantly positive effect on 2020 school engagement. Hence, girls with higher levels of historic school engagement were able to increase their school engagement the longer the time since the first school disruption. For boys, however, no significant effect was found.

Overall, while the effect of the time since the first school closure on present school engagement in 2020 is significantly impacted by the level of historic school engagement in female students, no such effects exist for male students. Also, the identified neutral and positive effects are at odds with historic reports of girls' school engagement suffering more than that of

boys when schooling is disrupted (e.g., during the Ebola pandemic; World Bank, 2020), and with concerns about girls being especially vulnerable to COVID-19 lockdown risks (e.g., increased rates of teenage pregnancy; Molek & Bellizzi, 2022). The potentially protective effect of historic school engagement on girls' school engagement during times of prolonged school closure is an important contribution to the school engagement literature.

Furthermore, two co-variates— both school-related – were significantly associated with school engagement in the context of COVID-19: teacher kindness and the experience of adversity at school. This fits with the general school engagement literature that emphasizes the value of caring (i.e., kind) teachers and safe or affirming school environments to students' school engagement (Bang et al., 2020; Fredricks et al., 2004; Quin, 2017). The resilience literature that focuses on South African and other students who are vulnerable (e.g., challenged by socioeconomic risks or social status) reports these same resources (Malindi & Machenjede, 2012; Motti-Stefanidi & Masten, 2013; Van Breda & Theron, 2018), also during COVID-19 (Luthar et al., 2020).

Implications for school psychologists

Because the entire sample was drawn from a resource-constrained municipality that faced similar stressors (Authors, 2021), it is difficult to theorize what might have contributed to the higher 2018 school engagement of some girls versus the lower school engagement of others. A follow-up study would be helpful to better understand what informed higher school engagement. Still, the important implication is that there is value in supporting students (particularly female ones) to be highly school engaged. While high levels of historic school engagement appear to strengthen school engagement in the context of disrupted schooling, even moderate levels of school engagement are likely to support girl students to remain school engaged when school

closures/disruptions complicate their school journey. Although this finding might be too late for students impacted by COVID-19-related school closures, there is a high likelihood of future pandemics and other disasters (e.g., climate change related) and related school closures (World Bank, 2020). In short, there is merit in actively supporting girl students to be highly school engaged with a view to their reaping protective benefits for future disruptions to their schooling. Essentially, this would mean ensuring their access to the individual, household, and school-related resources that matter for school engagement (Fredricks et al., 2004; Quin, 2017; Quin et al., 2018; Sharkey et al., 2008). In this regard, school psychologists and other school-based practitioners are key advocates. As advocates, they will need to do more than support girl students to develop the necessary individual resources that matter for school engagement. Additionally, they will need to educate teachers and families that a ‘resource mix’ is pivotal to school engagement and heighten teachers’ and families’ appreciation for their personal potential to advance students’ engagement in schooling. For instance, teachers and families could benefit from knowing that time to be invested in their studies (i.e., fewer domestic chores/care duties), warm caregiving, and teacher kindness/competence can support girls to be school engaged.

Boys’ school engagement should not be neglected by school psychologists, even if the non-significant effects found for boys imply that their school engagement was apparently less vulnerable to the negative effects of schooling disruptions at low levels of past school engagement. In stressed communities, like the RYSE SA one, school engagement is key to advancing boys’ wellbeing and future prospects (Malindi & Machenjedge, 2012). Boys with historic levels of lower school engagement will require support to be school engaged; boys with historic levels of higher school engagement will require support to maintain/advance those levels in the face of school closure. Given that gendered socialization is probably implicated in girls

being more school engaged (Roorda et al., 2011), supporting boys' school engagement encourages changes to how boys are traditionally socialized. School psychologists can play a key psychoeducational role in this.

The finding that school-related factors – in particular, kind teachers and schools that protect students from adverse experiences at school – were salient to the school engagement of our sample of South African students during COVID-19, reinforces the importance of supporting teachers and schools to be resilience-enabling, also in times of national/global disaster (Luthar et al., 2020). Knowing that many school staff have experienced significant professional stress during COVID-19 (Kim & Asbury, 2020; Luthar et al., 2020; Spaul & Van den Berg, 2020), underscores the need to enable/sustain the resilience of these adults (Theron, 2021), especially as shocks and stressors are likely to continue even when COVID-19 abates (World Bank, 2020). In the absence of teachers who are resilient enough to continue being supportive despite shocks and stressors, how much lower would students' school engagement levels be? Likewise, what would the impact on school engagement be if school management staff are not resilient enough to facilitate a protective school environment in stressed times, particularly given the additional demands on school management in extraordinary circumstances like pandemics (Viner et al., 2020)? Essentially, championing the school engagement of students in COVID-19/extra-stressed times requires championing the resilience of their teachers and other school staff. School psychologists and other school-based practitioners have a special duty in this regard.

Limitations and future studies

It is possible that the school engagement levels of students who completed the RYSE survey when schools were open (i.e., parts of June/July; after schools reopened at the end of August), might have been confounded by the fact that they could attend school in-person. For

instance, there are reports that the resumption of in-person schooling was embraced by students who were eager to return to school (Gittings et al., 2021). Likewise, there were parents and teachers who were critical of schools reopening and whose concerns might have influenced students' engagement (Grootes, 2021).

Even though we anticipated differences between female and male students, the analyses found significant moderating effects of historic school engagement for girls only. Since this variable did not differentiate between sub-groups of boys, future research needs to identify cross-sex and male-specific variables to facilitate adequate prevention programs.

The attrition of 49% of the sample from 2018 to 2020 is not uncommon in longitudinal South African studies (Cockcroft et al., 2019). Still, given the limited sample size, future research should investigate larger samples with an equal ratio of male/female students. Also, it was impossible for the RYSE study to survey participants at an earlier time point (closer to the start of the school closure) due to COVID-19 regulations and related moratoriums on research with human participants. Hence, the survey assessments started about 2.5 months after the first school lockdown (18 March). It remains unclear, therefore, how the identified effects play out closer to the start of school closures. Future studies need to apply a design that makes it possible to administer surveys in resource-constrained communities in highly regulated pandemic circumstances. Additionally, future studies should make use of multi-item scales to more reliably investigate resources that were indicated by only one item in the RYSE survey (e.g., teacher competence/kindness, role functioning).

Finally, a significant auto-correlation of school engagement over time might be responsible for the identified effects. However, our study found contrasting effects between female and male students and identified a non-significant region in the model for the female

sample, too. This shows that past school engagement should have an effect on future school engagement in the context of the studied risk that goes beyond mere auto-correlation by being a resilience-supporting resource.

Conclusion

It is probable that school closures will form part of societies' response to future pandemics and other disasters (World Bank, 2020). Accordingly, families and school communities need be ready to protect young people against the negative effects of school closure. The current study suggests that enabling young people's school engagement is an important first step to mitigating future effects of school closures, more particularly for girls.

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