

Master's Thesis: COVID-19 Stress and Middle School Students' Engagement and School Aversion: Examining the Mediational Roles of Emotion Regulation and Perceptions of School Climate

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B.A., University of Victoria, 2010

B.Ed., Simon Fraser University, 2012

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We acknowledge and respect the lək'wəŋən peoples on whose traditional territory the university stands and the Songhees, Esquimalt and WSÁNEĆ peoples whose historical relationships with the land continue to this day.

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Abstract

Learning during the COVID-19 pandemic has included disruption, uncertainty, and additional stress for students. Adverse learning outcomes are a growing concern especially for vulnerable groups, such as middle school students. While COVID-19 research in academic fields is currently emerging, more research needs to address the specific experiences of middle school students. The current study examined the relationship between COVID-19 related stress (distress or fatigue) and student outcomes (student engagement and school aversion) for a sample of middle school students ($N = 301$). Specifically, coping (i.e., emotion regulation strategies) and perceptions of school climate were examined as mediators in the above relationship. Findings indicated that COVID-19 fatigue was inversely related to student engagement and positively related to school aversion. Emotion regulation mediated this relationship such that utilizing adaptive emotion regulation strategies promoted student engagement and dampened school aversion in relation to COVID-19 fatigue. School climate was also a significant mediator above and beyond the role of emotion regulation such that positive perceptions of school climate promoted engagement and reduced school aversion. A deeper explanation of the importance of regulation and the way middle schoolers perceive school rules and supports in the context of the COVID-19 pandemic is discussed.

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Dedication

For Dani, thank you for seeing the bright colours on the other side of the storm. With you, all is possible. To my new baby, I've seen you in raindrops and sailing on ocean waves, and any day now, you'll be here. Join us when you're ready, little frog.

Introduction

The COVID-19 pandemic is an enduring, volatile, and ever-changing event in history with far reaching effects felt globally and on individual levels. The threats imposed by the pandemic go beyond disease mortality and include implications related to mental health, well-being, and psychological adjustment, which disproportionately affect vulnerable populations (Egede et al., 2020). School-aged students have experienced immense disruptions to their educational experiences, which could have negative associations with academic outcomes (e.g., attendance, performance, motivation, engagement). Young people, including students, are prone to experience disproportionately higher levels of stress, anxiety and depression (Nwachukwu et al., 2020). Understanding how the pandemic impacts young people has been identified as an important target for COVID-19 research (Qiu et al., 2020). Research related to middle school students during the COVID-19 pandemic is timely and pressing. Few studies have examined the experiences of middle school students during this time.

To add to early pandemic literature, new research is critical and may provide novel insight into the experiences of middle school students, which may be unknown or in the initial stages. This study examined the relationship between COVID-19 related stresses and middle school students' self-reported academic engagement and aversion to school. In addition, this study examined the contribution of student coping strategies (emotion regulation) and individual perceptions of school climate to that relationship.

Literature Review

COVID-19 Related Stresses, Student Engagement, and School Aversion

Vulnerability of Middle School Students during the Pandemic

During the pandemic, students have experienced abrupt changes in their typical schooling experience, including disruptions to their school year, extended breaks from instruction, shifts from in-class instruction to remote learning, enhanced government mandated health and safety regulations, and several COVID-19 school outbreaks. Students have been forced to adapt quickly to new regulations and routines as necessary. Lockdowns, restrictions on movement, disruption of routines, physical distancing, curtailment of social interactions and deprivation of traditional learning methods have led to increased stress, anxiety, and mental health concerns among learners worldwide (UNESCO, 2020). Middle school students also face difficult pressures to prioritize the health and safety of others atop their social connections with friends, which could cause additional stress and tension. Recent research indicates that students are feeling heightened levels of general stress and anxiety during the pandemic (Hoyt et al., 2021; Styck et al., 2020). Students reported that constant stress was the ‘new normal’ (Hoyt et al., 2021) and primary stressors for middle and high school students included feeling unable to concentrate, not feeling motivated at school, and falling behind in school during the pandemic (Styck et al., 2021).

Certain age groups are particularly vulnerable to undue stress, as they already face school transitions. Generally, school transitions have been shown to trigger adverse outcomes (Eccles et al., 1993). Specifically, the transition from elementary to middle school confronts students with drastic social, environmental, and physical changes (Blackwell et al., 2007; Eccles

et al., 1993). Goodenow's (1993) foundational work highlights the fundamental developmental, social, and environmental changes that adolescents undergo and how these changes are related to academic outcomes and motivation. Goodenow notes that for middle school students, heightened self-consciousness, increased significance placed on friendships and peer rejections, and decreased personal contact with teachers combine to create a social environment in which social-emotional supports, sense of belonging, and personal acceptance is critical and problematic. Additionally, the middle school transition was associated with an increase in maladaptive coping strategies (Skinner & Saxton, 2020).

Stress and COVID-19 Related Stresses

The relationship between stress and adverse outcomes, such as diminished well-being and illness is firmly established (Charmandari et al., 2005; Cohen et al., 1993). Research assessing how stresses related to the pandemic are contributing to diminished well-being as well as diminished academic outcomes is currently emerging. Stress may be one of the greatest risk factors for adolescents' health related quality of life (Mikkelsen et al., 2020). For middle school students, acute life stressors have been positively associated with psychological symptomology (Crean, 2004). Specifically, experiencing a high number of negative life events was positively associated with higher frequency of emotional and behavioural symptomatology (Crean, 2004). Adolescence is a critical period characterized by increased vulnerability to stressors (Charmandari et al., 2005). Additionally, acute life stressors have been negatively associated with school competencies (Crean, 2004). Exposure to adverse environmental factors contributes to the development and severity of negative outcomes related to stress (Charmandari et al.

2005). The onset and duration of the COVID-19 pandemic can be conceived as an adverse environmental factor which has introduced additional sources of stress.

Researchers agree that stressors associated with COVID-19 pandemic are associated with diminished mental health and well-being of the global population. For example, Carroll et al., (2020) examined health behaviours and stress levels of Canadians with children during the pandemic. Findings indicated that since the onset of the pandemic parents have experienced moderately high levels of stress. For children, the main concerns surrounded an increase in misbehaviour and screen time as well as a decrease in physical exercise. Egede et al. (2020) explained that COVID-19 disproportionately impacts vulnerable populations and that gaps in access to mental health services for marginalized communities are likely exacerbated during the pandemic. Vigo et al. (2020) summarized that pandemics and epidemics have had long known impacts on mental health, such as health anxiety, which may lead to maladaptive optimism or pessimism related to the pandemic. The authors noted that adolescents may be affected by the pandemic differently than adults. Taylor (2019) noted that, in general, many people in pandemics experience high levels of distress or the worsening of pre-existing psychological problems, such as depression or anxiety.

Psychological distress is a variable commonly measured in the context of disease and natural disaster, where populations are forced to react to high levels of stress. Taylor (2019) explained that a population's psychological reaction to a pandemic infection influences the extent to which widespread emotional distress or social disorder occurs. A meta-analysis conducted by Beaglehole et al. (2018) indicated that in the context of natural disasters, researchers commonly found increased rates of psychological distress and psychiatric disorders.

More recently, Qiu et al. (2020) found that the COVID-19 pandemic triggered psychological distress including psychological problems such as panic disorders, anxiety, and depression. Throughout this thesis, the term COVID-19 distress is used to refer to stress and anxiety specifically related to the COVID-19 pandemic (Taylor et al., 2020).

In addition to distress related to the pandemic, students also appeared to be displaying a new form of stress in relation to the extended duration of the pandemic. After a full-year in the COVID-19 pandemic, many schools returned to school and provided face-to-face instruction. Mask wearing combined with continuously evolving restrictions imposed by public health orders were increasingly coupled with waves of public push back and resistance (McElroy, 2020). The construct COVID-19 fatigue emerged to refer to the emotional exhaustion students feel (e.g., frustration) about the pandemic and the extent which students believe the pandemic has impacted their enjoyment of school (Harvey, 2020; Hwang et al., 202; Labrague & Ballad, 2021). Despite some inconsistencies in the use of the term (e.g. Hwang et al., 2021; Labrague & Ballad, 2021), some researchers believe COVID-19 fatigue is directly linked to rule adherence and behaviour where continued exposure to strict health and safety measures (e.g., lockdown) will leave people in a state of fatigue, which may lead them to adhere less to the mandated COVID rules (Harvey, 2020). Labrague and Ballad (2021) described COVID-19 fatigue in relation to mandatory lockdowns and found that during lockdowns, university students experienced moderate levels of COVID-19 fatigue, which included physical exhaustion, tiredness, decreased motivation, and increased worry. Notably, resiliency and adaptive coping strategies were associated with lower levels of COVID-19 fatigue (Labrague & Ballad, 2021). Rates of emotional exhaustion have also been reportedly higher since the onset of the COVID-

19 pandemic (Hwang et al., 2021). This paper characterizes COVID-19 fatigue in a school context relating to students' feelings of exhaustion and frustration with pandemic rules at school and a general lack of enjoyment at school because of the pandemic. Additionally, COVID-19 fatigue taps into how motivated students feel about following the pandemic rules, rather than their subsequent behaviours.

Stress and Diminished Academic Outcomes: Student Engagement and School Satisfaction

Research supports the inverse relationship between stress and student outcomes, such as engagement. In different academic contexts (i.e., students in medical school) high stress levels have been negatively associated with academic outcomes (Stewart et al., 2002;1999). Similarly, in a longitudinal study of medical students, Kötter et al. (2017), high perceived stress scores were found to predict low academic performance. Aspects of school burnout, such as exhaustion, has been negatively linked to schoolwork engagement (Salmela-Aro et al., 2013). Even when students are engaged, students experiencing burnout are more likely to be stressed by their educational aspirations, vulnerable to emotional distress, and experience low self-esteem (Tuominen-Soini & Salmela-Aro, 2014).

The effects of COVID-19 specific stresses on student outcomes is an emerging area of research interest that has not been examined adequately. However, drawing from past research finding relationships between general or academic stress and student outcomes, it is reasonable to expect that COVID-19 related stresses will be negatively related to academic outcomes in middle school. In the context of learning, anxiety can trigger students to adopt maladaptive cognitions, emotions, and behaviours that are negatively associated with their performance (Bandura, 1997). Academic stress has been connected to adverse outcomes, such as overall

moods, negative academic affect, disengaged coping, and diminished GPA (Arsenio & Loria, 2014; Kötter et al., 2017; Stewart et al., 2002;1999). Middle school students who are already vulnerable to adverse outcomes may be more susceptible to the stresses associated with COVID-19, which in turn could be negatively related to their engagement at school, which may be associated with other important academic outcomes. In academic settings during the pandemic, stress has been studied using several different measures. Some COVID-19 studies in academic fields have used general stress measures (Carroll et al., 2020; Nitschke et al. 2021; Nwachukwu et al., 2020) and other studies have included COVID-19 specific stress measures (Hadwin et al., 2021; Nitschke et al., 2021) to examine the levels of stress experienced during the pandemic. In order to encapsulate the experiences of students during the pandemic, a scale specific COVID-19 that includes elements of both distress and fatigue may provide a more complete picture about the experiences of middle school students during a particular time in the pandemic. Student levels of COVID-19 distress and fatigue may be linked to negative student outcomes.

Student engagement may be an academic outcome that has suffered particularly because of the stresses associated with the pandemic. Student engagement refers to the degree to which students demonstrate a willingness to participate and engage in school (Christenson et al., 2012). Often, conceptions of student engagement typically include behavioural, cognitive, and emotional elements (Darr, 2012). For the purposes of this thesis, student engagement is characterized by behavioural and cognitive engagement. Christenson et al. (2012) defined behavioural engagement as including activities and behaviours that relay adherence to school norms, participation in class, and involvement in extracurriculars. Behaviours could include

asking questions during lessons, completing assignments, staying on task, or being attentive. Studies consistently reveal that behavioural engagement is strongly related to educational accomplishment. According to Appleton et al. (2006), behavioural engagement could also include attendance. According to Christenson et al. (2012) low behavioural engagement in 1st grade was found to be predictive of low levels of 8th grade engagement and subsequently lower GPA. Cognitive engagement includes both relevance and utility of learning. For example, students who are cognitively engaged at school are interested in what they are learning (Darr, 2012).

During a longitudinal study of Finish middle school students measuring student engagement before and during the pandemic, approximately 75% of students experienced diminished engagement (Salema-Aro et al., 2021). Behavioural engagement has been positively associated with academic performance (e.g., good grades and performance on standardized tests (Bandura et al., 1997). If students are experiencing stress and diminished well-being due to the pandemic, it is possible that they will be less likely to volunteer ideas and demonstrate behaviours aligned with engagement. Student engagement is an important outcome to investigate because it involves behaviours that promote academic success, such as help-seeking. Student engagement is linked to academic performance (i.e., GPA) and can indicate trends in absenteeism. Importantly, student engagement has been shown to hold constant over time (Christenson et al., 2012), therefore a snapshot of student engagement in middle school may indicate trends for student engagement in the future.

Another key issue exacerbated by the pandemic is students' aversion to school. School aversion refers to a students' current feelings of dislike towards school, indicated by hating

school and feeling tired of it (Lewis et al., 2017; Nishina & Juvonen, 2005). There appears to be overlap between the concept of school aversion and elements of emotional engagement and school satisfaction. According to Darr (2012), students who are emotionally engaged are likely to look forward to school and feel that school puts them in a good mood; this characterization of emotional engagement appears to be the inverse of school aversion. It is possible that during the pandemic, students who are emotionally engaged will also feel low aversion to school and they will utilize adaptive behaviours for learning, which are associated with academic performance. Students with low emotional engagement will likely report high aversion to school, which may be indicated by absenteeism, or diminished academic performance. Relatedly, school aversion may be an indication of school dissatisfaction, which refers to students' perceptions of their level of contentment with school (Daily et al., 2020). A study of primary and secondary students in Luxembourg, Germany and Switzerland during COVID-19 lockdown found a steep drop in school satisfaction in all countries and students reported missing a lot of school (Kirsch et al., 2021).

Additionally, activities that students typically enjoy have been disrupted and normal experiences at school have suffered because of the pandemic, including the cancellation of extracurricular activities and strict health and safety mandates designed to limit social interactions significantly. It is conceivable that students may be experiencing less satisfaction with school and more aversion to school because of the lack of social interaction and reduced activities. Lewis et al. (2017) measured daily school aversion in the context of cross-ethnic interactions of middle school students. Cross-ethnic interactions predicted better academic outcomes in the form of lower levels of daily school aversion and higher GPA in core subjects.

While this study focused on cross-ethnic interactions particularly, this finding linked peer social experiences and positive student outcomes. Perceptions of social relationships may provide insight into why and how COVID-19 related stresses promote aversion to school.

Student engagement and aversion to school can be considered solid indicators of student experiences at school during the pandemic. While the outcomes are likely related, the two constructs may provide distinct insights into student experiences when explored separately. As mentioned, student engagement includes behavioural and cognitive indicators of engagement, whereas, school aversion relates to the attitudes and feelings students hold about school, specifically if they hate school or if they are tired of school. It is possible that student engagement may be closer linked to student outcomes in the classroom, since assessment of student engagement includes behaviours and thinking patterns exhibited in classroom settings (Darr, 2012). Engaged students display adaptive patterns in well-being and motivation; specifically, they do well at school, they are likely to value school, and report low levels of both academic withdrawal and depressive symptoms (Tuominen-Soini & Salmela-Aro, 2014). In a different way, school aversion taps into the attitudes and feelings students possess about school. Students experiencing high aversion to school may also feel low satisfaction with school, they may be less engaged, they may miss school more often, and they may perform poorly academically.

In the context of the pandemic, a negative relationship between COVID-19 related stresses and student outcomes is expected. Specifically, COVID-19 related stresses are predicted to be negatively associated with school engagement and positively associated with school aversion. A possible explanation for why engagement and aversion likely vary in relation

to COVID-19 related stresses, may be connected to how well students are able to adapt to and cope with their changing school experience.

Coping as a Mediator of COVID-19 Related Stresses and Student Engagement and School Aversion

The varied realities that students encounter during the pandemic will likely shape their experience of pandemic stress, which may predict how they respond or cope when faced with that stress. Experiencing pandemic distress or fatigue overtime may overwhelm students' capacity to effectively regulate their emotions. Heightened stress and chronic stress have been linked to maladaptive responses to stress over time. The allostatic load model explains that exposures to stress affect biobehavioural development, psychiatric and biomedical disorder because prolonged stress responses over time promote illness (Ellis & Giudice, 2014; McEwen & Stellar, 1993). Allostatic load refers to the strain on the body from repeated physiologic responses, which over time result in disease outcomes (McEwen & Stellar, 1993). Exposure to stress has been linked to cognitive, behavioural, and emotional impairment in children (Ellis & Giudice, 2014). From this perspective, students interpret their stressors and process a response which varies in the cost to their well-being. If students are overwhelmed with COVID-19 related stresses they may not have the capacity to regulate their emotions adaptively, especially if stressors persist overtime. Students likely varied in the number of external stressors they endured during the pandemic. For example, some students may have parents who lost their jobs during the pandemic, some students may have been exposed to the virus personally, some students may be worried about the health of loved ones, and some students may feel social strain because of the health and safety restrictions. In addition to these external forces, students

likely vary in the way they perceive their academic lives during the pandemic. Some students may feel heightened academic stress and worry that their schooling experience will be irreversibly changed and others may struggle with the strict rules, such as mask wearing and social distancing. Additionally, relative to external factors such as vaccine availability, lifted or sanctioned restrictions, new variants, or school exposures, students' individual experiences with stress may wane at times and swell at others. The variability in student experiences with stressors makes it plausible to consider that COVID-19 related stress may be related to how students cope during this time. Students experiencing high levels of stress may cope poorly and those with more manageable levels of stress may cope better because high levels of distress or fatigue may overwhelm their ability to utilize adaptive strategies.

Definition of Coping

There are several definitions of coping, which depend largely on their context, and generally, all describe a common dichotomy between positive and negative coping. For example, Compas et al., (2017) conducted a quantitative meta-analysis, which examined 212 studies related to coping and described a consensus in the literature that coping is a process of responding to stress. This process specifically requires conscious, intentional, and purposeful behaviours, thoughts, and emotions. In the context of education, Skinner and Saxton (2020), described coping in terms of how students deal adaptively or maladaptively to educational stresses or academic challenges. Their study explored aspects of coping through a developmental lens across the middle school transition. These coping strategies require both motivation and emotion regulation. Adaptive coping strategies included help-seeking, strategizing, comfort-seeking, self-encouragement, and commitment; conversely, examples of

maladaptive coping included confusion, escape, isolation, self-pity, projection, and rumination. Gustems-Carnicer et al. (2019) explored coping and stress in the context of teacher education programs, where students experience heightened levels of stress. The authors summarized common founding literature and explained that coping can be categorized as either approach or avoidance. Approach coping is problem-focused and aims to purposefully adapt behaviour or cognitions to control or ease stress. In contrast, avoidance coping tends to focus on effortfully avoiding thinking about the stress source. To integrate the above definitions, effective coping results in positive outcomes and includes adaptive and approach strategies. Ineffective coping results in negative outcomes and includes maladaptive and avoidance strategies.

Research shows that coping is related to both stress and student outcomes and can be considered a plausible mediator in this relationship (Arsenio & Lorio, 2014). Coping is regulatory in nature and strategies to cope are prompted in response to stress, thus it appears that individual levels of stress may predict how students cope. In other words, stress initiates ones' need to cope, therefore, without stress, students would not need to employ regulatory strategies to manage their stress. Students who experience high levels of pandemic stress may cope poorly, indicated by lacking adaptive coping strategies, whereas students who experience low levels of pandemic stress may be more likely to utilize more adaptive strategies to manage their stress. The directionality of the relationship between stress and coping is likely reciprocal and in the case of correlational relationships, causality is not an intended aim. Thus, it is important to establish in extant literature the negative association between stress and coping. For example, posttraumatic stress symptoms, in a sample of university students, were highly associated with emotion dysregulation (Hannan & Orcutt, 2020).

The way students cope with stress may explain the relationship between stress and diminished academic outcomes. For example, students' ability to utilize adaptive coping strategies to reduce stress and anxiety, such as gum chewing, have been shown to boost academic performance in university students (Yaman-Sözber et al., 2018). Importantly, students who readily deploy adaptive coping strategies (i.e., cognitive reappraisal emotion regulation strategies) may be equipped to manage the stresses associated with the pandemic more effectively, which may be related to better school engagement and diminished aversion to school. Arsenio and Loria (2014) found that the techniques students use to cope mediated the relationship between academic stress and negative overall moods. Students who used disengaged coping strategies were more likely to have lower GPA and report higher levels of stress. Gustems & Calderon (2019) found that high levels of stress were negatively related to academic achievement and maladaptive coping strategies were negatively related to academic achievement. Coping was a key variable in the process of reducing, minimizing or tolerating stress and has direct links to academic performance (Gustems & Calderon, 2019). One's ability to regulate their emotions significantly predicted school rule violating behaviour, GPA, and self-reported satisfaction with school (Ivcevic & Brackett, 2014). School satisfaction includes looking forward to going to school and indicates low aversion to school.

Effective Emotion Regulation is an Example of Adaptive Coping

Compas et al. (2017) conducted a benchmark meta-analysis investigating the association between coping and emotion regulation, as the constructs were often ambiguously defined. The authors concluded that because emotion regulation strategies are embedded within factors derived from coping measures. Therefore, emotion regulation strategies fit under the umbrella

of coping. Adaptive coping includes effective utilization of emotion regulation strategies, such as cognitive reappraisal. How well one employs adaptive emotion regulation strategies in response to stress may contribute to the relationship between COVID-19 related stresses and student engagement or school aversion. Emotion regulation is regulatory in nature and can be a response to stress or emotions (Compas et al., 2017). Emotion regulation includes one's ability to accurately perceive and identify experiences, approach and accept emotions, pursue personal goals despite negative emotions, and select strategies for changing the intensity of emotions (Van Eck et al., 2017). Two pronounced and well-defined strategies of emotion regulation include reappraisal and suppression. Reappraisal, sometimes referred to as emotion reappraisal, positive reappraisal or cognitive reappraisal, describes an adaptive strategy of emotion regulation. Conversely, emotional suppression, also known as expressive suppression, refers to a maladaptive emotion regulation strategy (Phillips & Power, 2007). Reappraisal describes a problem-focused strategy, whereas emotional suppression refers to an avoidance strategy (Phillips & Power, 2007). Reappraisal requires cognitive change which involves construing a potentially emotion-eliciting situation in a way that promotes well-being for the individual (Gross & John, 2003), whereas suppression requires the inhibition of ongoing emotion-expressive behaviour (Gross, 1998). This study operationalizes emotion regulation as a facet of coping that includes adaptive strategies (i.e., cognitive reappraisal) and maladaptive strategies (i.e., suppression) that one employs to influence which emotions they have, how they experience them, and how emotions are expressed.

One's capacity to cope with stress is related to the strategies they employ. Those who utilize adaptive strategies have a greater capacity to cope than those who utilize maladaptive

strategies. Researchers have provided strong evidence that emphasizes emotion regulation strategies as key coping resources. Gross and John (2003) found that when faced with stressful situations, people who use reappraisal strategies to cope are more likely to focus on positive outcomes and repair their moods. Conversely, people who cope using suppression strategies are less likely to be clearly aware of and to express their upset feelings, which may explain why they are less likely to repair their moods. Not surprisingly, using reappraisal strategies were associated with more positive emotions, whereas, suppression strategies were negatively associated with positive emotions. (Gross & John, 2003).

In the context of the pandemic, coping with heightened COVID-19 related stress includes effective emotion regulation. Pandemic stress may overwhelm or impede effective emotion regulation. Rising stress levels may increase the likelihood of a decline in student outcomes, such as decreased engagement or heightened aversion. If a student is unable to cope well by regulating their emotions effectively, they may experience more negative attitudes about school, which would likely be related to heightened levels of school aversion. For example, students experiencing high levels of COVID-19 distress or fatigue may be less equipped to utilize cognitive reappraisal strategies, such as controlling their thoughts to stay calm when faced with stressful situations, which may be related to them feeling like they hate school and are tired of it.

The Role of Individual Perceptions of School Climate

School as a Social Context with Individual Variation

Social constructivists believe that learning occurs in the context of a social environment (Schunk, 2016). Social climate has been examined as a contextual factor shared among students

(Kuperminc et al., 2001) in a particular learning environment (e.g., shared classroom climate or school climate). However, it is also possible to examine individual differences in students' perception of their school climate (Patrick et al., 2007). The variability of students' COVID-19 related experiences has the potential to contribute to the ways students interpret and make sense of the rules, practices, and relationships that constitute school climate as supporting or impeding their well-being and success. Pandemic distress or fatigue may predict how students interpret their school climate.

School climate is a multi-faceted construct that depicts the environment or context in which students learn. School or classroom climate relates to the perceptions students have about a particular school environment and research has shown that these perceptions are associated with academic outcomes (Cheema & Kitsantas, 2013; Hung et al., 2014:2015; Patrick et al., 2007). Five essential elements of school climate include: safety, relationships, teaching and learning, institutional environment, and school improvement efforts (Thapa et al., 2013). School climate is cultivated through the quality of interactions between individuals in groups. Belonging or connectedness is a facet of school climate (Shochet et al., 2006; Thapa et al., 2013). As mentioned in both Thapa et al. (2013) and Wang & Degol's (2015:2016) reviews of school climate research, the importance of school climate has grown significantly, emboldened by the construct's association with the promotion of safety, healthy relationships, engaged learning and teaching, and school improvement efforts. However, there is a lack of consensus on a distinct definition of school climate or of the parameters of which to measure school climate (Wang & Degol, 2015:2016). This study defines school climate as the quality and character of school life (Cohen et al., 2009), including norms, values, expectations, and

relationships that support students' feelings of social, emotional, and physical safety.

Traditionally, school climate is a context-level variable bound by classroom norms and averages. However, it is clear that school climate is not a homogenous experience for students. Obstacles to building and supporting a unified learning environment for students may have been amplified by the diminished attendance due to illness, disrupted school year transitioning from online to remote learning, reduced exposure to diverse social experiences due to cohort regulations and strict health and safety rules. Wang et al. (2014) investigated both school-level and individual level school climate measures. Peer victimization was negatively related with individual-level school climate, which indicates that when students experience victimization they are likely to perceive their relationships at school negatively. In a representable sample generalizable to a broader population of ethnically diverse middle and high school students in California, relative to non-transgender students, transgender students were likely to report more negative perceptions of school. Transgender students were more likely to experience peer victimization, bias-based bullying, and were more likely to be truant from school climate (Day et al., 2018). Therefore, strained educational environments where students experience stress or negativity due to external factors may contribute to individual-level school climate perceptions.

Social and political responses to the pandemic have resulted in many school disruptions and ongoing unpredictable disruptions. Diversity in student interpretations of their social context may be predicted by students' stress level. When people feel stressed they try to control and make sense of the world around them by attributing that stress to external factors. Behavioural neuroscience research on child poverty has demonstrated that children who experience chronic external stressors are more likely to interpret ambiguous situations as hostile

or negative (Javanbakht et al., 2015). In school, this might translate to students who experience high levels of stress may perceive the strict health and safety COVID-19 rules at school to be unfair and an infringement on their personal freedoms, whereas students without high levels of stress may perceive COVID-19 school rules as fair and part of a group effort to end the pandemic.

Students experiencing heightened COVID-19 related stresses (distress and fatigue) may be more inclined to interpret their school environments negatively. Specifically, COVID-19 distress is characterized by students feeling worried that the basic health and safety guidelines (e.g., hand washing, sanitizing, and social distancing) are not enough to keep them safe from the virus. This may lead students to view their school environment negatively indicated by disliking their school and feeling unsafe. COVID-19 fatigue is characterized by feeling exhausted by the pandemic rules, believing the pandemic has made school less enjoyable, and feeling less motivated to follow the COVID-19 rules, all of which may lead students to dislike their school or feel the rules are unfair, and too harsh. By April 2021, students had been exposed to external stressors in the form of distress and fatigue for over a year; experiencing heightened levels of either component of COVID-19 related stresses (distress and fatigue) may contribute to students viewing ambiguous factors at school, including their environment, peers, and teachers as negative, unsafe, and unsupportive (Javanbakht et al., 2015).

Relatedness of School Climate and Coping Strategies

Evidence suggests that classroom climate and coping are reciprocally related. Not only does school climate contribute to how one copes, but how one copes also contributes to classroom climate. Both coping and school climate have strong ties to positive outcomes for

students. Poor emotion regulation is associated with behavioural problems and therefore, is often connected to poor social functioning (Gross, 1998; Van Eck et al., 2017). Students who utilize reappraisal strategies are more likely to have closer relationships with friends (Gross & John, 2003). Reappraisers are also able to negotiate stressful situations with optimistic attitudes, reinterpreting the stress they feel, and by making active efforts to repair negative affect (Gross & John, 2003). Van Eck et al. (2017) linked emotion regulation to externalizing (e.g., attention-deficit/ hyperactivity disorder or anti-social behaviour) and internalizing (e.g., inability to utilize emotion regulation strategies to reduce stress) behavioural problems.

Crean (2004) found that acute life stressors and social conflict were significant risk factors in early adolescent adjustment and were positively associated with adolescent symptomatology. The author found that social support and adaptive coping were protective against the above risk factors. Interestingly, social support was associated with more adaptive coping and school competencies (e.g., GPA and classroom-conduct). Kidger et al. (2012) found that student perceptions of teacher support and school connectedness were associated with better emotional health. Emotion regulation was predictive of teacher-student relationships, an aspect of school climate, among kindergarteners (Graziano et al., 2007). Students who are able to regulate their emotions well may contribute to a healthy and supportive school climate through their interactions with peers and general behaviour.

Coping occurs within a social environment; social factors (e.g., peer interactions, parental involvement, teacher-student relationships) can not only materialize as a stressor, but are also related to which coping strategies one employs (i.e., adaptive or maladaptive). Coping requires the regulation of emotions, motivations, behaviours, and cognitions to effectively deal

with stresses. In the context of positive relationships, better social adjustment is associated with a greater capacity for emotion regulation (Morrish et al., 2018). The environment that students learn in includes dynamic social interactions and structures that influence how students perceive their context as either positive and supportive or negative and discouraging. Supportive learning environments have been linked to positive academic outcomes (Korpershoek et al., 2019; Van Eck et al, 2017, Walton & Cohen, 2007; Wang & Degol, 2015;2016, Won et al., 2018).

Classroom climate is related to how students cope and experience stress in high school (Haugan et al., 2021). Positive social interactions are associated with the use of reappraisal strategies (Gross & John, 2003). A nurturing school climate may promote more adaptive coping strategies because when students feel safe, secure and connected, they may be more motivated to employ strategies to regulate their emotions in ways that will benefit themselves and those around them. In a positive school climate, students may also witness their peers modeling the use of adaptive coping strategies, which may encourage them to also utilize similar strategies.

School Climate Linked to Student Engagement and School Aversion

Several studies have linked stress, school climate, and student outcomes. While the relatedness of the factors is well-established, the arrangement of the associations and the direction of the relationships varies across studies. In the context of the pandemic, school climate has been inversely related to stress. Pandemic conditions may have contributed to students feeling less connected to their school, teachers, and classmates. For example, students and teachers were encouraged to stay home if they had any illness symptoms, thus, schools experienced higher than usual absence rates. Also, some students only physically attended part of the school year because they opted to learn remotely. Due to these realities, students may

have missed out on opportunities for connection at school, which may have contributed to them engaging in school less. For example, if students feel less connected to their teachers and peers, they may feel less comfortable sharing their ideas in class. Wang & Dishion (2012) found that students viewed their school climate on a downward trend in middle school and speculated that this may be attributed to decreases in school engagement.

Extent COVID-19 research linking stress indicators and school climate is sparse. Therefore, studies focused on similar variables that spotlight expected trends have been leveraged. For example, to illustrate an inverse relationship between COVID-19 related stress and connectedness, an aspect of school climate, perceived stress and COVID-19 specific worries during lockdown was negatively associated with social connectedness (Nitschke et al., 2021). Specifically, the authors found that larger social network size predicted lower levels of both distress indicators and was negatively associated with people's level of fatigue during the pandemic. The authors indicated that their study cannot determine the nature of the association between distress and social connectedness and acknowledged that the relationship is likely bidirectional, where those who report higher levels of distress may also be less likely to seek social contact with others (Nitschke et al., 2021). As an indication of the relationship between stress generally as a predictor of school climate, poor work climate among teachers was predictive of their level of perceived stress, mediated by their coping behaviours (adaptive emotion regulation- cognitive reappraisal). The more teachers perceived their climate as positive the more likely they were able to utilize reappraisal strategies to cope with stress (Jeon & Ardeleanu, 2020).

Positive school climate has been linked to several positive outcomes for students, whereas, negative perceptions of school climate are related to negative outcomes for students. For example, individual-level school climate was positively related to GPA among 5th grade students (Wang et al., 2014). In middle school and high school, school climate is positively related to school satisfaction (Zullig et al., 2011), which likely indicates low aversion. To exemplify this point, a student who perceives their school climate positively believes their peers and teachers care about them, they like going to their school, they feel safe at school, and they believe the rules are fair. It is plausible that all of these points benefiting one's perception of school climate also promote overall engagement and satisfaction with school.

The perceptions students have about the quality of their school climate may contribute to how engaged they are in class and their level of aversion to school. COVID-19 is likely to increase the risk of burnout and decrease student engagement in elementary and middle school. Change and stability in student engagement were accompanied with change and stability in social emotional factors, such as social belongingness (Salmela-Aro et al., 2021). In a study of 5th-grade students, Patrick et al. (2007) found a significant relationship between student perceptions of their social environment, (i.e., teacher support, student support, promotion of mutual respect) and classroom engagement. Positive perceptions of school climate among 7th graders were positively associated with behavioural engagement in grade 8, which was in turn positively associated with GPA (Wang & Holcombe, 2010). While there is no COVID-19 specific research linking school climate and school aversion, it is possible to infer that if students are experiencing satisfaction with school, they are likely experiencing low school aversion. In the context of COVID-19, school satisfaction was positively related to academic

performance and negatively related to absenteeism (Daily et al., 2020). Lewis et al. (2017) found that that connectedness with peers was inversely related to school aversion and positively associated with GPA in core subjects.

In the absence of adequate literature related specifically to COVID-19 stresses, emotion regulation and school climate, evidence for the inverse association between stress and both emotion regulation and school climate can be leveraged to support the idea that COVID-19 related stress may predict how students regulate their emotions or how they perceive their school climate, which may be associated with diminished student outcomes. The established inverse relationship between stress and student outcomes may be explained by the way they regulate their emotions or their individual perceptions of school climate. Both adaptive coping strategies and positive perceptions of school climate are positively associated with student outcomes (Daily et al., 2020; Davis, 2016, Graziano et al., 2007; Gustems-Carnicer et al., 2019; Ivcevic & Brackett, 2014; Wang & Holcombe, 2010). Students experiencing high levels of stress may be less likely to utilize effective coping strategies, which may predict diminished student outcomes. For example, students with high levels of COVID-19 related stresses may be less able to change the way they are thinking about a situation when they experience a negative emotion because students may be overwhelmed by the pervasive negativity of the pandemic, which may predict poor student outcomes. Similarly, when students experience high levels of stress, they may be more likely to perceive their school climate poorly, which will likely predict poor student outcomes. For example, COVID-19 distress is indicated by feeling worried about contracting COVID at school; students with high levels of distress may be hyper vigilant and anxious about their surroundings and peers. This may lead them to perceive their school context

negatively; they may not believe that school rules are keeping them adequately safe and they may not feel their peers care about them, especially if they do not share the same level of concern for virus. Relatedly, students experiencing heightened COVID-19 fatigue feel that the pandemic has made school less enjoyable. This may predict that they do not like their school or that they wish they went to another school, both of which are indicators of negative perceptions of school climate.

Both emotion regulation and school climate provide a plausible explanation for why students' stress levels could be related to negative student outcomes and both can be considered as distinct mediators in the relationship between stress and student outcomes. Their relatedness also provides rationale to investigate how both emotion regulation and school climate coupled together may better explain the relationship between stress and student outcomes, such as engagement and aversion to school. From a practical standpoint, the utility of examining the mediational role of both emotion regulation and student perceptions of school climate rests in the potential for educators to target these factors in classrooms. Interventions aimed at promoting adaptive emotion regulation through intentional reappraisal strategy instruction (Davis & Levine., 2013) as well as cultivating positive school climate perceptions (see Charlton et al., 2021;2020) may support students to manage stressful experiences effectively and promote positive student outcomes. The sources of external stress cannot be managed; if COVID-19 related stress is related with diminished engagement and heightened aversion, teachers can help students intervene through emotion regulation strategies and school climate. The position of emotion regulation and school climate as mediators in the relationship between COVID-19 related stresses and student outcomes (student engagement and school aversion) provides utility

and practical insight for educators. Both emotion regulation and school climate can be targeted through interventions in order to protect student outcomes in relation to COVID-19 stress.

Purpose Statement

The COVID-19 pandemic has been associated with a variety of negative outcomes for students, including general well-being and school related outcomes. A growing concern for educators is the lack of engagement and heightened aversion to school that students are experiencing, which may be related to other academic outcomes such as GPA and absenteeism. The purpose of this study was to examine the relationship between COVID-19 related stresses (both COVID-19 distress, and COVID-19 fatigue) and academic engagement in middle school. Furthermore, this study examines whether student coping strategies (i.e., emotion regulation strategies) and school climate mediate the association between COVID-19 related stresses and (a) student engagement, or (b) school aversion.

COVID-19 related stresses (i.e., distress and fatigue) were expected to be directly related to student engagement and school aversion. This direct relationship was predicted to be further explained through students' capacity to cope with stress (i.e., their ability to utilize adaptive emotion regulation strategies). Since emotion regulation and school climate are strongly associated (Gross & John, 2003; Morrish et al., 2018) it was predicted that individual variation in how students perceive the quality of their school climate may also explain the relationship between COVID-19 related stresses and both student engagement and school aversion.

Research Questions

1. Are COVID-19 related stresses directly related to student engagement and daily school aversion?

2. a. Do students' emotion regulation strategies mediate the relationship between COVID-19 related stresses and student engagement?
- b. Do students' perceptions of school climate during the pandemic mediate the relationship between COVID-19 related stresses and student engagement above and beyond emotion regulation?
3. a. Do students' emotion regulation strategies mediate the relationship between COVID-19 related stresses and daily school aversion?
- b. Do students' perceptions of school climate during the pandemic mediate the relationship between COVID-19 related stresses and daily school aversion above and beyond emotion regulation?

Research Design

Research Design

This study used cross-sectional mediation to examine the contributions of emotion regulation to the relationship between COVID-19 stressors and academic engagement. The design of the study considered the vulnerability of middle school students and the potential added strain that may have accompanied answering questionnaire questions related to feelings of distress. Lavrakas (2008) suggests the degree to which a respondent perceives participation in survey research to be difficult or emotionally stressful is called respondent burden. One recommended solution is to break up a long series of questions into smaller, manageable chunks to reduce burden (Lavrakas, 2008). Therefore, data collection instruments were administered over a school week to reduce respondent burden and to better accommodate the 30-minute class scheduling blocks used in the school. Temporal precedence required in mediational analysis of

longitudinal designs with treatment conditions is not applicable for this study (Maric et al., 2012). Furthermore, given the ongoing duration of the pandemic, students' perceptions of their levels of COVID-19 related stresses were not expected to fluctuate between Monday and Friday of the same week.

To add ecological validity and be sensitive to a growing need to support the well-being of students during the pandemic, data collection was coupled with an instructional unit that created opportunities to self-assess, and briefly reflect upon their experiences with the goal of identifying at least one strategy to try in the future.

Predictor Variables

COVID-19 Related Stresses

COVID-19 related stresses were the main predictor variables for this study. During the pandemic, stress has been studied in academic settings using several different measures. Some studies have used general stress measures (Caroll et al., 2020; Nitschke et al. 2021; Nwachukwu et al., 2020) while others have included COVID-19-specific stress measures (Hadwin et al., 2021; Nitschke et al., 2021) to examine the levels of stress experienced during the pandemic. To encapsulate the experiences of students during the pandemic, a COVID-19-specific scale that includes elements of both distress and fatigue may provide a more complete picture about the nuanced experiences of middle school students almost a year into the pandemic. Student levels of COVID-19 distress and fatigue may be linked to negative student outcomes. Therefore, this study incorporated two COVID-19 related stress scales: COVID-19 distress and COVID-19 fatigue. Both components of COVID-19 related stresses were included to account different ways COVID-19 stress might be experienced by students during the rapidly shifting waves of

the pandemic and after a full year of pandemic restrictions at school and in the community. It was important to include both measures in this paper to provide insight into two types of stress experienced during the pandemic. Data on these measures were calculated separately.

Dependent Variables

Two school engagement dependent variables were considered separately: student engagement and daily school aversion. These outcomes were selected because diminished engagement appears to be a solid indicator of student experiences during the pandemic (Salmela-Aro et al., 2021). Engagement has been linked to mediating variables emotion regulation and school climate (Wang & Dishion, 2012). As well, engagement has been linked to other academic outcomes, such as GPA, academic performance, and attendance (Appleton et al., 2006; Bandura et al., 1997; Christenson et al., 2012). Salmela-Aro (2021) described the prominence of engagement as a good indicator of students' academic and psychological functioning as well as their potential to predict academic achievement, misbehaviour, or dropout.

Student Engagement

Salmela-Aro (2021) described the prominence of engagement as a good indicator of students' academic and psychological functioning as well as their potential to predict academic achievement, misbehaviour, or dropout. Engagement has been linked to mediating variables emotion regulation and school climate (Wang & Dishion, 2012) as well as other academic outcomes, such as GPA, academic performance, and attendance (Appleton et al., 2006; Bandura et al., 1997; Christenson et al., 2012). There is a lack of consensus on an exact definition of student engagement or the subgroups that make up the construct. Research tends to include

behavioural, cognitive, affective, and academic elements within the definition of student engagement (Appleton et al., 2006). For the purposes of this study, priority was given to elements related to behavioural and cognitive engagement. Indicators of behavioural student engagement appear to be easiest for young students to self-assess. A variety of scales exist to measure student engagement including Student Engagement Instrument (Appleton et al. 2006), Motivated Strategies for Learning Questionnaire (MSLQ; Pintrich et al., 2016;1993), and Student School Engagement Model (Hazel et al., 2013). Darr (2012) provides a chapter that describes the development of a survey tool used in New Zealand, *Me and My school*. The scale was developed by the New Zealand Council for Educational Research (NZCER) and includes behavioural, emotional, and cognitive subgroups. Data was collected in 2007, $N = 8,500$, from students 11-15 years old.

School Aversion

Nishina & Juvonen (2005) included school aversion items within a scale for negative affect among middle school students experiencing peer harassment. School aversion was indicated by feelings of dislike towards school. Lewis et al., 2017 adapted Nishina & Juvonen's (2005) scale and created a daily school aversion scale that isolated the two school dislike items. Lewis et al. (2017) conceptualized school aversion as the inverse of engagement and found that social connectedness was negatively related to school aversion (Lewis et al. 2017). Based on the items in NZCER scale for engagement provided by Darr (2012), it is possible to view school aversion as the inverse of emotional engagement. School aversion may also be an indication of low satisfaction with school and potentially an aspect of burnout. School satisfaction or dissatisfaction relates to students' perceptions of their level of contentment with school (Daily et

al., 2020). Low satisfaction at school is often associated with high absenteeism and diminished academic performance. School burnout can be conceptualized as a school syndrome that includes exhaustion and a negative cynical attitude toward school (Salmela-Aro, 2021). Lewis et al. (2017) provided a simple school aversion measure that appears to combine aspects of emotional engagement, satisfaction and burnout. Lewis et al. (2017) scale includes students' aversion to school indicated by feeling tired of school and hating school. Daily school aversion (DSA) provides a snapshot of students' attitudes towards schools over the course of a week with daily data collection.

Mediators

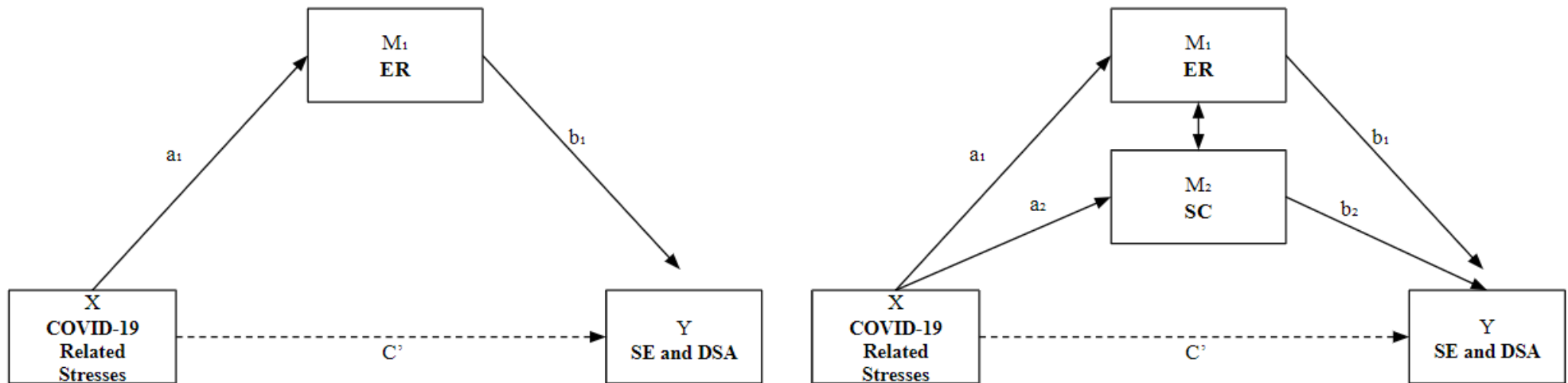
Emotion Regulation

Emotion regulation was the primary mediator because previous literature supports coping as a significant mediator in academic settings in response to stress (Arsenio & Lorio, 2014). Adaptive emotion regulation is inversely related to stress (Hannan & Orcutt, 2020; Santi et al., 2020;2021). Emotion regulation is also strongly associated with academic outcomes and well-being (Arsenio & Lorio, 2014; Gross & John, 2003; Ivcevic & Brackett, 2014). A variety of scales measure emotion regulation including the Regulation of Emotion Questionnaire (REQ; Phillips & Power 2007), Emotion Regulation Difficulties Scale (Gratz & Roemer, 2004), and Emotion Regulation Profile-Revised (Nelis et al., 2011). Notably, the Emotion Regulation Questionnaire (ERQ; Gross & John, 2003) examines two main emotion regulation strategies: cognitive reappraisal and emotion suppression.

School Climate

School climate was added in parallel mediation because it has been strongly associated with emotion regulation (Crean, 2004; Graziano et al., 2007; Gross & John, 2003; Morrish et al., 2018), in past research and has been studied in the context of academic outcomes (Korpershoek et al., 2019; Van Eck et al., 2017, Walton & Cohen, 2007; Wang & Degol, 2015;2016) and stress (Haugan et al., 2021; Nitschke et al., 2021; Sönmez & Kolaşinli, 2021). Research has used aspects of school climate, such as school belonging and teacher expectations, as mediators (Doumas & Midgett, 2019; Kuperminc et al., 2001). Scales measuring school climate typically include similar key elements: safety, relationships, teaching and learning, institutional environment, and school improvement efforts (Thapa et al., 2013). Notable scales for school climate include: Classroom Environment Scale (Trickett & Moos, 1974) and the School Climate Survey (Griffith, 1995), and the Delaware School Climate Survey (D-SCS; Bear et al., 2011).

Figure 1

Theoretical Mediation and Parallel Mediation Models

Note. COVID-19 Related Stresses = COVID-19 distress and COVID-19 fatigue; ER = emotion regulation; SC = school climate; SE = student engagement; DSA = daily school aversion

Pandemic Context for Study

Important events coincided with data collection that marked a looming shift in the pandemic: vaccination access in BC was becoming increasingly available, vaccination rates in BC were increasing rapidly including the largest immunization rollout in BC's history between March and April 2021 (Government of BC, 2021), and media attention was focusing on the imminent approval of the vaccine for children 12-17 (Government of BC, 2021). However, these positive events were juxtaposed with the emergence of the third and biggest pandemic wave to date in April 2021, local school districts experienced 45 exposures in April 2021 (Island Health, 2021), renewed restrictions and requests for people to limit movement across regions and health districts, and reduce the size of their social interaction network, as well as concerns that school closures may follow.

Throughout the COVID-19 pandemic viral spread, government restrictions, and school-level pandemic responses developed rapidly and inconsistently across geographical regions and even school districts. This section contextualizes the pandemic context at the time of data collection. At the time of data collection, in April 2021, students had been navigating their schooling experience during the pandemic for over a year. At the onset of the pandemic, in March 2020, schools in the Sooke, BC school district abruptly transitioned to remote learning and did not return back to school until the following September 2020. When students returned to face-to-face instruction strict health and safety mandates were implemented including sanitization protocols, mandatory mask wearing, cohorts designed to limit exposures, and the loss of extracurricular activities and applied skill development classes (e.g., wood work or sewing). Prior to data collection, the 2020/2021 school year included over 100 potential school exposures on Vancouver Island. During the time of data collection, 3 potential exposures

occurred at the middle school where the study took place, causing many students and staff to isolate or quarantine (Island Health, 2021). At the time of data collection, 2.8 million COVID-19 deaths had been reported with over 130 million cumulative cases reported (World Health Organization, 2021). February 2021 saw an upward trend in vaccination rates as more adults became eligible to receive their vaccination (Government of Canada, 2021). At the time of data collection, in April 2021, just over 15% of Canadians had received at least 1 dose of the vaccine (Government of Canada, 2021). Children 12-17 were not eligible for vaccination at this time. In May, after data collection, it was announced that the vaccine was approved for children 12-17 (Government of British Columbia, 2021).

Instructional Context

Teachers from one school (Grades 6-8) in the Sooke school district implemented an instructional unit. The unit was designed to meet aspects of the British Columbian curriculum as outlined by the Ministry of Education, in particular features of the core competencies (e.g., thinking competencies and personal/social competencies). Activities and questionnaires provided opportunities for students to reflect, self-assess, and develop metacognitive awareness. Students received personalized visual summaries of their questionnaire results and were briefly introduced to proactive social, emotional, and self-regulated learning strategies designed to promote well-being and academic success in lagging areas. Teachers completed the instructional unit with their classes as part of their regular schooling experience over 1 week, 25 minutes a day for 5 school days.

Table 1 outlines topics and corresponding questionnaires administered on each of the five school days. Questionnaires were administered in an order that best facilitated curricular

flow. Given worldwide concerns about the mental health of youth during the pandemic, teachers did not want COVID-19 questions to trigger further and COVID-19 stress was the last topic. By day 5 it was expected that students would be familiar with the idea that each lesson focused on proactively: (a) learning about me, discussing sharing my results, and identifying the best strategy for me to try in the future. Emphasis for the instructional unit was given to promoting open discussion about well-being. Daily activities included within the instructional unit were designed to help students self-assess their competencies and experiences, promote class discussion about the topic and give students access to a few strategies they might consider trying in the future. Each day students completed a questionnaire and received an individualized report of their results before the teacher-led discussion and activities commenced.

Research Methods

Participants

Participants were 301 of 363 consenting middle school students from a Western Canadian school district who completed all the questionnaires. Grade information is provided in Table 2 that outlines the original sample of 363 and the final sample of 301. In the original sample 146 students were in grade 8, 98 students were in grade 7, and 101 students were in grade 6. Grade was unspecified for 18 students who failed to respond to the demographic question. Data from 9 students in total were deleted prior to analysis because 2 students misused their tokens and 7 students did not complete any of the 5 questionnaires. The original sample included 162 female students, 152 male students, 5 non-binary students, 1 two-spirit student, 14 students preferred not to say, and 24 students missed the demographic question and did not provide gender information.

Table 1***Overview of Instructional Unit and Data Utilized for Research***

Topic		Questionnaire Administered within Instructional Unit*
Day 1	What makes a good student? <ul style="list-style-type: none"> • Skills that contribute to success at school • Strategies for engaging in school 	<ul style="list-style-type: none"> • Student Engagement* • Daily School Aversion Day 1* • <i>Grades</i> • <i>Attendance</i>
Day 2	Perceptions of school context <ul style="list-style-type: none"> • Differing ways students feel connected to school • Strategies to build social connection 	<ul style="list-style-type: none"> • School Climate* • Emotion Regulation* • Daily School Aversion Day 2*
Day 3	Self-regulated learning <ul style="list-style-type: none"> • What is self-regulated learning? • Strategies for self-regulating learning 	<ul style="list-style-type: none"> • <i>Self-Regulated Learning</i> • Daily School Aversion Day 3*
Day 4	Academic challenges <ul style="list-style-type: none"> • Challenges students encounter at school • Strategies for conquering academic challenges 	<ul style="list-style-type: none"> • <i>Academic Challenges</i> • Daily School Aversion Day 4*
Day 5	COVID-19 Related Stresses <ul style="list-style-type: none"> • General pandemic experiences and impact on life • Strategies used to feel better during the pandemic 	<ul style="list-style-type: none"> • COVID-19 Related Stress • <i>Exposure to COVID-19</i> • <i>Family stress</i> • COVID-19 Distress* • COVID-19 Fatigue* • Daily School Aversion Day 5*

Note. *Scales used in this study

Table 2***Grade Level and Gender: Original Sample (N = 363)***

<i>N = 363</i>	<i>n (%)</i>
Grade	
6	146 (40.2%)
7	98 (27%)
8	101 (27.8%)
Missing	18 (5%)
Total	363 (100%)
Gender	
Female	162 (44.6%)
Male	156 (43%)
Non-binary	5 (1.4%)
Prefer not to say	14 (3.9%)
Two-spirit	1 (0.3%)
Missing	24 (6.6%)
Total	363 (100%)

Note. Missing values relate to students who did not complete the demographic questions

Measures

Predictor Variables

COVID-19 Distress. An adapted version of Taylor et al. (2020) COVID stress scales (CSS) measured the levels of distress students felt during the COVID-19 pandemic (see Appendix D). The original 36-item scale assessed 5 main areas related to the pandemic: danger and contamination fears, fears about economic consequences, xenophobia, compulsive checking and reassurance seeking, and traumatic stress symptoms about COVID-19. Items related to xenophobia, socio-economic consequences, and compulsive checking were dropped because they were not relevant for middle school students. Ten remaining CSS items were used and 4 items were added relating to family and social pressures, and stress related to physically attending school; the scale's acceptable reliability was indicated by Cronbach's alpha (α) coefficient ($\alpha = .92$). Students responded to 14-item scale on a 5-point scale (1) *Not at all* (5) *Extremely*. High scores on the COVID-19 distress scale indicate high levels of COVID-19 distress.

COVID Fatigue. A COVID-19 fatigue scale was developed for this study. It included 3-original items: (a) feeling tired and frustrated with the COVID rules, (b) feeling a lack of enjoyment at school, and (c) feeling diminished motivation to follow the COVID rules (see Appendix D) and produced an acceptable reliability coefficient ($\alpha = .77$). Students responded to COVID-19 fatigue items on a 5-point scale (1) *Not at all* (5) *Extremely*. High scores indicate high levels of COVID-19 fatigue.

Dependent Variables

Student Engagement. The NZCER Scale was selected for this study as it was designed specifically for middle school aged students and the items relating to behavioural and cognitive

engagement were clear and concise. A self-report student engagement scale was created based on the NZCER ‘Me and My school’ scale (see Darr, 2012). The original 36-item scale was reduced to limit the duration of questionnaire response time. Items from the original NZCER scale were selected for their focus on behavioural and cognitive engagement. Priority for selection was given to items that appeared easily observable for students to self-assess with simple comprehension. An additional item was added to target class participation, which is an aspect of behavioural engagement (Appleton et al., 2006). The adapted scale included 10 items and used a 5-point scale (1) *Strongly disagree* to (5) *Strongly agree* (see Appendix D); the scale produced an acceptable reliability coefficient ($\alpha = .85$). Students were asked to base their responses on their experiences at school this year. High scores on the student engagement scale indicates that a student has high levels of engagement.

Daily School Aversion. Lewis et al.’s (2017), 2-item self-report scale assessed how students feel- “right now”- on a 4-point scale (1 = *No*; 2 = *Not Really*; 3 = *Sort of*; 4 = *Yes*). Two school aversion items (“hate school” and “tired of school”) were summed per to produce a daily score out of 8. Daily school aversion scores were averaged over 5 days to produce a measure of school aversion that week (see Appendix D); the scale produced an acceptable reliability coefficient ($\alpha = .92$). High scores indicate high levels of hating school and being tired of school.

Mediators

Emotion Regulation. The 6-item cognitive reappraisal subscale from the Emotion Regulation Questionnaire (ERQ; Gross & John, 2003), was used as a measure of adaptive emotion regulation strategies (see Appendix D). Students responded to items on a 5-point scale (1) *Strongly disagree* to (5) *Strongly agree*; the scale produced an acceptable reliability

coefficient ($\alpha = .88$). High scores indicate that students readily utilize adaptive emotion regulation strategies.

School Climate. For this study, DSC-S (Bear et al., 2011) was selected and adapted to measure levels of students' satisfaction regarding their school climate (see Appendix D). The DSCS factor was found to be stable across grade levels, racial-ethnic groups, and gender. The survey demonstrated concurrent validity (Bear et al., 2011). The original scale separated items into five subcategories: teacher-student relations, student-student relations, fairness and rules, school safety, and liking of school. To reduce the size of the scale, 2 items from each subcategory were selected. The adapted scale included 10-items and used a 5-point scale (*1 Strongly disagree to 5 Strongly agree*; the scale produced an acceptable reliability coefficient ($\alpha = .88$). High scores indicate school is perceived as a fair, safe and supportive environment during this pandemic school year.

Ethical Procedures and Consent

Prior to commencing, information regarding the research project was circulated within the school, sharing an educational unit and information on an optional research component with all teachers in the school. Parents and guardians received a subsequent letter of information regarding the educational unit and the optional research component (see Appendix C). All students completed the questionnaires as part of the educational unit. However, instructions were provided for students (and legal guardians) to decline consent for data to be used for student data included in the research without consequence.

To ensure anonymity, each student was provided with a personalized ID number, called a 'token', that was used to login to the LimeSurvey questionnaires. No student identification information was entered into LimeSurvey.

Three options were provided to students and guardians to decline consent for data to be used for research purposes: (a) click on a link to a web-based form and enter the token, (b) email the token to research-team email address, or (c) text message the token to a burner cell phone. Each questionnaire also included a link to a 'decline consent' by entering the token number.

All data associated with the anonymous 'tokens' of people who declined consent were destroyed prior to data analysis. Consent was implied for all students, parents, or guardians who did not deny consent for their anonymized questionnaire response data used for research purposes. The nature of implied consent was explained on the Information Poster and Letter of Information.

The researcher, also a teacher in the school, was blinded to the identity of students who declined consent to participate. Data was removed by a research assistant who was not affiliated with the school. The researcher/teacher accessed fully anonymized data only.

Data Collection Procedure

All questionnaires were completed using 3rd party web-based survey tool, LimeSurvey. Data were stored on a secure Canadian server. Each lesson followed the same sequence. First students completed the questionnaire and received a personalized report of their results. Second, the teacher facilitated a discussion to talk about what the topic and their own questionnaire reports. Third, strategies were introduced, and students were asked to identify one strategy they

might like to try in the future. A booklet was provided for students to record notes about their daily self-assessment and strategy choice.

Students completed questionnaires within the instructional unit as part of regular instruction in April 2021. Questionnaires were administered during 26-minute lessons over 5 consecutive days during one school week following the order of the instructional unit (see Table 1). Consistent with COVID protocols for instruction in the school, flexibility was provided if a student missed a day of school and was able complete questionnaire items within the allotted 2-week window. Most classes finished the unit within one week.

Data Analysis

Missing Data

Data were cleaned and missing data analyzed to determine if there were significant patterns in missingness. To complete mediation analysis a stable data set was needed, therefore, decisions to remove incomplete data were determined following the rationale described below. A total of 363 students provided at least some data on the questionnaires, however not all questionnaires were complete. Across the questionnaires, the number of students completing each questionnaire ranged from 324 to 350. For example, 39 students did not complete the COVID-19 related stress questionnaire, 15 students missed the emotion regulation questionnaire, 13 students missed the school climate questionnaire, and 24 students missed the student engagement questionnaire. For daily school aversion, average scores were compiled from all students who completed at least 2 of the daily school aversion questionnaires. Only data from 6 students were removed who only completed 1 daily school aversion questionnaire.

Missing data were most pronounced for the COVID-19 related stresses questionnaire;

approximately 11% of students did not complete the COVID-19 questionnaire. It is possible that students who did not complete the COVID-19 questionnaire were simply absent from that day, or it may indicate a more significant pattern. For example, students who missed the COVID-19 questionnaire may also be students who were less engaged may or perceived their school climate more negatively. Of the students who missed the COVID-19 related stresses questionnaire, 9 also missed the school climate, 10 also missed the emotion regulation questionnaire, 5 also missed the following academic outcome questionnaires (student engagement). In terms of grade level missingness, 6 grade-6 students, 2 grade-7 students, 14 grade-8 students, and 17 students who did not specify their grade did not complete the COVID-19 related stresses questionnaire.

Listwise deletion revealed that 301 students completed all questionnaires. Listwise deletion removed all data from students who missed the COVID-19 related stresses questionnaire including any data from other scales completed on other days. To determine if listwise deletion generated bias, it was necessary to analyze how the students who missed the COVID-19 questionnaire scored on the mediating variables (emotion regulation) and the moderator (school climate). Essentially, analysis aimed to determine if the missingness was random or if it represented a pattern, which may indicate bias. A dichotomous code for the COVID-19 missing data was created. Means were compared between the dichotomous COVID-19 questionnaire variable and the other questionnaire scores. Comparison between mean values of students who completed the COVID-19 questionnaire and those who did not revealed that students who missed the COVID-19 questionnaire scored within 1 standard deviation from the mean across all other questionnaires. ANOVA indicated that the mean differences were

significant between students who completed the COVID-19 items and those that did not for school climate ($p = .005$), SE ($p < .001$), and DSA ($p = 0.004$). However, completing a missing value analysis (MVA) by using Little's (1988) MCAR test revealed that the p value was not significant ($p = 0.438$) and thus the data may be assumed to be MCAR and pattern of missingness in the total 363 persons by 6 variables data set can be considered ignorable. If the data are MCAR, listwise deletion creates unbiased estimates of means, variances, and regression weights, as well, listwise deletion produces standard errors and significance levels that are accurate for the reduced subset of data, but that are often larger relative to all available data (Little & Rubin, 2002; Schafer & Graham, 2002). Therefore, it was concluded that the missingness from the COVID-19 questionnaire was random and listwise deletion could be used as an appropriate method to produce a final sample ($N = 301$) for further analysis.

The final sample included 301 students from grade 6 ($n = 135$), grade 7 ($n = 91$), and grade 8 ($n = 74$). Of the 301 students, only 1 student missed the demographic question. The final sample included 148 female students, 139 male students, 3 non-binary students, 11 students preferred not to say, and 1 student missed the demographic question and did not provide gender information (see Appendix B).

Preliminary Analyses

Correlational analysis of the main variables was completed to test the expected associations between the main variables. Table 3 presents the mean, standard deviation and correlations between 6 variables with a sample size determined by listwise deletion ($N = 301$). Table 3 includes Cronbach's alpha's (α) for each scale, which indicates acceptable reliability for all scales. Correlational analysis indicated that the two scales of COVID-19 related stresses

(distress and fatigue) were associated very differently with the other main variables. While COVID-19 fatigue was inversely related to emotion regulation, school climate, student engagement and positively associated with daily school aversion, COVID-19 distress was only positively associated with daily school aversion and was not correlated significantly with emotion regulation or school climate.

It was expected that both COVID-19 related stresses (i.e., COVID-19 distress and COVID-19 fatigue) would be related to emotion regulation and school climate; however only COVID-19 fatigue was significantly and negatively associated to emotion regulation school climate. COVID-19 distress had no significant relationship with either variable. As predicted, COVID-19 fatigue was inversely related to student engagement and positively related to daily school aversion. COVID-19 distress was positively related to daily school aversion; however, no significant relationship was found with student engagement. As anticipated, emotion regulation and school climate were positively associated with student engagement and negatively associated with daily school aversion. Student engagement and daily school aversion were inversely related. Emotion regulation and school climate were positively correlated.

Based on the lack of correlation between COVID-19 distress and other main variables (i.e., emotion regulation, school climate, and student engagement), it was determined that subsequent analysis would focus solely on COVID-19 fatigue as the predictor variable, and COVID-19 distress was removed as a predictor.

Table 4 provides a comparison of mean scores based on gender and grade. Independent sample t-tests were conducted to determine if mean differences between females and males were statistically significant. Self-reporting males reported statistically higher COVID-19

distress; self-reporting females reported statistically higher COVID-19 fatigue and student engagement. Chi-square tests were conducted to determine if the mean differences between grade 6, grade 7, and grade 8 students were statistically significant for all key variables. As indicated in table 4, the difference in mean scores across grades for variables school climate and daily school aversion were statistically significant.

Table 3***Correlations and Descriptive Statistics of Main Variables (N = 301)***

	1	2	3	4	5	6
1. CO_F	1.00					
2. CO_D	.17***	1.00				
3. ER	-.13*	.02	1.00			
4. SC	-.42***	-.01	.53***	1.00		
5. SE	-.28***	.00	.48***	.57***	1.00	
6. DSA	.54***	.12*	-.39***	-.68***	-.56***	1.00
<i>M</i>	3.22	2.21	3.34	3.68	3.60	5.03
<i>SD</i>	1.07	.79	.76	.64	.61	1.84
α	.77	.92	.88	.88	.85	.92

Note. $N = 301$. The result scale for all variables ranged from 1-5, except DSA which ranged from 1-8. CO-F = COVID-19 fatigue; CO_D = COVID-19 distress; ER = emotion regulation; SC = school climate; SE = student engagement; DSA = daily school aversion

α = Cronbach's alpha

* $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$

Table 4*Comparisons in Mean Values Separated by Gender and Grade*

	Mean					
	CO_F	CO_D	ER	SC	SE	DSA
Female	3.08*	2.31*	3.35	3.75	3.73*	4.86
Male	3.35*	2.09*	3.37	3.65	3.50*	5.10
Grade 6	3.24	2.23	3.35	3.82**	3.65	4.71**
Grade 7	3.07	2.25	3.40	3.75**	3.63	4.95**
Grade 8	3.39	2.09	3.23	3.35**	3.47	5.69**

Note. CO-F = COVID-19 fatigue; CO_D = COVID-19 distress; ER = emotion regulation; SC = school climate; SE = student engagement; DSA = daily school aversion

*independent sample t-tests indicated significant differences for mean values based on gender

**chi-square tests indicated significant differences for mean values based on grade

Analytic Method to Test Research Questions

Mediation data analysis requires large sample sizes as it is required to obtain enough power to detect mediation effects, which are typically smaller in size (Wu & Zumbo, 2007;2008). This obtained sample size of 301 fits well with existing literature studying similar factors (see Davis, 2016; De Castella et al., 2013; Goodenow, 1993; Ivcevic & Brackett, 2014; Jayman et al., 2019; Mauss et al., 2011; Morgan et al., 2017; Walton & Cohen, 2007). Mediating variables were selected based previous research that have examined engagement, aversion and stress in the context of middle school age. Previous research supports emotion regulation (Hopfinger et al., 2016; Nielsen et al., 2017; Rentzoi et al., 2019) and school climate (Demirtas et al., 2020; Swee et al., 2020; Tomczyk et al., 2015) as factors that promote positive outcomes for students in academic settings. It was unknown how COVID-19 related stress would related to middle school students' engagement and aversion to school; however, the predicted negative relationship between COVID-19 related stresses and both student engagement and school aversion was cultivated by drawing on previous research examining the negative associations between general stress and academic outcomes.

The mediation and parallel mediation model 4, provided by Hayes and Rockwood's (2019) conditional process analysis, provided a suitable framework for this study. Mediation analysis was conducted using Hayes Process Macro in SPSS. Grade level and gender were treated as concomitant variables in the regression equations. The intention of mediational analysis is to examine and identify the relationship between the dependent variable Y and an independent variable X, which may be mediated via a third variable M that represents a hypothesized mechanism through which X is related to Y. In the current study, it was predicted that COVID-19 fatigue would be directly related to both student engagement and school

aversion. This direct relationship was predicted to be further explained through students' capacity to cope with stress (i.e., their ability to utilize adaptive emotion regulation strategies). Additionally, it was predicted that individual variation in how students perceive the quality of their school climate may also explain the relationship between COVID-19 related stresses and both student engagement and school aversion.

The approach to answering the following research questions involved incremental step-by-step model building. First, a direct relationship was explored between COVID-19 fatigue and each outcome variable (student engagement and school aversion), if a direct relationship was established then additional mediation analysis would follow with emotion regulation as the mediator. Lastly, to explore the role of school climate in addition to the role of emotion regulation, parallel mediation analysis followed with both emotion regulation and school climate as parallel mediators to explain the relationship between COVID-19 and both outcomes (student engagement and school climate).

Figure 2

Model of Direct Relationship between COVID-19 Fatigue and Outcomes

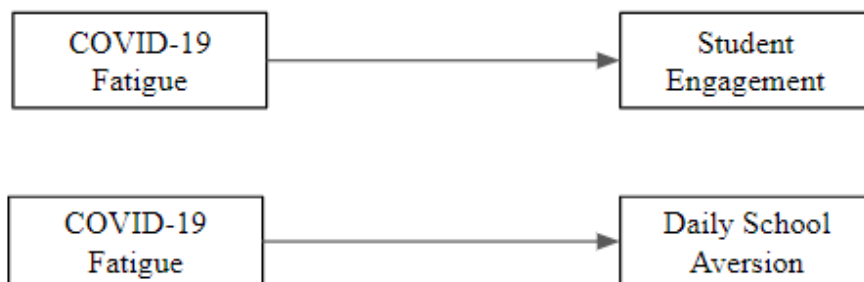


Figure 3

Mediation Models Linking COVID-19 Fatigue (X) and Student Engagement (Y) Via Mediating Variables (Emotion Regulation, M_1) and (School Climate, M_2)

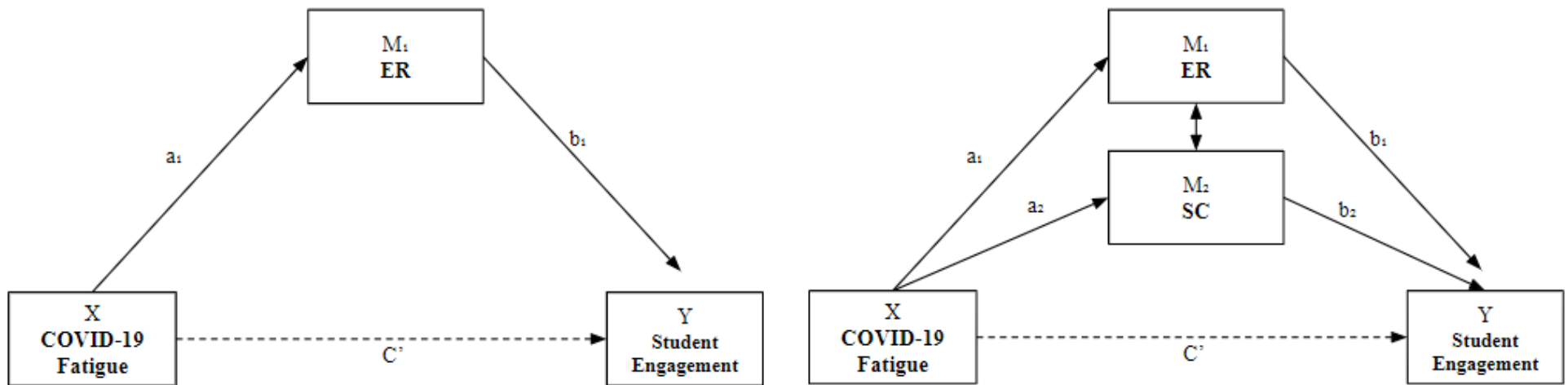
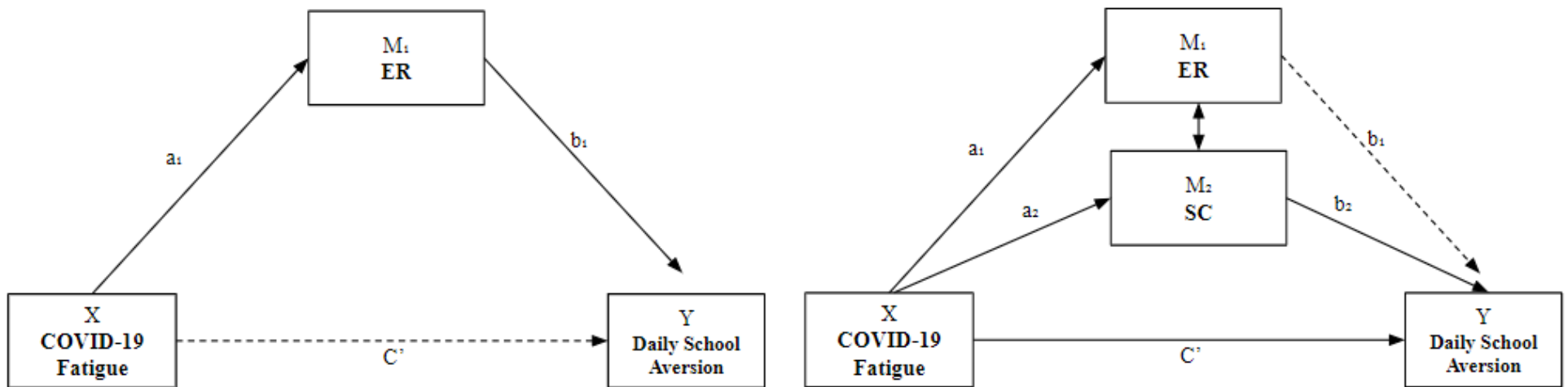


Figure 4

Mediation Models Linking COVID-19 Fatigue (X) and Daily School Aversion (Y) Via Mediating Variables (Emotion Regulation, M_1) and (School Climate, M_2)



Research Question 1: Is COVID-19 fatigue directly related to student engagement and daily school aversion?

The total effect of COVID-19 fatigue on student engagement and daily school aversion was expected to be significant. Specifically, high levels of COVID-19 related fatigue were expected to be associated with diminished engagement and more aversion (Hadwin et al., 2021; Kötter et al., 2017; Stewart et al., 2002;1999). The total effect is equal to the direct effect plus the indirect effect ($c = c' + ab$). To determine if COVID-19 fatigue had a significant total effect on student engagement and school aversion, linear regression analyses between the dependent variable (student engagement and daily school aversion) and the independent variable (COVID-19 fatigue) were completed.

Research Question 2a: Do students' emotion regulation strategies mediate the relationship between COVID-19 fatigue and student engagement?

It was predicted that individual differences in emotion regulation would mediate the relationship between COVID-19 fatigue and student engagement. Coping is inextricably tied to levels of stress; coping refers to various strategies utilized in response to stress. Previous research supports the hypothesis that strong coping strategies (e.g., adaptive emotion regulation strategies, such as cognitive reappraisal) will be predictive of positive outcomes for students (Arsenio and Lorio, 2014; Davis, 2016; Gaeta et al., 2021; Gusterms-Carnicer et al., 2019; Ivcevic & Brackett, 2014). Previous research focused on emotion regulation in academic settings, demonstrated that adaptive emotion regulation strategies were related to well-being (Morish et al., 2018) and highlighted the negative association with the stresses accompanying the pandemic (Zarei et al., 2016). It was expected that the relationship between COVID-19 fatigue and diminished student engagement would be mediated by students' levels of emotion

regulation coping. Therefore, students who have high levels of emotion regulation, meaning that they readily employ adaptive strategies, may experience less diminished. COVID-19 fatigue was predicted to be negatively related to emotion regulation and emotion regulation was predicted to be positively related to student engagement. A mediation model was produced to depict the analysis between the independent variable (X) COVID-19 fatigue, mediator (M) emotion regulation, and dependent variable (Y) student engagement (see Figure 3).

Research Question 2b: Do students' perceptions of school climate during the pandemic mediate the relationship between COVID-19 fatigue and student engagement above and beyond emotion regulation?

It was predicted that the ways students perceived their school climate would also further explain the relationship between COVID-19 fatigue and student engagement. Research suggests an inverse relationship between stress and school climate. Specifically, perceived stress and COVID-19 specific worries during lockdown was negatively associated with social connectedness (Nitschke et al., 2021). Research links supportive learning environments and sense of belonging, which are both aspects of school climate, with positive outcomes for students (Korpershoek et al., 2019; Van Eck et al, 2017, Walton & Cohen, 2007; Wang & Degol, 2015;2016, Won et al., 2018). Positive perceptions of school climate among 7th graders were positively associated with behavioural engagement in grade 8, which was in turn positively associated with GPA (Wang & Holcombe, 2010). Classroom climate was related to how students cope and experience stress in high school (Haugan et al., 2021). Studies showed that students' perceptions of their school context were found to positively influence the coping strategies that students utilized (Crean, 2004; Morrish et al., 2018; Skinner & Saxton, 2020;

Swee et al., 2020; Tu et al., 2020). Given the established connection between emotion regulation and school climate, it was decided to build school climate as a parallel mediator into the above mediation model (see figure 3). Parallel mediation would allow for insight into the role of school climate (M_2) in the relationship between COVID-19 fatigue (X) and school engagement (Y) alongside emotion regulation (M_1). It was crucial to first analyze the sole mediational contribution of emotion regulation in the relationship between COVID-19 fatigue and student engagement prior to the addition of school climate as a parallel mediator to determine if school climate helped to explain above and beyond emotion regulation. It was expected that the individual perceptions students hold about their school climate will explain the relationship between COVID-19 fatigue and student engagement. These perceptions of school climate are expected to be positively related to emotion regulation.

Research Question 3a: Do students' emotion regulation strategies mediate the relationship between COVID-19 fatigue and daily school aversion?

It was predicted that individual differences in emotion regulation would mediate the relationship between COVID-19 fatigue and daily school aversion. As mentioned above, coping is a response to stress and utilizing adaptive emotion regulation strategies, such as cognitive reappraisal is predictive of positive outcomes for students (Arsenio and Lorio, 2014; Davis, 2016; Gaeta et al., 2021; Gusterms-Carnicer et al., 2019; Ivcevic & Brackett, 2014). School aversion refers to feeling tired of school and hating school. It is likely that students who experience high levels of school aversion may also not attend school as often or perform well academically. Daily school aversion has been associated with lower GPA (Lewis et al., 2017). The connection between COVID-19 fatigue and school aversion was predicted because the

stresses associated with the pandemic likely have made school less enjoyable for students and therefore, they may feel heightened levels of aversion to school. A study based on the COVID-19 lockdown found a steep drop in school satisfaction and students reported missing more school (Kirsch et al., 2021). While, research has not yet linked school aversion to COVID-19 related stresses, it is possible that diminished satisfaction and high absenteeism may be indicators of aversion to school. It was expected that the relationship between COVID-19 fatigue and heightened aversion to school would be mediated by students' levels of emotion regulation coping. Therefore, students who have high levels of emotion regulation, may experience less heightened aversion to school. COVID-19 fatigue was predicted to be negatively related to emotion regulation and emotion regulation was predicted to be negatively related to school aversion. Two mediation models were produced to depict the analysis between the independent variable (X) COVID-19 fatigue, mediator (M) emotion regulation, and dependent variable, (Y) daily school aversion (see figure 4).

Research Question 3b: Do students' perceptions of school climate during the pandemic mediate the relationship between COVID-19 fatigue and daily school aversion above and beyond emotion regulation?

It was predicted that the ways students perceived their school climate would also further explain the relationship between COVID-19 fatigue and daily school aversion. As explained above, research suggests an inverse relationship between stress and school climate (Haugan et al., 2021; Nitschke et al., 2021). School climate is also associated with positive outcomes for students (Korpershoek et al., 2019; Van Eck et al, 2017, Walton & Cohen, 2007; Wang & Degol, 2015;2016, Wang & Holcombe, 2010; Won et al., 2018). In middle school and high

school, positive school climate is positively related to school satisfaction, which may be an indicator of low school aversion. School satisfaction was positively related to academic performance and negatively related to absenteeism (Daily et al., 2020). Social factors, such as cross-ethnic interactions, predicted better academic outcomes in the form of lower levels of daily school aversion and higher GPA in core subjects (Lewis et al., 2017). How students view their interactions with their peers, which is an aspect of school climate, may be related to their levels of school aversion. Classroom climate was related to how students cope and experience stress in high school (Haugan et al., 2021) and positively influenced the coping strategies (Crean, 2004; Morrish et al., 2018; Skinner & Saxton, 2020; Swee et al., 2020; Tu et al., 2020).

Given the established connection between emotion regulation and school climate, school climate was added as a parallel mediator into the above mediation model (see figure 4). Parallel mediation would allow for insight into the role of school climate (M_2) in the relationship between COVID-19 fatigue (X) and daily school aversion (Y) alongside emotion regulation (M_1). It was crucial to first analyze the sole mediational contribution of emotion regulation in the relationship between COVID-19 fatigue and daily school aversion prior to the addition of school climate as a parallel mediator in order to determine if school climate explained the relationship above and beyond emotion regulation. It was expected that the individual perceptions students hold about their school climate will further explain the relationship between COVID-19 fatigue and daily school aversion. These perceptions of school climate are expected to be positively related to emotion regulation.

Results

COVID-19 Fatigue Direct Relationship with Student Engagement and School Aversion:

COVID-19 fatigue was expected to be inversely related to student engagement and positively related to aversion to school. As expected, the total effect of COVID-19 fatigue on student engagement was significant ($\beta = -.29, p < 0.001$ [figure 4]) and the 2 variables were inversely related. Higher levels of COVID-19 fatigue were related to lower levels of student engagement. Also, the total effect of COVID-19 fatigue on daily school aversion was significant ($\beta = .54, p < 0.001$ [figure 4]) and the 2 variables were positively related. Higher levels of COVID-19 fatigue were associated with higher levels of school aversion.

Figure 5

Total Effects of COVID-19 Fatigue on Student Engagement and School Aversion



Mediation Analysis: Student Engagement as Outcome Variable

Emotion Regulation as a Mediator between COVID-19 Fatigue and Student Engagement

As expected, the mediation results indicated that emotion regulation was a significant mediator in the relationship between COVID-19 fatigue and student engagement. Table 5 provides the results of mediational analysis, which indicated that the level of COVID-19 fatigue was significantly and inversely related to emotion regulation ($\beta = -.13, p = .02$), COVID-19

fatigue was inversely related to student engagement ($\beta = -.22, p < 0.001$), and emotion regulation was positively related to student engagement ($\beta = .45, p < 0.001$). As demonstrated in figure 6, mediational analysis revealed that emotion regulation appeared to mediate the relationship between COVID-19 fatigue and student engagement with significant a₁, b₁, and C' pathways. Table 7 displays the bootstrapped 95% confidence interval (CI) based on 5000 samples, which confirmed that the indirect effects of emotion regulation in the relationship between COVID-19 fatigue and student engagement were significant. If 0 does not fall between the upper and lower bound of the bootstrapped CI, it can be concluded that indirect effect is different from zero (Preacher & Hayes, 2004). Therefore, it appears that the indirect effect through emotion regulation between COVID-19 fatigue and student engagement was significant.

Table 5

Mediation Analysis: COVID-19 Fatigue and Student Engagement Via Emotion Regulation

	B	SE	t	p
CO_F→ER	-13	.04	-2.31	.02*
CO_F→SE	-.22	.03	-4.44	<.001***
ER→SE	.45	.04	9.00	<.001***

Note. $N = 301$. CO_F = COVID-19 fatigue; ER = emotion regulation; SE = student engagement

* $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$ Standardized coefficients.

School Climate as a Mediator Above and Beyond Emotion Regulation

As anticipated, the results of parallel mediation indicated that in the relationship between COVID-19 fatigue and student engagement that both emotion regulation and school climate are significant mediators. With the addition of school climate as a parallel mediator, all pathways via emotion regulation remained significant (see table 6), however, the b_1 coefficient between emotion regulation and student engagement was reduced (see figure 6). Table 6 provides the results of mediational analysis; COVID-19 fatigue was inversely related to school climate ($\beta = -.42, p < 0.001$), school climate was positively associated with student engagement ($\beta = .41, p < 0.001$). While the direct relationship (C') between COVID-19 fatigue and student engagement with emotion regulation as the sole mediator was significant ($\beta = -.22, p < 0.001$ [table 5]), when the parallel mediator, school climate, was added the direct relationship (C') between COVID-19 fatigue and student engagement was no longer significant ($\beta = -.08, p = .13$ [see figure 6]). Hayes (2018) indicated, contrary to Baron and Kenny (1986), that it is possible to conclude mediation in the absence of significant direct effects, if a and b pathways are significant. Table 7 provides bootstrapped 95% confidence interval (CI) based on 5000 samples, which confirmed that the indirect effects of parallel mediators, emotion regulation and school climate, in the relationship between COVID-19 fatigue and student engagement were both significant. While both mediators are significant, school climate has a larger effect size (see Table 7) than emotion regulation, which suggests that school climate mediates the relationship between COVID-19 fatigue and student engagement above and beyond emotion regulation.

R-squared (R^2) is a goodness-of-fit measure for linear regression models (Cameron & Windmeijer, 1997). In order to provide insight into whether the mediator model (emotion

regulation as mediator) or the parallel mediation model (emotion regulation and school climate as parallel mediators) for each outcome variable best fit the observed data, R^2 values were calculated. Table 11 illustrates the comparison of R^2 values across models for student engagement. In the relationship between COVID-19 fatigue and student engagement, the mediation model yielded an R^2 value of 0.28 and the parallel model yielded an R^2 of 0.38; this indicates a 10% increase in the way the data fit the model. In proportional terms, the change in R^2 reflects an increase of 35.7% in the way the data fits the parallel model. Comparing R^2 values across models exemplifies the superiority of the parallel mediation model.

Additionally, to yield an estimate of the percentage of the variance attenuated by the mediating variables, computation of the amount of variance associated with the original direct effect that is partially or fully mediated by the inclusion of the mediators was completed by deriving the difference between the β values for the direct effect between COVID-19 fatigue and student engagement with and without the mediators and dividing this difference by the original effect and multiplying by 100 (MacDonald et al., 2012). The direct effect between COVID-19 fatigue and student engagement ($\beta = -.29$) compared with the direct effect in the single mediation model with emotion regulation as the mediator ($\beta = -.22$) revealed that emotion regulation accounted for 24.1% of the variance in the original association. This indicates that the emotion regulation mediator partially attenuated the relationship between COVID-19 fatigue and student engagement. When the parallel mediator, school climate, was added the direct effect was reduced ($\beta = -.08$), C' was no longer significant. Notably, this indicated that the parallel mediator pathways fully attenuated the relationship between COVID-19 direct relationship accounting for 72.4% of the variance in the original association.

Table 6

Parallel Mediation analysis: COVID-19 Fatigue and Student Engagement Via Emotion Regulation (M₁) and School Climate (M₂)

	B	SE	t	p
CO_F→ER	-.13	.04	-2.31	.02*
CO_F→SC	-.42	.03	-7.93	<.001***
CO_F→SE	-.08	.03	-1.52	.13
ER→SE	.25	.04	4.65	<.001***
SC→SE	.41	.06	6.84	<.001***

Note. $N = 301$. CO_F = COVID-19 fatigue; ER = emotion regulation; SC = school climate; SE = student engagement

* $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$ Standardized coefficients.

Figure 6

Mediation and Parallel Mediation Models: COVID-19 Fatigue and Student Engagement

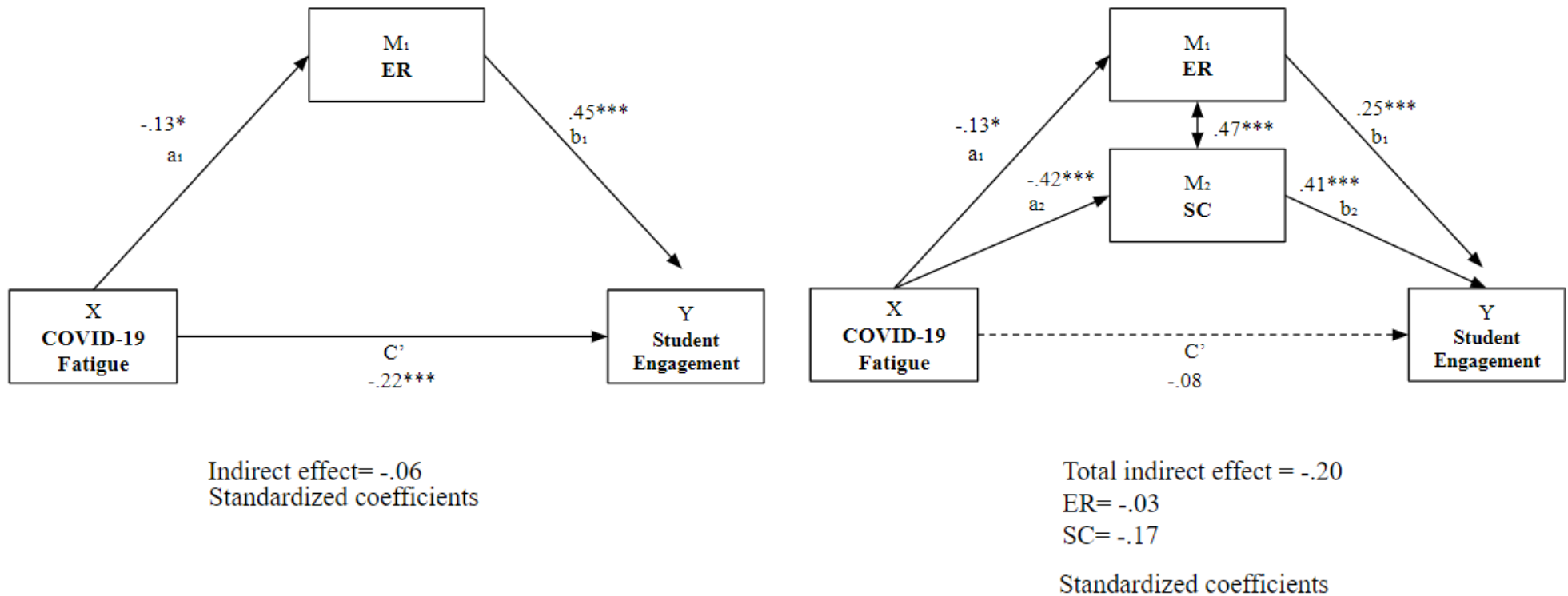


Table 7***Bootstrap Results for Indirect Effects COVID-19 Fatigue on Student Engagement: Mediation and Parallel Mediation***

	Effect	SE	LL 95% CI	UL 95% CI
Variables	Mediation: COVID-19 fatigue (X) on SE (Y) via ER (M)			
ER (M)	-.06	.03	-.11	-.01
Variables	Parallel Mediation: COVID-19 fatigue (X) on SE (Y) via ER (M ₁) and SC (M ₂)			
ER (M₁)	-.03	.02	-.07	-.00
SC (M₂)	-.17	.03	-.23	-.11

Note. $N = 301$. ER = emotion regulation; SC = school climate; SE = student engagement. Standardized coefficients are presented using 5000 bootstrap samples.

Mediation Analysis: Daily School Aversion as Outcome Variable

Emotion Regulation as a Mediator between COVID-19 Fatigue and Daily School Aversion

As expected, the results of the mediation analyses demonstrated that emotion regulation was a significant mediator in the relationship between COVID-19 fatigue and daily school aversion. Table 8 provides the results of mediational analysis, which indicated that the level of COVID-19 fatigue was significantly and inversely related to emotion regulation ($\beta = -.13, p = .02$), COVID-19 fatigue was positively related to daily school aversion ($\beta = .50, p < 0.001$), and emotion regulation was inversely related to daily school aversion ($\beta = -.32, p < 0.001$). Mediation analysis (see figure 7) with COVID-19 fatigue as the independent variable revealed that emotion regulation appeared to mediate the relationship between COVID-19 fatigue and daily school aversion with significant a_1 , b_1 , and C' pathways. Table 10 shows the bootstrapped 95% confidence interval (CI), which confirmed that the indirect effects of emotion regulation in the relationship between COVID-19 fatigue and daily school aversion were significant.

Table 8

Mediation Analysis: COVID-19 Fatigue and Daily School Aversion Via Emotion Regulation

	B	SE	t	p
CO_F→ER	-.13	.04	-2.31	.02*
CO_F→DSA	.50	.08	10.89	<.001***
ER→DSA	-.32	.11	-7.04	<.001***

Note. $N = 301$. CO_F = COVID-19 fatigue; ER = emotion regulation; DSA = daily school aversion

* $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$ Standardized coefficients.

School Climate as a Mediator Above and Beyond Emotion Regulation

Unexpectedly, the results of parallel mediation indicated that only school climate was a significant mediator in the relationship between COVID-19 fatigue and daily school aversion. With the addition of school climate as a parallel mediator, the b_1 pathway between emotion regulation and daily school aversion was no longer significant (see table 9). Table 9 displays the results of parallel mediational analysis; COVID-19 fatigue was inversely related to school climate ($\beta = -.42, p < 0.001$), COVID-19 fatigue was positively related to daily school aversion ($\beta = .32, p < 0.001$), and school climate was inversely related to daily school aversion ($\beta = -.51, p < 0.001$). COVID-19 fatigue was inversely related to emotion regulation ($\beta = -.13, p = .02$), however emotion regulation was not significantly related to daily school aversion ($\beta = -.08, p = .13$). Figure 7 provides a clear visual to demonstrate that while the direct relationship (C') between COVID-19 fatigue and daily school aversion remained significant across the models, that it was reduced in the parallel mediation model. Table 10 provides bootstrapped 95% confidence interval (CI) based on 5000 samples, which demonstrated that the indirect effect of emotion regulation in the parallel mediation model was no longer significant. However, Table 10 confirms that school climate, in the relationship between COVID-19 fatigue and daily school aversion was a significant mediator. In the relationship between COVID-19 fatigue and daily school aversion, parallel mediation analysis suggests that school climate was an effective mediator above and beyond emotion regulation.

Table 12 illustrates the comparison of R^2 values across models for the relationship between COVID-19 fatigue and daily school aversion. An R^2 value of 0.39 in the mediation model increased to 0.54 for the parallel mediation model. This indicates a 15% increase in the

percentage of variance the independent variables explain in the parallel model. In proportional terms, the change in R^2 reflects an increase of 38.6% in the way the data fits the parallel model. This suggests that when compared to the single mediator model, the parallel mediation model better explained the relationship between COVID-19 fatigue and daily school aversion.

Additionally, the direct effect between COVID-19 fatigue and daily school aversion ($\beta = .54$) compared with the direct effect in the single mediation model with emotion regulation as the mediator ($\beta = .50$) revealed that emotion regulation accounted for 7.4% of the variance in the original association, which indicates that emotion regulation partially attenuated the direct COVID-19 and daily school aversion relationship. When the parallel mediator, school climate, was added the direct effect was reduced ($\beta = .32$). This indicates that the parallel mediator model partially attenuated the relationship between COVID-19 fatigue and daily school aversion at a higher rate than the single mediation model by accounting for 40.7% of the variance in the original association.

Table 9

Parallel Mediation analysis: COVID-19 Fatigue and Daily School Aversion Via Emotion Regulation (M₁) and School Climate (M₂)

	B	SE	t	p
CO_F→ER	-.13	.04	-2.31	.02*
CO_F→SC	-.42	.03	-7.93	<.001***
CO_F→DSA	.32	.07	7.33	<.001***
ER→DSA	-.08	.11	-1.68	.09
SC→DSA	-.51	.15	-9.99	<.001***

Note. $N = 301$. CO_F = COVID-19 fatigue; ER = emotion regulation; SC = school climate; DSA = daily school aversion

* $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$. Standardized coefficients.

Figure 7

Mediation and Parallel Mediation Models: COVID-19 Fatigue and Daily School Aversion

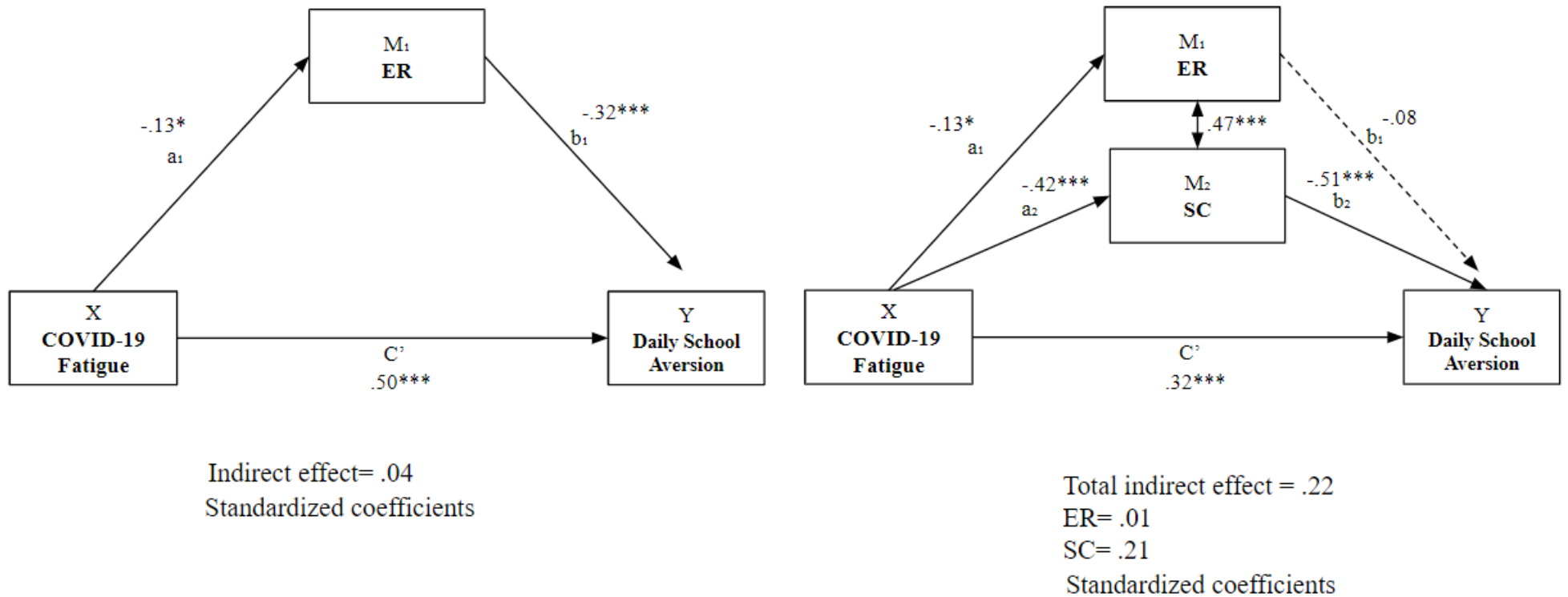


Table 10***Bootstrap Results for Indirect Effects COVID-19 Fatigue on Daily School Aversion: Mediation and Parallel Mediation***

	Effect	SE	LL 95% CI	UL 95% CI
Variables	Mediation: COVID-19 fatigue (X) on DSA (Y) via ER (M)			
ER (M)	.04	.02	.00	.08
Variables	Parallel Mediation: COVID-19 fatigue (X) on DSA (Y) via ER (M ₁) and SC (M ₂)			
ER (M₁)	.01	.01	-.00	.03
SC (M₂)	.21	.03	.16	.27

Note. $N = 301$. ER = emotion regulation; SC = school climate; DSA = daily school aversion. Standardized indirect effects using 5000 bootstrap samples.

Table 11

Comparing R^2 Values for Mediation and Parallel Mediation Models: Student Engagement as Outcome

Mediation Model	R^2	Parallel Mediation Model	R^2
SE	0.28	SE	0.38
ER	0.02	ER	0.02
		SC	0.18

Note. $N = 301$. ER = emotion regulation; SC = school climate; SE = student engagement.

Table 12

Comparing R^2 Values for Mediation and Parallel Mediation Models: Daily School Aversion as Outcome

Mediation Model	R^2	Parallel Mediation Model	R^2
DSA	0.39	DSA	0.54
ER	0.02	ER	0.02
		SC	0.17

Note. $N = 301$. ER = emotion regulation; SC = school climate; DSA = daily school aversion

Discussion

Overview of Findings

The purpose of this study was to explore how middle school students were experiencing pandemic stresses (distress and fatigue) and how this might be related to engagement and aversion to school. Additionally, the role of emotion regulation and school climate in the above relationship were explored. Research into the pandemic experiences of middle school students provides insight on an understudied, vulnerable population. COVID-19 related stresses included two subcategories: COVID-19 distress and COVID-19 fatigue. Findings showed that COVID-19 fatigue was related to student engagement, aversion to school, emotion regulation and school climate. COVID-19 fatigue was positively associated with aversion to school and inversely related to student engagement, emotion regulation, and school climate. Emotion regulation was found to significantly mediate the relationship between COVID-19 fatigue and both outcomes, student engagement and daily school aversion. This suggests that students who feel exhausted and frustrated with the pandemic are less likely to participate in class, pay attention and are more likely to dislike school; this may be the case because students experiencing high levels of COVID-19 fatigue do not regulate their emotions effectively and therefore, are less likely to stay engaged and maintain a positive attitude about school in the face of pandemic stresses. School climate was also a significant mediator of COVID-19 fatigue and both student engagement and daily school over and above the role of emotional regulation.

Together these findings suggest that students experiencing high levels of COVID-19 fatigue are likely to experience dampened engagement and strong dislike for school. This may be the case especially when students do not feel connected or safe at school. The role of school climate in the relationship between COVID-19 fatigue and student engagement appeared to be

stronger than the role of emotion regulation. When school climate was added to the relationship between COVID-19 fatigue, emotion regulation, and daily school aversion, emotion regulation was no longer a significant mediator. These findings provide evidence of the weighty role that school climate plays in explaining how middle school students experience and engage in school under the fatigue of the pandemic.

COVID-19 Distress Lacking Link to Emotion Regulation, School Climate, and Engagement

An unexpected finding was that COVID-19 distress was not significantly related to emotion regulation, school climate, or student engagement. A possible explanation may be that middle school students were not experiencing high levels of COVID-19 distress at the time of data collection. COVID-19 distress includes 5 main areas related to the pandemic spanning danger, fears, xenophobia, traumatic stress about the pandemic, and compulsive checking (Taylor et al., 2020). The adapted COVID-19 distress scale for middle school students used in this study found that COVID-19 distress levels (i.e., mean = 2.21, $N = 301$) were low compared to levels of COVID-19 fatigue (i.e., mean = 3.22, $N = 301$). Nwachukwu et al. (2020) studied the general stress, anxiety, and depression levels of various age ranges during the pandemic and found that people under 25 reported the highest levels of stress, anxiety, and depression. While Nwachukwu et al. (2020) did not investigate COVID-19 distress specifically, the findings related to general stress during the pandemic were expected to model how people experience COVID-19 distress during this time, however this was not the case. The findings of low COVID-19 distress could indicate that there was a shift in how people were feeling during the pandemic. The negative association between stress and well-being is well-established in

empirical research (Vigo et al., 2020), yet levels of COVID-19 distress have not been studied at length. Much of the COVID-19 research studying stress during the pandemic measures stress in a general sense (Carroll et al., 2020; Nitschke et al., 2021; Nwachukwu et al., 2020; Qiu et al., 2020). In contrast, Taylor et al. (2020) specifically measured stress related to COVID-19, which included items that tapped into fears about contracting the virus. Using a comparable COVID-19 specific distress scale (Qiu et al., 2020). Hadwin et al., (2021) also found low levels of COVID-19 distress in undergraduate students toward the end of their first pandemic-driven online semester. General stress levels during the pandemic and specific COVID-19 stress must be differentiated in future study. Future research could measure general stress and COVID-19 stress within the same sample to determine how the constructs compare.

COVID-19 Fatigue, Emotion Regulation, School Climate, Engagement, and School Aversion

To date, emerging pandemic research explores COVID-19 specific stress or general stress in academic settings (Carroll et al., 2020; Daily et al., 2020; Hoyt et al., 2021; Nitschke et al., 2021; Styck et al., 2020). However, there are currently no studies measuring how COVID-19 fatigue might be related to academic outcomes. It is possible that during the extended duration of the pandemic, levels of distress and fatigue fluctuated. At the time of data collection, in April 2021, students had endured the pandemic for over a year and their worries about contracting the virus may have settled, which may provide insight into the low levels of COVID-19 distress found in this study. According to Fu et al. (2021), people likely acclimate to anxiety related to COVID-19 cases when stressors are constant. The new normal at school included various health and safety measures, such as mask wearing, hand sanitizing, and social

restrictions. While students may have adapted to their new reality at school, they were likely frustrated and tired of the pandemic rules and felt negatively about school, which was indicated by heightened levels of COVID-19 fatigue.

The COVID-19 fatigue scale was generated for the purpose of this study and the acceptable internal consistency of the measure warrants its future use. However, further validation of the scale is necessary in diverse samples. As well, as new COVID-19 constructs are currently emerging, there is no consensus in the literature on the construct of COVID-19 fatigue. The term COVID-19 fatigue can refer to a symptom of having the virus or sustained physical fatigue symptoms post-COVID (Mackay, 2021). Some researchers believe COVID-19 fatigue is directly linked to rule adherence and behaviour (Harvey, 2020). In this study COVID-19 fatigue operationalized as how students feel about the pandemic rules (e.g., frustration), their level enjoyment of school during the pandemic, and their feelings about their motivation to continue following pandemic rules at school. This paper describes COVID-19 fatigue as something associated with the students' attitudes or feelings about school during the pandemic, which does not include any measurements regarding their subsequent actions or behaviours. COVID-19 fatigue was conceptualized as a type of stress; however, more research is necessary to understand whether COVID-19 fatigue is a component of stress or a distinct correlate of stress. Findings in this study suggest that COVID-19 fatigue functions differently from COVID-19 distress, therefore, understanding how and when COVID-19 fatigue arises in relation to distress is worthy of further investigation.

COVID-19 Fatigue and Student Engagement

Heightened levels of COVID-19 fatigue were related to low levels of student engagement. As expected, students' feelings of dissatisfaction and frustration with the pandemic rules were strongly associated with how engaged they were in class. While research has not directly linked COVID-19 fatigue with student engagement, Salema-Aro et al. (2021) found during the pandemic that student engagement suffered significantly. The strong connection between engagement behaviours and positive academic outcomes, such as GPA (Bandura et al., 1997; Christenson et al., 2012) is well-established in the literature. Therefore, if COVID-19 fatigue is connected to diminished engagement, there is potential that other important academic outcomes, outside the scope of this paper, may have also suffered.

COVID-19 Fatigue and School Aversion

COVID-19 fatigue was also directly related to school aversion. High levels of COVID-19 fatigue were related to high levels of aversion to school. Not surprisingly, COVID-19 fatigue (feeling tired and frustrated with the pandemic rules, low levels of school enjoyment, and lacking motivation to follow the COVID-19 rules) was associated with feeling high aversion to school, which was characterized by being tired of school and hating school. This finding is supported by pandemic literature that found a steep drop in school satisfaction and an increase in missing a lot of school (Kirsch et al., 2021). It appears possible that high levels of aversion may be indicators of other school outcomes, such as diminished GPA (Lewis et al., 2017), or absenteeism (Kirsch et al., 2021).

Persisting in a State of COVID-19 Fatigue

The COVID-19 pandemic is currently into a 5th wave and the likelihood of remaining in a state of pandemic health and safety mandates in schools is probable. External stressors, whether COVID-19 related or not, will exist in students' lives and may be related to negative student outcomes. Findings in this study indicate that students who experience COVID-19 fatigue are less likely to engage in school and are more likely to feel aversion towards school. It is difficult for teachers and schools to target external stressors in curricular related interventions, therefore, teachers can instead target factors that mediate the relationship between COVID-19 fatigue and student outcomes to promote academic and emotional well-being. Specifically, teachers can support students to develop adaptive strategies to cope under stress and develop proactive interpretations of the ways school rules, people, and peers are put in place to support rather than thwart well-being (see Charlton et al., 2021;2020; Davis & Levine., 2013).

Future study could aim to illuminate whether levels of academic stress are related to either COVID-19 distress and COVID-19 fatigue and investigate whether this is related to other academic outcomes. However, associations between COVID-19 fatigue and academic outcomes must be considered within the context of data collection, which was a year after the pandemic began. This time period likely differed from studies where data were collected at times of greater upheaval or at the onset of the pandemic. Research should carefully discern how the experiences of students changed rapidly throughout the first year of the pandemic with changing protocols and safety mandates. Therefore, generalizing or comparing the experiences of students at different points of the pandemic should be done with caution. Future research should consider longitudinally modelling COVID-19 related stresses (distress and fatigue) overtime to better

understand how long-term fluctuations in COVID-19 experiences may contribute to student engagement and school aversion. An additional benefit of an appropriate longitudinal design could test a longitudinal mediation model, which with temporal precedence could permit insight on potential causality.

Emotion Regulation as a Mediator between COVID-19 Fatigue and Student Engagement

COVID-19 fatigue was inversely related to emotion regulation. This finding indicates that students with high levels of COVID-19 fatigue are less likely to employ adaptive strategies (i.e., cognitive appraisal). It is possible that experiencing COVID-19 fatigue compromises students' ability to effectively cope. COVID-19 fatigue has been conceptualized as a component of COVID-19 related stress; specifically, it may arise as an outcome associated with enduring long-term external stressors. Students experiencing COVID-19 fatigue feel exhausted and tired of the excessive restrictions and rules, they dislike school, and they do not feel motivated to continue following the rules. While responses to external stressors in the short term can be adaptive, prolonged exposure to stress has been linked to cognitive, behavioural, and emotional impairment in children (Ellis & Giudice, 2014). At the time of data collection, students had been enduring the pandemic for over a year; prolonged exposure to external stressors during the pandemic may have contributed to heightened levels of COVID-19 fatigue and may provide an explanation for why students experiencing COVID-19 fatigue were less likely to utilize adaptive coping strategies.

Emotion regulation was positively related to student engagement. The connection between emotion regulation and positive student outcomes is well-established (Arsenio & Lorio, 2014; Gustems & Calderon, 2019; Ivcevic & Brackett, 2014). Expectedly, students who

are able to utilize adaptive emotion regulation strategies are more likely to be engaged in school. The relationship between COVID-19 fatigue and student engagement can be partially explained by individual differences in emotion regulation, specifically the use of adaptive strategies (i.e., cognitive reappraisal).

The mediational role of emotion regulation in the relationship between COVID-19 fatigue and student engagement adds to the literature for several reasons. Research supports emotion regulation as a mediator between stress and academic outcomes (Arsenio & Lorio, 2014; Crean, 2004), however the findings of this study provide insight into the experiences of middle school students in a pandemic, which has not yet been explored. Individual differences in coping explain the inverse relationship between COVID-19 fatigue and engagement. Previous research has linked adaptive coping as a protective factor to promote academic outcomes against stress (Crean, 2004). When students utilize adaptive emotion regulation strategies as a way to cope with COVID-19 fatigue, they may not experience diminished school engagement in the same way that students who do not employ adaptive emotion regulation strategies.

Emotion regulation includes responding to stress, positive or negative emotions, and the ability to identify one's own emotional experience and select strategies to modify the intensity of emotions to pursue personal goals (Compas et al., 2017; Phillips & Power, 2007; Van Eck et al., 2017). One caution is that the adapted scale used for emotion regulation only included items for cognitive reappraisal. To improve accuracy of the emotion regulation score, future research could use a scale that included items related to suppression, which is a maladaptive strategy for emotion regulation. It is possible that if the present study included suppression items that they

may have counteracted some scores ranked high on cognitive reappraisal. For example, if students who scored high on the cognitive reappraisal items also scored high on the suppression items, their scores would cancel each other out. Thus, without the suppression items, some students' emotion regulation scores may have been inflated.

School Climate as a Mediator between COVID-19 Fatigue and Student Engagement

Research links adaptive coping with social factors, such as feelings of connectedness and relationships with peers or teachers (Crean, 2004; Graziano et al., 2007; Gross & John, 2003; Haugan et al., 2021; Jeon & Ardeleanu, 2020; Morrish et al., 2018). Therefore, it was expected that adding school climate as a parallel mediator to the original mediator model with emotion regulation would better explain the overall relationship between COVID-19 fatigue and student engagement. The relationship between social connection, belonging, and school climate with positive academic outcomes is established for students (Korpershoek et al., 2019; Van Eck et al, 2017, Walton & Cohen, 2007; Wang & Degol, 2015;2016, Won et al., 2018).

Importantly, this study predicted that the ways individual students perceive school climate would further explain the relationship between COVID-19 fatigue and student engagement. School climate as defined in this study includes individual perceptions that students hold regarding the level of care they feel from their teachers and peers, their feelings of safety, and their beliefs regarding fairness of rules at school. As expected, COVID-19 fatigue was inversely related to school climate; therefore, high levels of COVID-19 fatigue (enjoying school less, feeling frustrated by the pandemic rules and feeling a lack of motivation to continue following pandemic rules) was associated with negative perceptions of school climate. COVID-19 fatigue includes feeling that the pandemic has made school less enjoyable, which may

contribute to students feeling as though they dislike their school or that they wish they went to another school, both of which are indicators of negative perceptions of school climate. School climate also was positively related to student engagement. This indicates that when students like their school, feel connected, safe, and perceive their school to be fair, that they are more likely to be engaged in class.

Literature supports the notion that social factors and coping strategies work together to promote well-being and positive academic outcomes for students (Daily et al., 2020; Davis, 2016, Graziano et al., 2007; Gustems-Carnicer et al., 2019; Ivcevic & Brackett, 2014; Wang & Holcombe, 2010). In this study, school climate was a significant mediator between COVID-19 and student engagement; this suggests that the ways students perceive school climate partially explains the inverse relationship between COVID-19 fatigue and student engagement.

This study provides evidence that both emotion regulation and school climate provide mediational pathways to explain the relationship between COVID-19 fatigue and student engagement. Both emotion regulation and school climate were found to mediate the relationship between COVID-19 fatigue and student engagement in the parallel mediation model, which suggests that both emotion regulation and school climate may protect against the diminished engagement students are experiencing in relation to the pandemic fatigue. Interestingly, the mediational role that emotion regulation played between COVID-19 fatigue and student engagement was reduced when school climate was added due to their shared variance, therefore, school climate more substantially explained the relationship between COVID-19 fatigue and student engagement. Remarkably, the direct effect was no longer significant once school climate was added to the parallel model, which suggests that the relationship between COVID-

COVID-19 fatigue and student engagement is no longer significant once emotion regulation and school climate are accounted for. This suggests that students who are feeling tired and frustrated with school during the pandemic are not less likely to engage in class if they are able to utilize adaptive emotion regulation strategies and most importantly if they perceive their school climate positively. This finding particularly isolates the salience of emotion regulation and school climate taken together as factors to protect against diminished engagement in the face of COVID-19 fatigue. Literature supports the possibility that low engagement may be related to other important academic outcomes, such as GPA and attendance.

As a possible explanation for the strength of school climate as a mediation, Goodenow (1993) explained that middle school students have heightened self-consciousness and place increased importance on friendships. At this stage of development, students place high importance on their social relationships. At the time of data collection, students were experiencing high levels of COVID-19 fatigue on average, indicated by general feelings of frustration, lack of enjoyment at school because of pandemic rules. These high levels of COVID-19 fatigue may be related to the numerous health and safety rules that infringed on the social experiences of students (e.g., cohort system). The cohort system effectively limited the number of social contacts students were able to interact with during the school day, and included restricting movement within the school and designated lunch time areas. Therefore, the strain on social functioning caused by the pandemic at the time of data collection may have contributed not only to the evident high levels of COVID-19 fatigue, but also to the salient nature of social factors on adolescents and the role this plays in their engagement.

Emotion Regulation as a Mediator between COVID-19 Fatigue and School Aversion

As previously mentioned, COVID-19 fatigue was inversely related to emotion regulation. This is supported by past literature that found that utilizing reappraisal strategies was positively linked to experiencing less stress (Butler et al., 2003). As well, emotion regulation was inversely related to school aversion. This indicates that students who readily utilize adaptive emotion regulation strategies are likely to have low levels of aversion to school, whereas students who do not use adaptive emotion regulation strategies frequently are likely to have higher levels of aversion. Aversion to school relates to feeling dissatisfaction toward school in the form of feeling tired of school or hating school. This finding is supported by the literature given the strong connection between emotion regulation and positive student outcomes (Arsenio & Lorio, 2014; Gustems & Calderon, 2019; Ivcevic & Brackett, 2014).

Emotion regulation was a significant mediator in the relationship between COVID-19 fatigue and school aversion. Therefore, individual differences in the utilization of adaptive emotion regulation strategies helps to explain the inverse relationship found between COVID-19 fatigue and school aversion. This suggests that supporting students to utilize reappraisal strategies may protect against heightened levels of aversion to school during the pandemic. When encountering stressful experiences, those who utilize reappraisal strategies (adaptive emotion regulation) have been found to be more likely to focus on positive outcomes and repair their moods (Gross & John, 2003). Therefore, if a student is using adaptive emotion regulation strategies frequently they may be more likely to repair negative feelings about school, and thereby mitigate feelings of aversion to school They may also be more equipped to manage COVID-19 fatigue symptoms, such as frustration and lack of enjoyment at school.

School Climate as a Mediator between COVID-19 Fatigue and Daily School Aversion

School climate was added in parallel mediation because it has been strongly associated with emotion regulation (Crean, 2004; Graziano et al., 2007; Gross & John, 2003; Morrish et al., 2018). Research has established the positive relationship between school climate academic outcomes (Korpershoek et al., 2019; Van Eck et al, 2017, Walton & Cohen, 2007; Wang & Degol, 2015;2016). As well, school climate has been inversely related to stress (Haugan et al., 2021; Nitschke et al., 2021). Unsurprisingly, this study found that school climate was a significant mediator in the relationship between COVID-19 fatigue and school aversion. When considering the positive association between COVID-19 fatigue and school aversion, this finding suggests that students' perceptions of school climate may play a protective role. If students view their relationships at school as supportive, they feel safe, and they perceive the rules to be fair, they may not experience high levels of aversion to school in relation to COVID-19 fatigue.

While emotion regulation was a significant mediator in the original mediation model, when school climate was added in parallel mediation, emotion regulation was no longer a significant mediator. This finding suggests that school climate accounts for more of the relationship between COVID-19 fatigue and school aversion than emotion regulation. School climate appears to override the role of emotion regulation in the relationship between COVID-19 fatigue and school aversion. It appears straightforward to understand why students are likely to dislike school when they experience COVID-19 fatigue especially in relation to how they perceive their school. For example, students who perceive their school as supportive, fair, and safe are less likely to dislike school when they experience COVID-19 fatigue. Conversely,

students who perceive their school to be unsupportive, unfair, and unsafe are more likely to dislike their school when they experience COVID-19 fatigue. It's possible that students' perceptions of their school climate are more strongly tied to their feelings about school (aversion to school) than emotion regulation possibly because the importance of social factors for this age group. If students feel positive about their relationships with their classmates and teachers they may be able to combat feelings of dislike for school during waves of COVID-19 fatigue.

Emotion Regulation and School Climate Should be Considered Together

Emotion regulation and school climate coupled together as parallel mediators were found to explain the relationship between COVID-19 fatigue and student outcomes better than when only accounting for emotion regulation. Literature links the relationship between school climate and coping. For example, positive social interactions are positively associated with adaptive coping strategies (Gross & John, 2003), positive relationships and better social adjustment is associated with a greater capacity for emotion regulation (Morrish et al., 2018). As well, better emotion regulation was found to predict positive teacher-student relationships, which is an aspect of school climate (Graziano et al., 2017). Schools provide an integral environment for students to develop and practice emotion regulation strategies and cultivate healthy relationships with peers and teachers. It seems plausible that students who are able to regulate their emotions adaptively (e.g., reappraise negative situations and shift to more positive thinking), may perceive their school environment more positively. For example, when encountering academic teacher feedback, a student with strong emotion regulation strategies may view feedback as constructive and supportive instead of critical and negative, and they will

therefore, perceive their relationship with their teacher positively. Relatedly, if a student feels supported, safe, and likes going to school they may have more capacity to regulate their emotions, which presumably requires regulatory effort and intention. Utilizing reappraisal strategies includes changing the way one views a situation, therefore, if a student views their environment positively they may be motivated to modify their emotions or perspective to maintain a positive outlook. Conversely, if a student feels unsupported, unsafe, and dislikes their school, they may not be as willing or able to invest in cognitive reappraisal strategies, which would help shift their mood from negative to positive or help them reappraise their situation.

When school climate is viewed as a contextual factor that can be conceptualized at a school-level, it has been traditionally modelled as a moderator. In general, moderators provide information on the circumstance under which effects are present and moderation effects explain who an effect worked for (Baron & Kenny, 1986; Wu & Zumbo, 2007;2008). However, this study was interested in understanding how and why COVID-19 related stress was related to student outcomes. School climate was conceptualized on an individual-level and thus was not considered as a contextual factor shared among students that might provide insight into the conditions in which an effect occurs. Instead, school climate was considered an individual perception, which may help to explain the relationship between COVID-19 related stress and student outcomes. Mediation aims to explain why and how a mechanism produces an effect (Baron & Kenny, 1986; Wu & Zumbo, 2007;2008). Therefore, both emotion regulation strategies and individual perceptions of school climate were modelled as mediators to appropriately provide insight into how and why COVID-19 fatigue related to student outcomes.

Emotion regulation and school climate were hypothesized to promote student outcomes in the face of pandemic stress. While both factors were considered independently, it was expected that the two factors would be related and the shared association may provide an explanation for how the two factors when added in the same model mediate the relationship between COVID-19 related stresses and student outcomes. Emotion regulation was modeled first as a single mediator and then school climate was added in parallel mediation to illustrate how the two factors behave in the relationship independently.

In this study, emotion regulation and school climate were positively correlated. When unpacking the parallel mediation results, it became apparent that adding school climate to the relationship between COVID-19 fatigue and student engagement contributed over and above emotion regulation, yet emotion regulation was still a significant mediator. As well, the parallel mediators fully attenuated the direct relationship. Emotion regulation and school climate share an association, and still they independently help to explain how and why COVID-19 fatigue is related to engagement. This indicates that the combination of positive perceptions of school climate and adaptive emotion regulation strategies together has the potential to benefit students' engagement in the face of pandemic stress better than when each factor is considered alone. In regards to school aversion, emotion regulation mediated the relationship between COVID-19 fatigue and aversion when modelled as a single mediator, however, when school climate was added, emotion regulation was no longer significant. The shared association between emotion regulation and school climate may help to explain this finding, whereby the shared association between emotion regulation was better accounted for by school climate. Therefore, while the relationship between COVID-19 fatigue and school aversion, as mediated by emotion regulation

was significant, this explanation was better encapsulated by the role of school climate, as indicated in the parallel mediation model. The shared association between emotion regulation and school climate likely explains why school climate appears to be the stronger mediator in the parallel mediation model, however through a holistic lens, both mediators were found to promote student outcomes in relation to COVID-19 fatigue. The utility of this finding provides novel insight for COVID-19 research focused on outcomes for middle school students.

Rethinking Data Collection Procedures in Schools

A novel contribution to current research rests in this study's design and implementation. Data collection was embedded within an educational unit that was shared with an entire school, regardless of participation in the research component. The educational unit benefited all students and teachers as it provided a platform for discussion and supported a partnership between research and practice during an unprecedented time. Additionally, students were provided with individualized visual summaries of their results and were provided with strategy support to target lagging areas. The anonymity of student participants and the benefit to the school community enabled insight into an under researched, vulnerable population.

Conclusion

This study has contributed to the existing pandemic research, which remains a topical, prevailing, and urgent issue. Presently, pandemic research in educational settings has primarily focused on undergraduate students, whereas this study has provided insight into an understudied and vulnerable population, middle school students. This study has contributed to emerging theory on COVID-19 related stress as it has utilized an existing COVID-19 specific distress scale and adapted it to fit the middle school audience. Additionally, the legitimacy of the

construct of COVID-19 fatigue was demonstrated through its significant relationships with emotion regulation, school climate, student engagement and school aversion.

Adaptive emotion regulation strategies mediated the relationship between COVID-19 and both outcomes student engagement and daily school aversion. School climate was treated a factor that varied across individuals within a school and even a class. The decision to view a contextual factor as one with individual variation was based on the rationale that the pandemic has influenced irregular schooling experiences for students and brought about significant disruptions to regular schooling experiences, which may influence how students interpret their school climate. School climate proved to be a significant mediator above and beyond emotion regulation for both outcomes, student engagement and school aversion.

The protective nature of adaptive emotion regulation strategies and positive perceptions of school climate in the context of the pandemic suggests that educators can directly combat diminished school outcomes in the face of COVID-19 fatigue through explicit instruction of adaptive emotion regulation strategies and relationship building activities that foster a sense of belonging and positive climate in schools.

Limitations and Future Directions

Several limitations of this study must be noted. First, the correlational nature of this study prevents causal conclusions. Therefore, while the results have been discussed as if COVID-19 fatigue predicted student engagement and school aversion via emotion regulation school climate, it can be argued that the reverse is true as well: that student engagement or aversion to school predicts levels of COVID-19 fatigue via emotion regulation or school climate. Longitudinal or experimental studies would provide more clearly the causal sequences

involved. This study also relied solely on self-report data from middle school students, which may have hindered the reliability of measurements. In addition to student self-report data, collecting observational data from teachers may have strengthened the information collected.

Another main limitation of this study is that many central findings are related to COVID-19 fatigue, which does not yet have a widely used definition or a validated scale. However, the apparent potency of COVID-19 fatigue, as described in this study, should be acknowledged as it was directly related to engagement levels and aversion to school. While outside the scope of this project, future study should start with confirmatory factor analysis (CFA) to establish the fit of the COVID-19 fatigue items used in this scale. Similarly, the scales for COVID-19 distress, emotion regulation, and school climate utilized or this study were adapted (e.g., shortened in length) to ensure minimal time required to complete questionnaires given the young age group and restricted time allotted to complete questionnaires. The scale for school engagement was shortened and only included behavioural and cognitive engagement subscale items, therefore, no emotional engagement items were included.

Subsequent research would benefit from the use of structural equation modeling (SEM). The current study was limited to path analysis due to developing statistical knowledge. A limitation of path analysis is that it assumes there is no measurement error in the items and scales. In contrast, SEM modelling takes measurement error into account. It may be that CFA produces a really good measure of COVID-19 related stresses that includes some of the distress and fatigue items. Additionally, the COVID-19 fatigue scale should be extended to include more items. While research focused on pandemic stress was limited and emerging rapidly, it was expected that COVID-19 distress would be the variable of interest in this study. COVID-19

fatigue was added to reflect a shift in the pandemic and the emergence of the construct as a variable of interest in COVID research, but fatigue lacked a consistent definition or scale. This study advances the field by developing a scale suited to middle school students, however further development and testing is necessary.

Another main limitation is that the data were clustered since students belonged to specific classes and cohorts. Traditional mediation analyses presume that data are at just one level and not clustered. However, to ensure anonymity, it was not possible to identify classrooms or cohorts that students were a part of. Additionally, while students did identify their grade level and gender, this study only analyzed the data at a whole group level. Grade level and gender were not controlled for but mean differences were present, therefore, future research may benefit from looking further into gender and grade interactions.

Another aspect that emerged throughout the study that requires attention is the challenging climate of data collection during a pandemic. To adequately capture the nuances of the pandemic in COVID-19 research is limited with only one data collection point. While data collection was spread over a week, the study should be considered cross-sectional. In future, longitudinal research may be better suited to illuminate trends and changing experiences of students during the pandemic. Therefore, research conducted during the pandemic should avoid sweeping generalizations, as the context and stressors of the pandemic are constantly evolving. The findings in this paper, without further research, should be considered within the context of when data was collected, approximately a year after the pandemic began.

Different approaches were used to measure the outcome variables in this study. The scale for student engagement utilized a more global measurement that included a series of items

collected on one day, which asked students to reflect on their engagement throughout the school year. In contrast, the scale for school aversion included daily sampling on 2-items referring to “right now”. Responses were aggregated over 5 days to produce a mean measure of a student’s typical level of school aversion for that week. Future study may benefit from using similar measurement approaches for both outcome variables.

Despite these limitations, this study has provided considerable insight into the experiences of middle school students during the COVID-19 pandemic. Pandemic research in academic fields currently include university students (Gaeta et al., 2021; Hadwin et al., 2021), high school students (Haugan et al., 2021; Styck et al., 2021), and middle school (Salmela-Aro et al., 2021; Styck et al., 2021). This study’s findings are preliminary, and substantially more research needs to be conducted in this field in order to strengthen the discourse on student experiences during the pandemic. As indicated earlier, middle school students are considered a particularly vulnerable demographic; the transition to middle school is often associated with diminished academic outcomes and weakened social and emotional capacities (Blackwell et al., 2007; Eccles et al., 1993; Goodenow, 1993). More research needs to be conducted during the pandemic on middle school students, which account for varying contextual factors.

The long-term effects or potential delayed impacts on students who have navigated the education system during the pandemic remains an area for future study. This area is of particular importance given the established relationship between COVID-19 fatigue and student engagement, where research shows that low engagement in grade 1 is indicative of low engagement in grade 8, which is related to low GPA (Christenson et al., 2012). If the dragging on of the pandemic, continued health and safety measures (e.g., mandatory mask wearing), and

social restrictions will contribute to heightened COVID-19 fatigue, which is inversely related to engagement, the potential for lasting deficits in school outcomes is possible.

As the pendulum swings, following new variants of the COVID-19 virus or improved vaccination rates, students may oscillate between feelings of distress, fatigue, hope, or catastrophe. Centering focus on factors, such as adaptive emotion regulation strategies or positive perceptions of school climate, that protect this vulnerable age group of students during the pandemic is essential. Explicit focus on protective factors will support students now and may contribute to their educational trajectories for years to come.

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Appendices

Appendix A

Certificate of Ethics Approval



University
of Victoria

Office of Research Services | Human Research Ethics Board
Michael Williams Building Rm B202 PO Box 1700 STN CSC Victoria BC V8W 2Y2 Canada
T 250-472-4545 | F 250-721-8960 | uvic.ca/research | ethics@uvic.ca

Certificate of Approval

PRINCIPAL INVESTIGATOR	Allyson Hadwin (Supervisor)	ETHICS PROTOCOL NUMBER	20-0586
		Expedited review - delegated	
PRINCIPAL APPLICANT	Moira Hood Master's student	ORIGINAL APPROVAL DATE	31-Mar-2021
UVIC DEPARTMENT	Educational Psychology and Leadership Studies EPLS	APPROVED ON	31-Mar-2021
		APPROVAL EXPIRY DATE	30-Mar-2022
PROJECT TITLE COVID-19 and academic outcomes, coping mechanisms, perceptions of social context as mediators.			
RESEARCH TEAM MEMBERS Moira Hood - Committee Member, UVIC-EPLS Sungjun Won - Committee Member, UVIC-EPLS Paweena Sukhawathanakul - Committee Member, UVIC-EPLS Ramin Rostamour - Hadwin Research Assistant, UVIC-EPLS			
DECLARED PROJECT FUNDING Social Sciences and Humanities Research Council (SSHRC), UVIC			
DOCUMENTS INCLUDED IN THIS APPROVAL tops2_core_certificate.pdf - 31-Dec-2020 Meter Example Thesis.jpg - 06-Feb-2021 New Admin Letter.docx - 23-Mar-2021 Information Poster.pdf - 24-Mar-2021 Booklet Template.pdf - 24-Mar-2021 Questionnaire Titles.png - 24-Mar-2021 Thesis Scales-2.pdf - 25-Mar-2021 Consent Flow Chart-2.png - 26-Mar-2021 Mini Unit and Research Component Consent Flow.pdf - 26-Mar-2021 First LimeSurvey Prompt Research Component-2.pdf - 26-Mar-2021 Revised Letter of Information Parents_Guardians-2.pdf - 26-Mar-2021 Letter of Information Student-2.pdf - 26-Mar-2021			
CONDITIONS OF APPROVAL			
This Certificate of Approval is valid for the above term provided there is no change in the protocol.			
Modifications To make any changes to the approved research procedures in your study, please submit a "Request for Modification" form. You must receive ethics approval before proceeding with your modified protocol.			
Renewals Your ethics approval must be current for the period during which you are recruiting participants or collecting data. To renew your protocol, please submit a "Request for Renewal" form before the expiry date on your certificate. You will be sent an emailed reminder prompting you to renew your protocol about six weeks before your expiry date.			
Project Closures When you have completed all data collection activities and will have no further contact with participants, please notify the Human Research Ethics Board by submitting a "Notice of Project Completion" form.			
Certification			

Appendix B

Descriptive Statistics N = 363 Original Sample

		CO_F	CO_D	ER	SC	SE	DSA
N	Valid	324	324	348	350	339	357
	Missing	39	39	15	13	24	6
Mean		3.22	2.20	3.32	3.65	3.55	5.12
Std. Error of Mean		0.06	0.04	0.04	0.03	0.03	0.10
Median		3.33	2.07	3.33	3.70	3.60	5.00
Std. Deviation		1.09	0.80	0.77	0.65	0.64	1.85
Variance		1.18	0.64	0.59	0.43	0.40	3.42
Skewness		-0.05	0.77	-0.47	-0.47	-0.23	-0.08
Std. Error of Skewness		0.14	0.14	0.13	0.13	0.13	0.13
Kurtosis		-0.86	0.43	0.62	0.09	-0.31	-1.16
Std. Error of Kurtosis		0.27	0.27	0.26	0.26	0.26	0.26
Range		4.00	3.86	4.00	3.40	3.30	6.00
Minimum		1.00	1.00	1.00	1.60	1.60	2.00
Maximum		5.00	4.86	5.00	5.00	4.90	8.00

Note. $N = 301$. The result scale for all variables ranged from 1-5, except DSA which ranged from 1-8. CO-F = COVID-19 fatigue;

CO_D = COVID-19 distress; ER = emotion regulation; SC = school climate; SE = student engagement; DSA = daily school aversion

* $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$

Descriptive Statistics N = 301 Final Sample

		CO_F	CO_D	ER	SC	SE	DSA
N	Valid	301.00	301.00	301.00	301.00	301.00	301.00
	Missing	0	0	0	0	0	0
Mean		3.22	2.21	3.34	3.68	3.60	5.03
Std. Error of Mean		0.06	0.05	0.04	0.04	0.04	0.11
Median		3.33	2.07	3.33	3.70	3.60	5.00
Mode		3.00	1.93 ^a	4.00	3.60	3.70	8.00
Std. Deviation		1.07	0.79	0.76	0.64	0.61	1.84
Variance		1.14	0.63	0.57	0.41	0.37	3.40
Skewness		-0.03	0.75	-0.52	-0.39	-0.18	-0.04
Std. Error of Skewness		0.14	0.14	0.14	0.14	0.14	0.14
Kurtosis		-0.83	0.45	0.77	-0.16	-0.36	-1.16
Std. Error of Kurtosis		0.28	0.28	0.28	0.28	0.28	0.28
Range		4.00	3.86	4.00	3.20	3.10	6.00
Minimum		1.00	1.00	1.00	1.80	1.80	2.00
Maximum		5.00	4.86	5.00	5.00	4.90	8.00

Note. $N = 301$. The result scale for all variables ranged from 1-5, except DSA which ranged from 1-8. CO-F = COVID-19 fatigue;

CO_D = COVID-19 distress; ER = emotion regulation; SC = school climate; SE = student engagement; DSA = daily school aversion

* $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$

Grade and Gender Descriptive Statistics N = 301 Final Sample

N = 301	n (%)
Grade	
6	135 (44.9%)
7	91 (30.2%)
8	74 (24.6%)
Missing	1 (0.3%)
Total	301 (100%)
Gender	
Female	148 (49.2%)
Male	139 (46.2%)
Non-binary	3 (1.0%)
Prefer not to say	11 (3.7%)
Two-spirit	0
Missing	0
Total	301 (100%)

Appendix C

Parent Information with Decline Consent Options

March 2021

Dear Dunsmuir Families,

My name is Moira Hood and I have been teaching at Dunsmuir Middle School for the past 6 years. I am currently working towards my Masters of Arts degree at the University of Victoria in the department of Educational Psychology and Leadership Studies. I am focussing my thesis research on the effects of COVID-19 stress on middle school students' academic outcomes.

Students at Dunsmuir are in the process of completing an instructional 'mini unit', which includes questionnaires and activities aimed at exploring student experiences during the pandemic. Questionnaires and activities focus on how students are feeling during the pandemic (perceptions of COVID-19 stress and fatigue), their perceptions of school support, how well they are coping (emotion regulation, and use of self-regulated learning strategies), and their academic experiences. Each questionnaire produces a personalized visual summary of their responses, which will also include proactive strategies for coping and succeeding during the pandemic. Each student will save their visualizations to their Google Drive, so parents/guardians can view their profiles. Results from the questionnaires will inform teacher activities and school-wide support. All questionnaires will be completed using a 3rd party tool- 'LimeSurvey'.

To complete the questionnaires, all students will receive an anonymized ID number, called a 'token'. Therefore, NO student identifying information will be collected. I hope the students and teachers at Dunsmuir benefit from the opportunity to explore, reflect, and discuss their experiences during the pandemic.

For my Masters thesis research, I would love the opportunity to analyze the anonymized questionnaire data generated from the questionnaire portion of the mini unit. It should be noted that NO identifying student information will be present in the data. Dr. Hadwin's research associate will remove all data from parents/guardians or students who wish to decline consent. Additionally, prior to my data analysis, Dr. Hadwin's research associate will also remove the anonymous tokens from the questionnaires. Therefore, by the time I receive access to analyze the data there will be NO information to link student responses with questionnaire responses.

If you would like to **decline consent** for your child's anonymous questionnaire response data to be analyzed for research purposes, you can:

1. Input your child's token at the weblink provided (**insert weblink**)
2. Input the token in a text message to (**insert phone number**)
3. Email (**insert email**) with your child's token in the subject

Furthermore, **each questionnaire will include a link to a 'decline consent' LimeSurvey page in order for students to withdraw their anonymous questionnaire data from being used for research purposes.**

If you **AND** your child **DO** consent to having the anonymized questionnaire response data used for research purposes, no further steps are required.

If you have any questions, you may contact Dunsmuir teacher and UVic Masters student, Moira Hood mhood@sd62.bc.ca, her supervisor at UVic, Allyson Hadwin hadwin@uvic.ca, or Dunsmuir Vice Principal, Pam Gerrits pgerrits@sd62.bc.ca. Also, you may verify the ethical approval of this study, or raise any concerns you might have by contacting the Human Research Ethics Office at the University of Victoria (250) 472-4545 or ethics@uvic.ca.

Thank you very much for your consideration,

Moira

Please find the poster introducing the mini unit attached for reference (insert poster)

Appendix D

Predictor Variable Scales

COVID-19 Distress Scale (Adapted from Taylor et al., 2021)

Scale (5) *Extremely* (4) *Very* (3) *Moderately* (2) *Slightly* (1) *Not at all*

To what extent is the following true for you?

1. I am worried about catching the virus.
 2. The virus makes me worried for my family.
 3. I am worried that basic hygiene (e.g., hand washing, sanitizing, wearing masks outside cohorts) is unable to keep me safe from the virus.
 4. I am worried that social distancing is not enough to keep me safe from the virus.
 5. I am worried if I touched something in a public space (e.g., door handle), I would catch the virus.
 6. I am worried that if someone coughed or sneezed on me, I would catch the virus.
 7. I have trouble concentrating because I keep thinking about the virus.
 8. I have trouble sleeping because I am worried about the virus.
 9. I think about the virus when I didn't mean to.
 10. Reminders of the virus cause me to have a physical reaction (e.g., sweating or pounding heart).
 11. I am worried that my social life will be affected by COVID-19.
 12. I am worried for my health when I attend school.
 13. I feel that attending school puts me at risk of catching the virus.
 14. I am worried that my family will not allow me to see my friends because of COVID-19.
-

**Note.* students answered preliminary questions about exposure to COVID-19 and family stress levels, which were not utilized in data analysis.

COVID-19 Fatigue Scale

Scale (5) *Extremely* (4) *Very* (3) *Moderately* (2) *Slightly* (1) *Not at all*

To what extent is the following true for you?

1. I am tired and frustrated with COVID-19 rules at school
 2. The pandemic has made school less enjoyable
 3. I am no longer motivated to follow COVID-19 school rules
-

Dependent Variable Scales

Student Engagement Scale Student Self-Report (Adapted from NZCER in Darr, 2012)

Scale (1) *Strongly disagree* (2) *Disagree* (3) *Neutral* (4) *Agree* (5) *Strongly agree*

Please answer the following questions based on your experiences at school this year.

1. I think it's important for me to behave well at school.
 2. I pay attention in class.
 3. I take school seriously.
 4. I do as little work as possible; I just want to get by.*
 5. I am interested in what I am learning at school.
 6. When schoolwork is difficult I stop trying.*
 7. I look for ways to improve my schoolwork.
 8. I take care that my homework (and assignments) are done properly.
 9. I often feel bored in class.*
 10. I volunteer to share my ideas in class.
-

**Note.* reverse coded items

Daily School Aversion Scale (Adapted from Lewis et al., 2018)

Scale 4-point scale (1 = *No*; 2 = *Not Really*; 3 = *Sort of*; 4 = *Yes*)

Please answer the following questions based on how you are feeling today, 'right now' at school.

1. Right now I hate school.
 2. Right now I am tired of school.
-

Mediator Variable Scales

Emotion Regulation Scale (ERQ) (Adapted from Gross & John (2003)

Scale (1) *Strongly agree* (2) *Agree* (3) *Neutral* (4) *Disagree* (5) *Strongly disagree*

Based on your general experience with emotions, please rate your agreement with each statement

1. I control my emotions by changing the way I think about the situation I'm in.
 2. When I want to feel less negative emotion, I change the way I'm thinking about the situation.
 3. When I want to feel more positive emotion, I change the way I'm thinking about the situation.
 4. When I want to feel more positive emotion (such as joy or amusement), I change what I'm thinking about.
 5. When I want to feel less negative emotion (such as sadness or anger), I change what I'm thinking about.
 6. When I'm faced with a stressful situation, I make myself think about it in a way that helps me stay calm.
-

School Climate Scale (Adapted from Bear et al., 2009)

Scale (1) *Strongly disagree* (2) *Disagree* (3) *Neutral* (4) *Agree* (5) *Strongly agree*

Based on your personal experiences at school this year, please rate your level of agreement with each statement.

1. Teachers care about their students.
 2. Students really care about each other.
 3. School rules are fair.
 4. Students feel safe in this school.
 5. I wish I went to another school.*
 6. Adults who work in this school care about the students.
 7. Students get along with one another.
 8. The rules at school are too harsh.*
 9. This school is safe.
 10. I like this school.
-

**Note.* reverse coded items