The Impact of the COVID-19 Pandemic on B.C. Secondary School Students' Schooling Experience: A Survey Inquiry and Thought Experiment

by

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Declaration of Committee

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Abstract

Attending school in-person in the year 2020-2021 was a different experience for many secondary school students in British Columbia. Safety measures such as mask-wearing and reduced interpersonal interaction were introduced nationwide. I conducted exploratory research to understand B.C. secondary school students' in-person schooling experience in this survey study. Survey items in this present study investigated the impact of COVID-19 at school and students' perceptions of school climate. In addition, I included a thought experiment where participants were randomly assigned to improved COVID-19 scenario or worsened COVID-19 scenario and asked to think about how their perceptions of school climate might change in response to the assigned scenario. The result of the present study showed about half of the participants worried about getting COVID-19 while they are at school, and almost all participants reported attending school in person felt different this year and preferred that school go back to the way it was before the COVID-19 pandemic. In addition, there was a small but statistically detectable correlation (r_{77} = -.29, p = .01) between participants' perceptions of the impact of COVID-19 at school and their perceptions of school climate. Furthermore, based on the results of the thought experiment, the COVID-19 progression on participants' perceptions of school climate appeared to have a greater impact on students' perceptions of peer relationships than student-teacher relationships. In conclusion, this rapid survey during the COVID-19 pandemic provided timely feedback and opinions from students about their in-person schooling experience during this unusual year.

Keywords: School climate; COVID-19; Social relationships in school.

Dedication

I dedicate this work to my parents, Aunt Branda, and my partner in crime Luigi.

Acknowledgement

Thank you for the support and help from many great people throughout this journey.

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List of Acronyms

B.C.	British Columbia
CAYCI	Community and Youth Collaborative Institute
EDSCLS	Education Department School Climate Surveys
EFA	Exploratory Factor Analysis

Chapter 1. Introduction

1.1. The Impact of the COVID-19 Pandemic on the Global Education system

In December 2019, multiple cases of pneumonia with unknown cause(s) were reported in the Province of Wuhan, People's Republic of China (*Listings of WHO's response to COVID-19*, 2020). This outbreak of pneumonia was determined to be caused by a novel coronavirus, later named COVID-19 (*Listings of WHO's response to COVID-19*, 2020). As the spread of COVID-19 continued on a global level, the World Health Organization (WHO) declared the beginning of the COVID-19 pandemic in March 2020 (*Listings of WHO's response to COVID-19*, 2020).

In reducing the spread of COVID-19, social distancing measures and lockdown were introduced and adopted by governments around the world (Bhamani et al., 2020). Although the implementation and intensity of these protective measures differed from country to country, their main purpose was to minimize in-person interaction between people, which in turn, decreases the transmission rate.

As human interaction and social activities are the hallmarks of schools (Bhamani et al., 2020), school closures were nearly impossible to avoid in the fight against COVID-19. It was estimated millions of students around the world were impacted by school closures (UNESCO, 2020). In the next section, I describe specifically the progression of the COVID-19 pandemic in the Province of British Columbia (B.C.), and its impact on secondary schools in B.C.

1.2. The COVID-19 Pandemic and B.C.'s Secondary School Education

1.2.1. An Overview of B.C.'s Secondary School Education

Canada's education system is governed under provincial jurisdiction. In general, children in B.C. at the age of 5 first attend elementary school and make their way up to middle school and secondary school. These three levels, elementary school, middle

school, and secondary school make up B.C.'s Kindergarten to Grade 12 (K-12) education system.

Typically, secondary schools in B.C. include students from grade 8 or 9 to grade 12. The grades included in each of elementary, middle, and secondary school vary somewhat across the province depending on factors such as the number of students in a school district or whether it is a public or private school. In the context of the present study, secondary school includes students from grades 8 to 12. Furthermore, a typical school year begins in early September and ends in the following calendar year around the end of June.

1.2.2. How did B.C. Secondary School System respond to the COVID-19 Pandemic?

Following the first confirmed case of COVID-19 reported in B.C. in January 2020, there was a growing concern about the exposure and spread of COVID-19 within the province (Nair, 2020). On March 17th, B.C.'s Education Minister announced the suspension of in-class instructional activities after spring break (Nair, 2020). This was also around the time when B.C. announced a provincial state of emergency because of the growing number of COVID-19 cases in the province. As schools remained closed, distance learning and online classroom activities were provided to students as a way to continue their education despite the ongoing pandemic. Fast forwarding to June 2020, B.C.'s Education Minister proposed a part-time voluntary return to class plan in light of the relatively low number of COVID-19 exposures in the school-aged population. It was reported that around 30% of students in all grades returned to school while others continued to opt for distance learning presumably due to concerns for safety (Nair, 2020).

Over the 2020 summer break, B.C.'s Education Minister proposed a back-to-school plan to ensure student health and safety in the upcoming school year. A variety of measures were introduced such as indoor mask wearing, physical distancing measures, and grouping students into smaller learning cohorts. The implementation and enforcement of these protective measures differed depending on grade level. For example, indoor mask wearing introduced in February 2021 was made mandatory for

middle school and high school students but not elementary school students for whom the decision to wear a mask was up to the parents (Schmunk, 2021).

In this context, important questions can be raised about how the COVID-19 safety measures in school impact student schooling experience. This study approaches addressing the impact of the COVID-19 safety measures on students' schooling experience and their perceptions of school climate using a survey instrument. In addition, a thought experiment related to the progression of the COVID-19 pandemic and students' perceptions of school climate was also included in the survey. Participants were asked to think about how their perceptions of school climate might change in response to a hypothetical scenario. This research contributes to the limited understanding on student schooling experience with these newly implemented in-school safety measures. Depending on the results of the study, potential policy and recommendation can be made to improve areas of schooling experience impacted by these in-school safety measures.

Chapter 2. Literature Review

2.1. COVID-19 Related Studies in the School-Aged Population

School closures have been a common practice to reduce the spread of COVID-19 in many countries around the world. The implementation of school closures was often sudden and ill-prepared due to the unexpected nature of the COVID-19 pandemic. As a result, researchers began to express concerns over unintended effects of school closures on students. In this section, I mainly focus on studies related to the impact of school closures on learning and social life, and the mental well-being of secondary school students. While this present study examined student perceptions of school climate after they have returned to in-person learning, the impact of social isolation and school closures on students is important to consider because it represents an experience most students have endured.

As the COVID-19 pandemic is still an ongoing issue at the time of this writing, research findings included here might not represent a comprehensive summary of research findings since studies related to the impact of the COVID-19 pandemic are still underway. I will primarily review studies with Canadian participants similar to the participants in this present study.

2.1.1. Impact of School Closures on Student Learning and School Life

According to the *BC COVID-19 SPEAK SURVEY* conducted by the Health Authority B.C. in 2020, over 70% of families with school-aged children in B.C. reported impairment in their children's learning (Dove et al., 2020). Learning impairments during school closures included lack of access to technology, specialized educational supports, and/or optimal learning environments (Dove et al., 2020; Masonbrink & Hurley, 2020). A prolonged period of school closures and lockdown posed challenges to student access to learning and education during the COVID-19 pandemic (Bhamani et al., 2020; Bonal & González, 2020; Dove et al., 2020) In Dewalt and colleagues' literature review on relationships between reading ability and various health outcomes, they reported educational achievement, especially one's reading ability, is a strong indicator of one's health and future socio-economic outcomes (Dewalt et al., 2004; Dove et al., 2020).

Diminution of reading ability is one of many possible negative outcomes that can result from school closure, I explore other issues in the following section (Fontenelle-Tereshchuk, 2021; Kuhfeld et al., 2020; Mirahmadizadeh et al., 2020, 2020; Sinha, 2021).

In a survey study that involved 600 secondary and post-secondary students in Kolkata, India's West Bengal state, issues related to the effects of the pandemic on learning were assessed (Singh et al., 2020). More than 73% of participants reported academics were negatively affected by closures caused by the pandemic, and more than 50% of participants reported they had difficulties in understanding on-line lessons. As well, the transition from in-person learning to online learning posed problems for the majority of participants in this study.

These challenges students faced in their learning and education might have a disproportional impact on students and families living in a disadvantaged environment (Bonal & González, 2020; Dove et al., 2020). Bonal and González (2020) in their survey study inquired about several factors that might contribute to such disproportional impact. According to their survey, students from a socially disadvantaged environment characterized by smaller households, poor access to the internet and technology, and less parental learning support, tended to experience a greater learning loss compared to their more advantaged counterparts. Any combination of such disadvantages from the student social domain, school domain, or their family environment could escalate pre-existing educational inequalities and learning gaps between families from different social classes (Bonal & González, 2020; Dove et al., 2020; Kuhfeld et al., 2020). This issue of inequity is among many factors that may account for between-student differences in learning and achievement outcomes during the COVID-19 pandemic (Bonal & González, 2020; Dove et al., 2020; Kuhfeld et al., 2020).

2.1.2. Impact of School Closures on Student Social and Emotional Well-being

In the context of this literature review, reduced social well-being is defined as feelings of loneliness and social isolation while lowered emotional well-being refers to negative psychological impacts such as depressive and anxiety symptoms. These two

well-being indicators are not mutually exclusive. Studies included in this literature review often overlap these two measures.

Early considerations of the impact of COVID-19 on students were informed by findings from previous pandemics such as the 2009 H1N1 and traumatic events such as the terroristic attack of 9/11 (Morelli et al., 2020). While studies of these past events helped estimate the impact of the current COVID-19 pandemic on student emotional and social well-being, they fell short in describing how the student population was affected by the COVID-19 pandemic. As more studies of the impact of COVID-19 on students' well-being studies are emerging, it is becoming clear that children and youths' emotional well-being is vulnerable and susceptible to negative effects of lockdown and social isolation (Bignardi, et al., 2020; Dove et al., 2020). These negative effects include: (1) heightened depressive and anxiety symptoms, and (2) an increased sense of loneliness due to a wide range of variables including school closures and distance learning (Bignardi, et al., 2020; Dove et al., 2020; Loades et al., 2020; Orgilés et al., 2020; Singh et al., 2020).

In light of the COVID-19 pandemic, Loades and colleagues (2020) conducted a literature review looking specifically at the association between loneliness and mental health problems in children and adolescents. Sixty three studies were included with participants from different geographical locations, pandemic-specific populations, and general populations (pre-pandemic). One's sense of loneliness can predict mental health problems, most frequently depression, as much as 9 years removed from the initial data collection (Loades et al., 2020 p.1234). Children who have gone through social isolation or quarantine were 5 times more likely to seek mental health services and experienced a higher risk for posttraumatic stress disorder in the future (Loades et al., 2020).

Also reported in the *BC COVID-19 SPEAK SURVEY*, 60.3% of families with children reported an increase in children's stress, and 79.2% of children reported a loss of connection with friends due to school closures. An increased level of stress and loss of connection in social life during the pandemic may result in problems related to student mental health and emotional well-being (Dove et al., 2020). Potential large increases in mental health problems are referred to as the "second wave" of the pandemic (Schwartz et al., 2021). In a national survey of Canadian youth aged 10-17 years old, a majority reported a general sense of boredom, missing their friends, being unmotivated academically, and a sense of dislike toward the current social isolation experience

(Korzinski, 2020). Similar to the impact of pandemic restrictions on learning and educational opportunities mentioned in the previous section, impacts on students' social and emotional wellbeing were also observed (Korzinski, 2020). In a 1-year longitudinal study of Canadian youths, older youths and females reported significantly higher stress scores on three emotion-related subscales: intrusion, avoidance, and arousal than younger and male counterparts. Similarly, in another study involving Canadian youth participants, females compared to males were more likely to exhibit a higher level of depressive, anxiety, and social phobia-related symptoms (Craig et al., 2020). On a related note, this present study also compared group differences (e.g., gender) on measures of students' schooling experience and perceptions of school climate.

2.1.3. Concerns and Worries About the Upcoming School Year

In Canada, provinces with a relatively low rate of COVID-19 cases in the student population, such as British Columbia and Alberta, decided to resume in-person learning starting in September 2020 (Fontenelle-Tereshchuk, 2021; Nair, 2020). In a study conducted by Fontenelle-Tereshchuk (2020), parents of school-aged children in the Alberta were interviewed and asked to express their opinions about the effects of lockdown on their children, and their thoughts about school re-opening. Parents reported mental health concerns for their children because of the lockdown and suggested schools should re-open in the Fall with safety measures in place to ensure student health and safety (Fontenelle-Tereshchuk, 2021). A report titled, "*Impact of School Closures on Learning, Child and Family Well-being During the COVID-19 Pandemic (2020)*", published by the B.C. Centre for Disease Control also highlighted the importance of addressing student psychological health needs when they return to school. This report forecasts mental health problems are likely to be more pronounced as students return to school after experiencing such a long duration of school closures and lockdown (Dove et al., 2020). Furthermore, student experience with social isolation and school closures may also have a carry-over effect on their schooling experience when in-person instruction is back in session.

2.1.4. Summary

In this section, I included an overview of the impact of the COVID-19 pandemic on student learning, and social and emotional well-being. School closures, social isolation, and transition to distance learning have created a great deal of stress and multiple difficulties for students. Socially disadvantaged students likely experience a higher-level of impact in comparison to the general population. To further complicate the issue, the impact of the COVID-19 pandemic from various sources such as social isolation, school closures, learning environment, and changes in student household environment are interrelated and exert changes in almost all aspects of students' life. Bronfenbrenner's ecological model of human development demonstrates how a multitude of interrelated factors across different "systems" (e.g., family life, social life, school life), in interaction with individual characteristics, impact a person's development (Bronfenbrenner, 1979). I will return to Bronfenbrenner's ecological model of human development when I describe the different theoretical frameworks for school climate.

2.2. What is School Climate?

2.2.1. Introduction

To evaluate student perceptions of the impact of the COVID-19 pandemic on their schooling experience, in this study I used school climate measures. In the remaining portion of this literature review chapter, I provide an overview of school climate related to its history, definition(s), measurements, and its functions in the field of education.

2.2.2. An Overview of the History of School Climate Studies

In two separate literature reviews of the construct of school climate (Koopman et al., 2009; Wang & Degol, 2016), the book *"Management of a City School (1908)"* by Arthur Perry is credited as the starting point of the construct of school climate in modern days. Perry's quote, the "duty of the school was to provide something more than mere 'housing'" (Perry, 1908, p. 303), raised the idea that school is more than a physical space that hosts students. Perry (1908) signified the school environment has the potential to affect students and their learning (Wang & Degol, 2016; Zullig et al., 2010).

Moving forward in time, March and Simon (1958) and Argyris (1958) used the term “organizational climate” to describe how characteristics of the workplace correlate to various outcomes such as workers’ productivity (Argyris, 1958; March & Simon, 1958; Zullig et al., 2010). However, empirical research on the construct of school climate in the field of education did not begin until the early 1960s when Halpin and Croft (1962) developed the *Organizational Climate Descriptive Questionnaire*. In Halpin and Croft’s (1963) work, they pointed out the associations among school organizational climate, student learning, and development outcomes. As explained by Halpin and Croft (1962), “the Organizational Climate can be construed as the organizational “personality” of a school; figuratively, “personality” is to the individual what “climate” is to the organization” (Halpin, 1962, p. 25).

Starting in the 1970s, researchers began to study the connection between the construct of school climate and various student outcomes (Zullig et al., 2010). The construct of school climate, among other constructs such as socioeconomic status and ethnicy, has joined popular student outcome predictors over time (Brookover et al., 1978; Coleman, 1968; Hauser, 1970; McDill et al., 1967; Zullig et al., 2010). In a study conducted by Brookover and colleagues (1978), students’ perceptions of themselves and the school were found to be better predictors of their achievement outcomes than students’ socioeconomic status or ethnicity.

Although the growing interest in the construct of school climate inspired many researchers to investigate the associations between “school climate” and student outcome(s), an expanding definition of school climate created confusion of what the construct included. In the next section, I will explore the multi-definitional issue of the construct of school climate.

2.2.3. Definitional Issues of School Climate

Despite the growing popularity of school climate studies in the past decades, researchers and scholars have not reached agreement on what the construct includes (Koth et al., 2008; Larson et al., 2020; Wang & Degol, 2016; Zullig et al., 2010). In Wang and Degol ‘s systematic review (2016) of the construct of school climate, they pointed out while some researchers opted for more tangible and specific definitions, others preferred definitions that were more conceptual and theoretical. For example, Brookover

and his colleagues (1978) defined school climate as beliefs and norms perceived and adopted by various members in the school while Freiberg and Stein (1999) defined school climate as “the heart and soul of the school” (Freiberg & Stein, 1999, p. 11).

It is generally agreed that there is no one universal definition of school climate and, as a result, operational definitions of school climate vary in regard to their inclusion of **different domains of interest** and **levels of analysis** (Koth et al., 2008; Larson et al., 2020a; Wang & Degol, 2016; Zullig et al., 2010). Broadly speaking, domains of interest represent the subject matter(s) of a school climate definition, and levels of analysis are the perspective(s) taken to measure a definition.

In the present study, school climate is predominately defined by students’ perceptions of in-person schooling experience and social relationships in school during the COVID-19 pandemic. For example, in my present survey study, some of the survey items/statements were included because of my interest in understanding how the COVID-19 pandemic impacted student perceptions of school safety: in this case, the my interest is the safety domain of school climate, and the level of analysis is student perceptions of the safety domain. In the following section, I will expand on the discussion related to the issue of multiple domains and levels of analysis of the construct of school climate.

Multiple domains of school climate

Although there is a lack of consensus on how to define the construct of school climate precisely, it’s widely recognized the construct of school climate spans multiple domains: social, emotional, and academic for example (Olsen et al., 2017; Wang & Degol, 2016; Zullig et al., 2010). In Wang and Degol (2016)’s review on the construct of school climate, they identified four general categorizations of school climate in the research literature: academic, community, safety, and institutional environment. These four domains in order represent (1) “the overall quality of the academic atmosphere”, (2) “the quality of interpersonal relationships within the school”, (3) “the degree of physical and emotional security provided by the school”, and (4) “the organizational or structural features of the school environment” (Wang & Degol, 2016, p. 317). In another review conducted by Zullig and his colleagues (2010), they included “school connectedness,” student sense of involvement in their school, as one of the school climate domains. These themes that emerged from studies of school climate are the reflection of the

subject matter; in other words, studying school climate means studying one or more of these domains (Ryberg et al., 2020).

To further demonstrate the complexity of such issues, I include several definitions of the construct of school climate in Table 1. While the issue of defining the construct of school climate is still under debate, there is a growing preference toward definitions that are more specific, narrow, and can be operationalized for research purposes (Payne, 2018).

Table 1 Examples of How the Construct of School Climate was Defined

Author(s)	Definition of School Climate
(Brookover et al., 1978)	beliefs and norms perceived and adopted by various members in the school
(Haynes et al., 1997, p. 322)	The quality and consistency of interpersonal interactions within the school community"
(Freiberg & Stein, 1999, p. 11)	The heart and soul of the school
(Cohen et al., 2009, p. 182)	the quality and character of school life. School climate is based on patterns of people's experience of school life and reflects norms, goals, values, interpersonal relationships, teaching and learning practices, and organizational structures

Levels of analysis of school climate

As the majority of definitions of school climate include some forms of value judgment, quality assessment, and expectation of school norms about the school environment and atmosphere, the construct of school climate is often represented through individuals' subjective beliefs, opinions, and perceptions of the school (Brookover et al., 1978; Cornell et al., 2017; Olsen et al., 2017; Wang et al., 2020; Wang & Degol, 2016; Zullig et al., 2010).

Since the school environment includes many groups of individuals: students, teachers, and administrators, and many levels of systems: interpersonal, classroom, and school (Zullig et al., 2010), all school *personnel's perceptions* on all *levels of systems* within the school could technically be considered as measures of school climate. For example, Griffith (1995) made an argument in support of distinguishing classroom level and school level analysis; he argued school level analysis is more appropriate for students who attend classes in different classrooms and classroom level analysis is

more suitable for students who spent most of their day in the classroom or with the same teacher (Griffith, 1995; Hoy & Hannum, 1997). Asking students about their opinions about their peers whether in the classroom or at the school may reveal two different aspects of the quality of peer relationships.

Despite the wide range of ways to analyze school climate, student perceptions of school climate are by far the most common and popular in school climate studies (Grazia & Molinari, 2020). I will return to this issue of a lack of different perspectives in studying school climate in later sections related to the criticisms and issues in research designs and measurements ins school climate studies.

Summary

In this section, the issue of multi-domain and multi-level analysis of the construct of school climate was discussed. The construct of school climate often includes measures of multiple domains within the school environment(Wang & Degol, 2016). It is typically measured from students' perspective or other school personnel of interest(Grazia & Molinari, 2020).

In the upcoming section, I will discuss several theoretical frameworks that underlie the construct of school climate, then I move on to how the construct of school climate is typically measured and evaluated.

2.3. Theoretical Frameworks of School Climate

In this section, I review seven theoretical frameworks that underlie the construct of school climate. Each of these theoretical frameworks provides a unique interpretation of the construct of school climate and its intended purposes. The issue of multi-domain and multi-level analysis of the construct of school climate also applies to these theoretical frameworks as different theoretical frameworks touch on different domains of school climate and include different levels of analysis. Consistent with the emphasis on student perceptions of school climate in this present study, the explanatory processes between school climate and student outcomes in these theories will also be addressed. Six of the seven theoretical frameworks included in the following sections are based primarily on Wang and Degol's (2016) literature review on school climate and student

outcomes, and one additional theoretical framework is identified in Rudasill and her colleagues' (2018) literature review of school climate studies.

2.3.1. Bio-Ecological Theory

As described above, Bronfenbrenner's (1979) bio-ecological theory of human development highlights the reciprocal nature of influence between individuals and their environments. According to the bio-ecological theory of school climate, school climate represents everything in the school context that students are exposed to (Koth et al., 2008; Kuperminc et al., 1997; Wang, 2009; Wang & Degol, 2016).

The bio-ecological theory provides a way to organize factors within school climate domains based on their frequency and quality of interaction with students. School climate factors are organized from proximal to distal based on their degree of impact on student development across time. Factors in proximal environments tend to have a more direct impact and influence on student development compared to those that are more distal (Wang et al., 2020). For example, , while student-teacher relationships and student-principal relationships are both part of the community domain of school climate, the former tend to have a more direct impact (proximal) on student development than the latter (distal), as students interact more often with their teacher(s) than with their school principal. In sum, the bio-ecological theory helps to explain and organize the multiple domains of school climate, and the relationship between school climate factors and various student outcomes (Wang & Degol, 2016).

2.3.2. Risk & Resilience Perspective

In contrast to the bio-ecological theory, the risk and resilience perspective provides a simpler way of understanding factors in individuals' environment by organizing them into either risk or resilience factors (Rutter, 2006; Wang & Degol, 2016). Within this perspective, risk factors refer to anything that increases an individual's probability of experiencing negative outcomes while resilience factors can be understood as the developmental assets in the individual's life that can counteract such negative outcomes (Brooks, 2006; M. W. Fraser et al., 1999) or increase the likelihood of positive outcomes. The objective of school climate studies based on the risk and resilience

perspective is to understand how to minimize risk factors and increase student resilience or protective factors in school-related contexts (Chang & Le, 2010; Wang, 2009).

From a risk and resilience perspective, the COVID-19 pandemic and its associated disruptions to student schooling have created many potential risk factors (e.g., a prolonged period of social isolation and decrease in-person interaction at school) that potentially diminish student learning and well-being. Since it's almost impossible to remove such COVID-19 related risk factors, the risk and resilience perspective focuses on increasing student resilience by strengthening or adding more protective factors to counteract the negative influence of the COVID-19 pandemic.

2.3.3. Attachment Theory

Attachment theory of human development focuses on the quality of infants' bonds to their primary caregivers and the implications of these bonds for development across the lifespan (Ainsworth, 1989; Bowlby, 1969). Due to the emphasis on early social bonds or attachment, the utility of attachment theory in understanding school climate is more oriented toward earlier learners (Wang & Degol, 2016). For example, an attachment approach to school climate theory would emphasize the importance of social relationships with peers or teachers in one's early years of schooling have an impact on one's subsequent academic and behavioral outcomes(Wang & Degol, 2016). Within this approach, a positive school climate is defined largely through the sense of safe and emotionally supportive schooling environment (Wang & Degol, 2016). In contrast to the multi-domain nature of bio-ecological theory, attachment theory in relation to school climate focuses more on the community domain and its sub-domains such as the quality of student-teacher relationships and peer relationships (Wang & Degol, 2016).

2.3.4. Social Control Theory

Social control theory is often used to explain delinquency and other maladaptive behaviours in school (Agnew, 1993; Hirschi, 1969; Wang & Degol, 2016). According to this perspective, there are four social bonds: attachment, commitment, involvement, and belief, that come into play in redirecting students from engaging in delinquent acts. (Agnew, 1993; Fisher et al., 2019; Hirschi, 1969). In applying these four social bonds in the school context, (1) *attachment* represents the respect and connection a student has

with significant people in the school, (2) *commitment* represents a student's present or future investment in school-related activities, (3) *involvement* represents how much a student participates in various school activities, and (4) *belief* represents a student's commitment to the moral norms and rules in school. For example, a student who lacks significant relationships with people from school (low *attachment*) and participates in little to no after-school activities (low *involvement*) would be more likely to engage in delinquent acts. Since social control theory focuses primarily on student behavioural adjustments, social control theory is most relevant to the safety and community domains of school climate (Fisher et al., 2019; Wang & Degol, 2016).

2.3.5. Social Cognitive Theory

Derived from social learning theory, social cognitive theory considers environmental, personal, and behavioral factors in making sense of human activities (Lacks & Watson, 2018; Wang & Degol, 2016). For example, internal reinforcement such as self-efficacy and external reinforcements such as peer pressure are all part of the complicated interaction between a person and their environment (Zysberg & Schwabsky, 2021).

According to social cognitive theory, student perceptions of school climate emerge from the interaction between environmental factors in school, student cognition, and their behaviors (Haron et al., 2010; Wang & Degol, 2016; Zysberg & Schwabsky, 2021). In the context of school climate, the application of social cognitive theory is not domain-specific unlike the attachment theory or social control theory (Wang & Degol, 2016). Instead, social cognitive theory is centered around students' cognition and their interpretation of factors in various school climate domains (Haron et al., 2010; Lacks & Watson, 2018; Wang & Degol, 2016; Zysberg & Schwabsky, 2021).

As I will be discussing in the upcoming section, measuring student perceptions is a common way researchers evaluate and assess the construct of school climate. The reliance on students' subjective evaluations and interpretations of school climate is supported by the emphasis on individuals' cognitive processes in social cognitive theory when making sense of the relationship between student perceptions of school climate and student outcomes (Bembenutty et al., 2016; Firoozi et al., 2017; Koth et al., 2008; Wang & Degol, 2016).

2.3.6. Stage-Environmental Fit Theory

Stage-environmental fit theory incorporates developmental outcomes with the concept of environmental fit (Eisenbach & Greathouse, 2020). It proposes that one's developmental outcomes are impacted by how supportive the environment is regarding the needs of the individual (Eccles et al., 1993; Eisenbach & Greathouse, 2020; Wang & Degol, 2016). In the context of school climate, a student's success, and adjustment in school is directly related to how well the school is able to support the various needs of the student. For instance, the stage-environmental fit theory is often used to explain the decreased satisfaction of student perceptions of school climate in middle school students; middle school students are typically in the period of change in which their schooling environment might not be sensitive enough to their new needs(Booth & Gerard, 2014; Chung et al., 1998; Eisenbach & Greathouse, 2020; Loukas & Murphy, 2007; Osterman, 2000).

During the COVID-19 pandemic, it may be safe to assume that the unusual format of schooling is less supportive of the various developmental needs of students than the standard schooling experience pre-COVID. For example, supporting student needs in forming meaningful relationships with peers and teachers might become a bigger challenge with the safety restrictions in school such as the social distancing measure.

2.3.7. Authoritative School Climate Theory

Authoritative school climate theory is a developing theory based on Baumrind's (1968) model of authoritative parenting (Cornell et al., 2016). Baumrind's work on parenting styles and subsequent research have reported that a parenting style characterized by a mix of firm discipline and emotional support tends to result in better developmental outcomes in children (Baumrind, 1968; Cornell et al., 2016; Larzelere et al., 2013) than parenting that is either authoritarian (high control, low emotional support) or permissive (low control, high emotional support). Authoritative parenting is associated with a child's emotional development, social development, cognitive development, aggression control, and the process of negotiating autonomy between the child and the parents (Larzelere et al., 2013).

In the context of school climate, the authoritative school climate theory puts emphasis on two key elements of school climate: disciplinary structure and student support (Larzelere et al., 2013). Disciplinary structure of school climate refers to students' awareness of school rules and their perceptions of the fairness of these rules while student support refers to students' perceptions of the interpersonal relationships within their school (similar to the community domain of school climate) (Cornell et al., 2016; Gregory et al., 2010; Gregory & Cornell, 2009; Larzelere et al., 2013). The disciplinary structure of school climate can be treated as a new domain of school climate while student support in the authoritative school climate theory resembles the community domain of school climate. In sum, authoritative school climate theory is a developing theory that aims to explain the relationship between school climate and student outcomes through student perceptions of the disciplinary structure and the level of student support of the school (Larzelere et al., 2013).

In the context of the COVID-19 pandemic, authoritative school climate studies would involve measuring student perceptions of the safety procedures and school rules relating to the COVID-19 pandemic, and how supportive the school was during this hardship. In the survey developed for this research, I included a statement about the effectiveness of mask-wearing and social distancing in protecting them from getting COVID-19 in school. While this statement might not directly touch on student perceptions of fairness of these new rules, it does indicate student perceptions of the necessity of implementing such rules in schools.

2.3.8. Summary of Theoretical Frameworks of School Climate

In summary, each of these theoretical frameworks provides a slightly different way to interpret the construct of school climate and the goal of school climate research. The organizational structure and the distinction between proximal and distal in school environment highlighted in the *bio-ecological theory* gives a better understanding of the complexity of the multiple domains within the construct of school climate (Bronfenbrenner, 1979; Wang & Degol, 2016). The *risk and resilience perspective* emphasizes the goal of strengthening protective factors in counteracting the influence of risk factors in school climate research (M. W. Fraser et al., 1999). The *attachment theory* pays close attention to the early interpersonal relationships within the school and the predictive value of the quality of such early interpersonal relationships on student

developmental outcomes (Ainsworth, 1989; Bowlby, 1969). *The social control theory* describes the process explaining student participation in delinquent acts through their level of socialization at school (the four social bonds) (Agnew, 1993; Fisher et al., 2019; Hirschi, 1969). The *social cognitive theory* explores the interaction between students' schooling environment, behaviours in school, and students' cognitive/personal factors, and the influence of such interaction on their developmental outcomes (Lacks & Watson, 2018). *The stage-environmental fit theory* highlights the importance of providing schooling experiences that are congruent with the various developmental needs of students in ensuring optimal student outcomes (Eccles et al., 1993). Lastly, the authoritative theory of school climate brings in the element of disciplinary structure and student support based on student perceptions in explaining the relationship between school climate and student outcomes (Larzelere et al., 2013).

What these theories and perspectives have in common is their goal of improving various student outcomes and the belief that the construct of school climate is a valuable tool in achieving this goal.

2.4. Research Designs and Measurements in School Climate Studies

In this section, I first describe common research designs and measurements in school climate studies. Second, I report the results of a recent meta-analyses on the predictive value of school climate toward student outcomes. Last, criticisms and issues regarding the research designs and measurements of school climate studies in relation to the strengths and limitations of school climate studies are presented. I focus mainly on survey designs and self-report measures in school climate studies as this present study also relies on survey research and self-report measures in evaluating student perceptions of school climate during the COVID-19 pandemic.

2.4.1. Common Research Designs and Measurements in School Climate Studies

Among the 297 school climate studies reviewed by Wang and Degol (2016), around 48% of studies adopted a correlational design, 28% of studies used qualitative research methods, 15% of studies focused on evaluating and developing ways of

measuring school climate, and the remaining 9% of studies were either experimental or quasi-experimental (Wang & Degol, 2016, p. 333).

As the construct of school climate is heavily dependent on people's subjective evaluations and perceptions of the school, the majority of school climate studies rely on collecting self-report survey data from students to measure factors in school climate domains (Lewno et al., 2020; Wang & Degol, 2016). Conducting self-report surveys is inexpensive and convenient for researchers to collect a large volume of information regarding different school climate domains from many participants at once (Grazia & Molinari, 2020). In Wang and Degol's (2016) review, 92% of studies included used self-report surveys (p. 333). Although interview and observational studies are sometimes used in school climate studies, self-report survey designs represent the majority (Berkowitz et al., 2017; Grazia & Molinari, 2020; Lewno et al., 2020; M.-T. Wang & Degol, 2016). In the following sections, I discuss how the different domains of school climate are represented in school climate surveys.

Measuring multiple domains of school climate in school climate surveys

Given that school climate is typically defined as a multi-domain construct, it's reasonable to ask how well the domains of school climate are represented across different school climate surveys. Anderson's (1982) literature review summarized this variability across school climate studies by asking, "Are we hunting the same beast?" (Anderson, 1982, p. 376). This question still applies in understanding how different school climate surveys measure the construct of school climate.

This long-standing problem has inspired many researchers to compare and contrast different school climate surveys (Grazia & Molinari, 2020; Lenz et al., 2021; Lewno et al., 2020; Wang & Degol, 2016). The overall evidence on the representativeness of different school climate domains in surveys/self-report measures tends to support the idea that school climate surveys as a whole do include all major school climate domains, however, there are often variations in terms of how a school climate domain is defined and measured across different surveys (Grazia & Molinari, 2020; Lenz et al., 2021; Lewno et al., 2020; Wang & Degol, 2016).

For example, Lewno et al. (2020) measured domain overlap between 18 school climate measures, they concluded most school climate measures included safety,

relationships, and institutional environments domain. However, in the same study, they also pointed out domains such as *teaching and learning*, and *school improvement processes* were underrepresented compared to *relationships* and *safety* domains, meaning the number of items representing such domains is less compared to other domains. In a systematic analysis conducted by Lenz and his colleagues (2021) on school climate measures and domain overlap, they concluded the domain of *institutional environment* was underrepresented compared to the other three domains of school climate identified in Wang and Degol (2016) across the 9 school climate measures included. Furthermore, Grazia and Molinari (2020) pointed out that school climate surveys don't always agree on the number of domains and sub-domains, and often used different words or descriptions when formulating measures for the same domain.

While there is some evidence showing how school climate was defined and measured differently across studies, the domain overlap between school climate measures indicates a commonality on the theorical structure of school climate (Lewno et al., 2020: Wang & Degol, 2016). The differences in how school climate was measured across studies often reflect differences in naming or labeling rather than how different domains were measured or the proposed underlying theoretical structure (Lewno et al., 2020; Wang & Degol, 2016).

2.4.2. School Climate as Student Outcome Predictors

The majority of school climate studies position the construct of school climate as a predictor of various student outcomes (Larson et al., 2020; Wang & Degol, 2016). In general, student outcomes associated with the construct of school climate can be organized into three main categories: achievement and learning outcomes, behavioural outcomes, and socio-emotional outcomes (Larson et al., 2020; Wang & Degol, 2016). In the following sections I focus mainly on student outcomes associated with self-perceptions of *peer relationships*, *student-teacher relationships*, and *school connectedness* because this present study defines school climate mainly by these three sub-domains. These three sub-domains are often included and listed under the community domain of school climate (Wang & Degol, 2016; Zullig et al., 2010). I discuss further the justifications and the importance of measuring student perceptions of these three sub-domains of school climate during the COVID-19 pandemic in later paragraphs.

Community domain of school climate and student outcomes

In the community domain of school climate listed in Wang and Degol's (2016) literature review, peer relationships and student-teacher relationships fall under the sub-domain of the quality of relationships while school connectedness falls under the sub-domain of connectedness. Consistent across different studies, student perceptions of peer relationships, student-teacher relationships, and school connectedness are often positively correlated with various student outcomes such as academic performance, social and emotional regulation skills, protection against interpersonal violence, stress management, communication skills, mental well-being, self-efficacy, self-esteem, satisfaction in learning and prosocial behaviors (Booth & Gerard, 2014; Firoozi et al., 2017; Holzberger et al., 2020; Larson et al., 2020a; Lester & Cross, 2015; Wang et al., 2013; Wang & Degol, 2016; Wentzel, 2017; Zullig et al., 2010). These correlations between school climate factors and student outcomes do not necessarily indicate causality or the direction of effect because of the lack of experimental research designs in school climate studies (Berkowitz et al., 2017; Lewno et al., 2020; Wang & Degol, 2016). I will expand further on the discussion on issues related to the limitations of establishing causal relationships from school climate studies in later paragraphs.

In the following paragraphs, I will turn to some of the relevant theoretical frameworks of school climate that help to explain why these three school climate factors (student perceptions of peer relationships, student-teacher relationships, and school connectedness) might associate with improved student outcomes.

According to the risk and resilience perspective, positive perceptions in these three sub-domains serve as protective factors that decrease the likelihood of negative outcomes and increase resources and support available for students. For example, students who have better perceptions of the quality of interpersonal relationships may objectively receive more social and emotional support from peers and teachers than students who have more negative perceptions of interpersonal relationships either due to a lack of interpersonal relationships or relational conflicts. This is not the same as saying students whose perceptions of interpersonal relationships are negative are doomed with less optimal outcomes. However, students with negative perceptions of their interpersonal relationships with peers and teachers may be more likely to experience these negative outcomes compared to their counterparts based on the risk

and resilience perspective. In other words, the contributions of these school climate factors to student outcomes are not determinant but probable.

Attachment theory signifies the community domain especially the quality of interpersonal relationships within the school (Wang & Degol, 2016). While attachment theory and the risk and resilience perspective both bring attention to the protective value and benefits of having high-quality interpersonal relationships regarding student behavioral, academic, and socio-emotional outcomes, attachment theory also suggests that the protective value and benefits of attachments can have a continuous and long-term impact on these student outcomes. Reaves and her colleagues (2018) conducted a literature review including only longitudinal studies on the relationship between school climate and problem behaviors. Among the 13 included in their analysis, the results indicated that school climate factors of interpersonal relationships correlated best with delinquency although this particular relationship was not found in previous studies (Johnson, 2009; Reaves et al., 2018). Nonetheless, this proposed continuous and long-term impact of interpersonal attachments within the school remained merely a theory at this point and more longitudinal studies are needed to support this theory (Grazia & Molinari, 2020; Wang & Degol, 2016).

The last theoretical perspective that I will be discussing here is the social control theory. As a recap, Social control theory is often used to explain the presence of delinquency and other maladaptive behaviors in school (Agnew, 1993; Hirschi, 1969; Wang & Degol, 2016). Student engagement in delinquency and other maladaptive behaviours in school is explained by the quality of the four social bonds: attachment, commitment, involvement, and belief. As most school climate studies in this regard are correlational, student perceptions of peer relationships, student-teacher relationships, and school connectedness could either *indicate* the quality of the four social bonds or *influence* the quality of these social bonds, which in turn contribute to student outcomes. Experimental research designs are necessary to determine whether the potential causal relationship and the direction of the causality between these student perceptions and the four social bonds. In sum, the social control theory and its proposed four social bonds provide a way of understanding the process behind student perceptions of peer relationships, student-teacher relationships, and school connectedness on various student outcomes.

Summary

In this section, I introduced some of the common academic, behavioral, and socio-emotional outcomes often associated with student perceptions of peer relationships, student-teacher relationships, and school connectedness. The risk and resilience perspective, attachment theory, and social control theory each provide a unique lens in understanding the relationship between these three school climate sub-domains and student outcomes. The risk and resilience perspective theorizes the protective value of these three school climate factors. The attachment theory suggests a continuous and long-term effect of attachments within the school. Last, the social control theory and the four social bonds provide a detailed explanatory process addressing how these three school climate factors may contribute to student outcomes.

2.4.3. Criticisms and Issues in Research Designs and Measurements of School Climate Studies

In this section, I will provide several criticism and issues of research designs and measurements in school climate studies. I will focus mainly on criticisms and issues related to survey designs in school climate studies. Although this present study didn't completely address these problems of survey designs in school climate studies, these problems are worth mentioning because they foreshadow some of the limitations of this present study.

A lack of agreement in defining school climate factors across surveys

As discussed previously, different studies often define school climate and its various domains differently. In Lewno et al. (2020)'s study for example, there are many different labels for describing peer relationships, such as positive peer associations (Gottfredson, 1999), student peer relationships (Halawah, 2005), student connectedness (Bradshaw et al., 2014), peer support, cohesion (Fraser, 1982), between student relationship climate (Janosz & Bouthillier, 2007). For more examples of this confusion of naming school climate domains and sub-domains see Lewno et al. (2020).

This lack of consensus in taxonomy when describing school climate domains or sub-domains poses two potential problems. First, it creates a sense of confusion in understanding school climate factors as there are often multiple interpretations or descriptions of such factors (Lewno et al., 2020). Second, it makes it difficult to compare

the psychometrics of these survey instruments (e.g. validity and reliability) when different words are used to represent the same theme or factor (Cornell et al., 2016). In a study on the association between school climate and aggression, Kohl and her colleagues (2013) suggested avoiding developing new measures of school climate as much as possible when there are adequate measures available. Their findings suggested school climate measures developed by different researchers were often similar therefore this redundancy in school climate measures could and should be avoided (Kohl et al., 2013).

A lack of multiple perspectives in measuring school climate

The lack of multiple perspectives in measuring school climate refers to the fact that the majority of school climate studies rely heavily on student perceptions of school climate as the main (often the only) indication of school climate (Grazia & Molinari, 2020; Wang & Degol, 2016; Zullig et al., 2010). In other words, school climate studies depend mostly on student-level measures (levels of analysis) in justifying the value and intend of school climate.

The debate over the benefits and limitations of using student-only reports versus multiple-informant reports is still ongoing. Interestingly, Wang and Degol (2016) raised a counterargument suggesting this lack of multiple perspectives in school climate studies may not be a problem if student perceptions of school climate are better outcome predictors than other informants such as teachers or parents. They suggested if student perceptions of school climate are indeed the strongest outcome predictor compared to other sources, then altering student perceptions of school climate ought to be the most effective and direct way of improving student outcomes (Wang & Degol, 2016).

In sum, focusing on student reports of school climate provide a more detailed outlook of student schooling experience and its relationship with student outcomes, whereas integrating multiple informants in school climate studies provides a more relational and collective view of school climate (Grazia & Molinari, 2020; Munoz & Dossett, 2016).

Temporal issues in school climate studies

In this section, I will be focusing on two closely related temporal issues in school climate studies. The first temporal issue is the tendency of studies of school climate to measure school climate only once, and the second temporal issue concerns the lack of

longitudinal research designs in school climate studies(Grazia & Molinari, 2020; Ramelow et al., 2015; Wang & Degol, 2016). Wang and Degol (2016) identified only around 30% of school climate studies measured school climate more than once (p.337). Regarding longitudinal research designs in school climate studies, based on Grazia and Molinari's (2020) findings, only around 15% of school climates are longitudinal (p.16).

Schooling experience is never static and fixed in terms of time for students. Students are expected to attend to the daily schedule of school, yearly schedule of school, and move from one level of school to another. Any difference in time may also result in a difference in the report of student perceptions of school climate. It's commonly observed that student perceptions of school climate often decrease significantly during the transition from elementary school to middle school or high school (Chung et al., 1998; Lester & Cross, 2015; Wang et al., 2010; Way et al., 2008). Therefore, without measuring student perceptions of school climate at multiple points, it's difficult to determine the trajectories and processes of change across time (Grazia & Molinari, 2020).

Issues of inferring causality based on school climate studies

While correlational studies are quick and easy to conduct, inferring causality has often been a shortcoming in correlational research designs. This issue is relevant in school climate studies because most of them at the moment are correlational (Lewno et al., 2020; Wang & Degol, 2016). In Wang and Degol's (2016) literature review, less than 10% of school climate studies could be considered experimental or quasi-experimental (p.333). A true experimental design in school climate is nearly impossible since student perceptions of school climate are a part of their pre-existing beliefs and opinions that often cannot be freely manipulated and controlled. Given this limitation, many studies have encouraged the use of longitudinal in school climate studies to strengthen claims about causal relationships between school climate and student outcomes (Grazia & Molinari, 2020; Johnson, 2009; Lenz et al., 2021; Lewno et al., 2020; Ramelow et al., 2015; Wang & Degol, 2016). As discussed in previous sections, popularizing the use of longitudinal research designs is still a project in progress.

2.5. Summary

In this chapter, I included a wide range of studies and findings on the impact of the COVID-19 pandemic on school-aged populations as well as the construct of school climate. The COVID-19 pandemic had a significant effect on student schooling experience, which in terms affecting student academic, social, emotional life based on existing literature. These COVID-19 related impacts are important to consider when assessing student perceptions of school climate, as such changes are all potential variables that lead to changes in student perceptions of school climate.

Regarding the construct of school climate, I provided a detailed review on the (1) historical background, (2) definitional issues, (3) theoretical frameworks, (4) research designs and measurements, (5) predictive values, and (6) the criticisms and issues of school climate. In the next section, I will introduce the basic premise of the present study, and how it helps to understand better the impacts of the COVID-19 pandemic on student perceptions of school climate. More importantly, I will also explain how this study fits into the existing state of school climate studies, and how it aims to overcome the criticisms of school climate studies identified above.

2.6. The Present study and Research Questions

2.6.1. Purpose of the Study

With the introduction of in-door mask-wearing and a variety of social distancing practices in B.C.'s secondary schools, secondary school students' schooling experience has undergone drastic changes in the school year of 2020-2021. Little is known about how secondary school students in B.C. have adjusted and adapted to this new way of schooling. Therefore, the purpose of this study is to gather student opinions on the impact of the COVID-19 regarding their schooling experience, and student perceptions of school climate during the pandemic. Due to the novelty of the situation and the lack of relevant research, this study is primarily an exploratory study to gain insight and knowledge of student perceptions of school climate during the COVID-19 pandemic.

The theoretical frameworks of this study lie within the idea that COVID-19 related changes in school are an environmental change that may affect nearly all aspects of

student schooling experience. The bio-ecological theory, the social cognitive theory, and the stage-environmental fit theory all speak to the importance of the schooling environment on various student outcomes. This survey study does not include measures of student outcomes. Instead it focuses on measuring student perceptions of school climate in this unusual school year.

In terms of measuring student perceptions of school climate, survey items measuring the impact of the COVID-19 pandemic on schooling experience and the community domain of school climate were included. As school changes related to the COVID-19 pandemic focused on reducing and minimizing in-person interaction within the school, it may be inferred such changes in school had major impact on student perceptions of the relational aspects (peer relationship, student-teacher relationships, and school connectedness) of the community domain. The importance of student perceptions of these relational aspects of the community domain is emphasized by attachment theory, social control theory, and the authoritative school climate theory. In sum, this present study measured student perceptions of school climate through using student perceptions of the impact of the COVID-19 pandemic on schooling experience and the community domain of school climate. In the process of developing the survey, a mix of new and existing measures of school climate were applied. The reason for doing so was to balance the specificity of the COVID-19 pandemic and overlap with existing school climate measures. The methods section provides a breakdown and review for all the survey items included in this present study.

While the present study selectively investigates the construct of school climate by addressing the four issues identified in section 2.4.3, I hope it will provide insight into how student life has been impacted by the COVID-19 pandemic and inform practical strategies that can improve student schooling experience if the COVID-19 pandemic continues or in the face of a future pandemic. One unique aspect of the present survey is the inclusion of a thought experiment. In short, participants were asked to think about how their perceptions of peer relationships, student-teacher relationships, and school connectedness would change (or would not) based on a hypothetical COVID-19 scenario. I explain further about the thought experiment in the methods chapter.

2.6.2. Research Questions

This study explores student perceptions of the impact of the COVID-19 pandemic on their schooling experience and the community domain of school climate. Aligned with the exploratory nature of the present study, survey development and data analysis address the following topics and questions:

1. Student subjective evaluation of the impact of the COVID-19 pandemic on their schooling experience

2. What are students' perceptions of the community domain of school climate (peer relationships, student-teacher relationships, and school connectedness) like in this current school year?

3. How well do students' subjective evaluation of the impact of COVID-19 pandemic on their schooling experience correlate with their perceptions of school climate?

4. How does change in the COVID-19 pandemic progression affect students' perceptions of the community domain of school climate based on a hypothetical scenario?

Chapter 3. Methodology

3.1. Research Ethics

This present study and documents used in the study were assessed by the Office of Research Ethics at Simon Fraser University. Approval as a minimal risk study was granted April 13th, 2020, valid for one year from the date of approval. The informed consent form, survey, recruitment materials, and Tri-Council Policy Statement for Research Involving Humans Certificate- Chi Hong Lao were documents approved in the research ethics application. The informed consent can be found in Appendix A and recruitment materials in Appendix B and Appendix C.

3.2. Research Method

This study employed a survey research method to explore students' perceptions of the impact of the COVID-19 pandemic on their schooling experience and the community domain of school climate. The administration of the survey was done through SurveyMonkey, a web survey tool. Conducting research activities in-person or at school was discouraged by several school boards in the greater Vancouver area because of COVID-19 related safety concerns. Therefore, administrating the survey online was chosen instead of visiting students at school. Convenience sampling and snowball sampling were used. Participants were recruited on social media or by referrals.

The survey had 5 components: (1) a written informed consent form, (2) a questionnaire on students' characteristics and demographics factors, (3) student perceptions of the impact of the COVID-19 on schooling experience survey, (4) student perceptions of the community domain of school climate survey, and (5) a COVID-19 related thought experiment. In the upcoming section, I explain how the survey was developed.

3.3. Survey Development

The survey in this study includes original items developed by the researcher and items adapted from existing surveys. The purpose of using a mix of new and existing items of schooling experience and school climate was to increase the sensitivity of

survey items in evaluating the specific impact of the COVID-19 pandemic and to avoid unnecessary redundancy in developing school climate measures that were similar to existing measures. Some items in this survey were adapted from the U.S. Education Department School Climate Surveys (EDSCLS)-Student Survey and the Community and Youth Collaborative Institute (CAYCI) School Experience Surveys (Anderson-Butcher, Iachini, et al., 2016; National Center for Education Statistics, 2016). These two surveys were free and available to the public. I obtained permission from Dr. Anderson-Butcher in adapting the CAYCI School Experience Surveys for the present survey. In the following paragraphs, I include relevant background information and describe the development of these two existing surveys.

The EDSCLS was developed by the U.S Department of Education's National Centre of Education Statistics starting in 2013 (National Center for Education Statistics, 2015). The EDSCLS has four versions designed for use with students, teachers and school staffs, principals, and parents and guardians. The EDSCLS student survey measures three domains of school climate: engagement, safety, and environment. In the EDSCLS 2015 pilot test, over 17,630 students from various schools in the U.S completed the survey with a total of 127 items. After evaluating the response rate, reliability, and construct validity, 63 items were retained in the final version of the EDSCLS student survey. Items used in the present survey were taken from the topic of relationships under the engagement domain from the EDSCLS student survey. I selected four items from the EDSCLS student survey measuring student perceptions of student-teacher relationships. I will describe these selected items in detail in a later section.

The CAYCI school experience survey was developed by Anderson-Butcher and her colleagues at Ohio State University to measure students' perceptions of school climate concerning student learning and positive development (Anderson-Butcher et al., 2018; Anderson-Butcher, Iachini, et al., 2016). Items from the CAYCI School Experience Surveys were selected for this study specifically for measuring student perceptions of peer relationships and school connectedness. Furthermore, alternations of the wording of items from the CAYCI School Experience Surveys were made to better suit the purpose of this present survey. For example, the item "my friends support and care about me" from the peer relationship scale was adapted into "my schoolmates support and care about me", to emphasise more strongly students' friends at school rather than

friends in general. Previous results from the psychometric tests indicated both the peer relationship and school connectedness items (the domains of interest in the present study) demonstrated validity and reliability of these survey items among students (Anderson-Butcher, Amorose, et al., 2016b, 2016a).

In the following section, I describe the different parts of the survey used in the present study and the corresponding items in each scale.

3.3.1. Survey Part 1: Students' Characteristics and Demographics Scale

Participants were asked questions concerning their identified gender, name of their school, grade level, age, and learning mode during the current school year. Before starting the survey, participants were presented with the informed consent form and reminded that only students in grades 8-12 attending school in person in B.C. should fill out the survey. Therefore, some of these questions helped to further determine eligibility of participants.

3.3.2. Survey Part 2: COVID-19 at School Scale

Participants were asked to express their opinion about five statements related to their perceptions of COVID-19 safety at school and the overall impact of COVID-19 at school. These five items were developed by the researcher and included: (1) I worry about getting COVID-19 while I am in school, (2) I think social distancing and mask wearing are effective in protecting me from getting COVID-19 while I am in school,(3) I prefer to stay home than going to school because of my worry about getting COVID-19 while I am in school, (4) I wish school can go back to the way it was last year before the COVID-19 pandemic, and (5) I don't see any changes in school because of the COVID-19 pandemic. Participants rated their opinions on a 5-point Likert scale ranging from strongly disagree, agree, no opinion, disagree, to strongly disagree.

3.3.3. Survey Part 3: School Climate Scale

The School Climate Scale consisted of items measuring student perceptions of (1) peer relationships, (2) student-teacher relationships, and (3) school connectedness. A mix of items developed by the researcher and from existing surveys was used to

construct the School Climate Scale. A summary of all survey items in this scale can be found in the below table, organized by the underlying factor these items represent. Participants responded to these items on a 5-point Likert scale identical to the COVID-19 at school scale.

These 11 items were chosen for their focus on the interpersonal and communication aspects of school climate including peer relationships, student-teacher relationships and school connectedness. Changes were made to some of these items to better meet the purposes of this study. First, for item no.4, the word 'friends' was changed to 'schoolmates' to emphasize peer relationships within the school. Second, on the CAYCI school experience survey the middle point of the Likert scale is labelled "neither disagree or agree" whereas for the present survey the term "no opinion" was used. Items on the original EDSCLS are responded to on a 4-point Likert scale. Here, as described, a 5-point scale was used. Last, among the three items under the school connectedness factor, items 9 and 11 were from the middle/high school version of the survey, and item 10 was taken from the elementary school version of the survey. I included item 10 because of its focus on the social and interpersonal relationship from the students' perspectives.

Table 2 Items in School Climate Scale

	Item	Underlying factor	From
1	My schoolmates and I know each other well.	Peer relationships	The present survey
2	I consider my schoolmates my friends.	Peer relationships	The present survey
3	I am satisfied with how often I get to hang out and talk with schoolmates while we are at school.	Peer relationships	The present survey
4	My schoolmates support and care about me.	Peer relationships	CAYCI (changed from friends to schoolmates)
5	My teachers understand my problems.	Student-teacher relationships	EDSCLS
6	Teachers are available when I need to talk to them.	Student-teacher relationships	EDSCLS

7	It is easy to talk with teachers at this school.	Student-teacher relationships	EDSCLS
8	My teachers care about me.	Student-teacher relationships	EDSCLS
9	I enjoy coming to school.	School Connectedness	CAYCI
10	I have good relationships with teachers and other adults at my school.	School Connectedness	CAYCI (elementary school version)
11	I feel like I belong at my school.	School Connectedness	CAYCI

3.3.4. Survey Part 4: Thought Experiment

In this last part of the survey, participants were randomly assigned into group A or group B of the thought experiment using the function of the A/B test in SurveyMonkey. Participants in both groups were asked to rate the 11 items in the school climate scale again, except this time on a 3 point Likert scale (less, no change, and more) based on a hypothetical COVID-19 scenario. The instructions for group A and group B are below. Participants in each group first read their group's instruction, then chose either less, no change, or more in response to the item "I enjoy coming to school____".

The goal of this thought experiment was to understand better how student perceptions of school climate may change depending on the progression of the COVID-19 pandemic. Conducting a true experimental study to determine the causal relationship between the COVID-19 pandemic and student perceptions of school climate would be difficult and ethically almost impossible. A true experimental study would require randomly assigning half of the participants to a schooling environment that is impacted by the COVID-19 pandemic and half of the participants to a typical schooling environment. Therefore, this thought experiment provided a safer and more ethical alternative to better understand the causal relationship between the COVID-19 pandemic and student perceptions of school climate.

Group A instruction:

"Now, you will be asked to rate some of the previous statements again. Except for this time, please imagine it is the beginning of another school year, and the COVID-19

pandemic has improved over the summer break. Safety measures against COVID-19 are not needed anymore at your school."

Group B instruction:

"Now, you will be asked to rate some of the previous statements again. Except for this time, please imagine it is the beginning of another school year, and the COVID-19 pandemic has worsened over the summer break. Additional safety measures against COVID-19 are in place at your school"

3.4. Procedures

After participants clicked on the link to the survey, they were reminded once again that only current students in grade 8-12 in B.C. who attend school in-person full-time or part-time should fill out this survey. After participants confirmed their eligibility, the informed consent form was presented (see Appendix A.). Subsequently, the participant completed the students' characteristics and demographics scale, COVID-19 at School Scale, School Climate Scale, and the thought experiment (randomly assigned to either group A or B). The order of items on all scales except the students' characteristics and demographics scale was randomized to minimize potential order effect that may systematically influence how participants respond to these items. On the last page of the survey, the contact information of the researcher was given to participants who would like to know the result of the study or have any questions about the study.

3.5. Summary

In this chapter, I provided relevant information about the research method and survey development process. As in-person research activities were discouraged due to safety concerns relating to COVID-19, conducting the survey online was chosen as an alternative. In the process of developing the present survey, items on the EDSCLS and CAYCI school experience surveys were integrated with newly developed items by the researcher to measure student perceptions of peer relationships, student-teacher relationships, and school connectedness. In addition, participants were also asked to engage in a thought experiment to understand better the causal relationship between the

COVID-19 pandemic and perceptions of school climate. In the procedure section, I listed the steps participants went through from the recruitment process to the end of the survey.

The complete survey including both descriptions used in the thought experiment can be found in Appendix E.

Chapter 4. Results

4.1. Cleaning and Preparing the Survey data

Data analysis was conducted primarily using the Statistical Package for the Social Sciences 27 (SPSS-27). Before entering data into SPSS, I first identified and removed participants with faulty data. Out of the 98 responses collected, 19 responses were excluded: 13 participants didn't complete the survey, 5 participants were deem ineligible (e.g., selected full time remote learning), and 1 participant showed the tendency to select the same response in the survey (straight-lined). If a participant selected the same response for 4 (or more) out of the 5 items on the COVID-19 at School Scale and 9 (or more) out of the 11 items on the School Climate Scale, that response was considered faulty data and excluded from the data analyses.

The remaining 79 responses were then transferred from Survey Monkey to a SPSS file. When transferring survey responses I deleted irrelevant recorded variables such as the collector ID. I also renamed items on the COVID-19 at school scale, school climate scale, and thought experiment for better identification of each variable. Also, items on the COVID-19 at school scale were shortened to variable COVID, items on the school climate scale were shortened to SC, and items on the thought experiment were shortened to TESC. Please refer to Appendix D for the naming of variables corresponding to items in all three scales.

Furthermore, participants' responses to the Likert scale on these three scales were assigned a numeric value. The 5-point Likert scale used in the COVID-19 at School Scale adopted an ascending numeric scale starting from -2 for strongly disagree, -1 for disagree, 0 for no opinion, 1 for agree to 2 for strongly agree, except for the statement "I think social distancing and mask wearing are effective ways to protect me from getting COVID-19 while I am in school". Higher numeric values on the COVID-19 at School Scale corresponded with perceiving the COVID-19 pandemic as having a higher impact and challenge on their schooling experience. Therefore, I reversed the score for the statement "I think social distancing and mask wearing are effective ways to protect me from getting COVID-19 while I am in school."

Moving on to items on the School Climate Scale, a similar scoring scheme was used as the COVID-19 a school scale. all statements were positively framed meaning high numeric values represented more positive perceptions, therefore no reverse-scoring was required.

In the thought experiment, the options “less”, “no change”, and “more” were assigned scores of -1, 0, and 1, respectively. The following table provides a summary of the scoring scheme and the interpretation of these numeric values.

Table 3 Scoring Scheme of the COVID-19 at School Scale, School Climate Scale, and Thought Experiment

	Scoring	Interpretation
COVID-19 at School Scale	Strongly disagree= -2 Disagree= -1 Neutral = 0 Agree = 1 Strongly Agree= 2 (*)	Higher points = higher perceived impact of the COVID-19 pandemic at school Lower points= lesser perceived impact of the COVID-19 pandemic at school
School Climate Scale	Strongly disagree= -2 Disagree= -1 Neutral = 0 Agree = 1 Strongly Agree= 2	Higher points = more positive perceptions Lower points = more negative perceptions
Thought Experiment	Less = -1 No change = 0 More = 1	Higher points = improvement of perceptions Lower points = deterioration of perceptions

Note: Reverse scoring on item: “I think social distancing and mask wearing are effective ways to protect me from getting COVID-19 while I am in school.”

4.2. Descriptive Statistics of Students’ Characteristics and Demographics Scale

Tables 4-8 provide a summary of students’ characteristics and demographics . The percentages in these tables were rounded to the nearest whole percent.

Table 4 Frequency Table of Participants' Gender

	n	% of total participants (n=79)
Other (please specify)	1	1%
Prefer not to say	7	9%
Male	20	25%
Female	51	65%

Table 5 Frequency Table of Participants' Birth Year

	n	% of total Participants (n=79)
2002	3	4%
2003	7	9%
2004	13	17%
2005	23	29%
2006	19	24%
2007	14	18%

Table 6 Frequency Table of Participants' Grade Level

	n	% of total participants (n=79)
Grade 8th	14	18%
Grade 9th	19	24%
Grade 10th	23	29%
Grade 11th	13	17%
Grade 12th	9	11%
Mix (Grade 11th and 12th)	1	1%

Table 7 Frequency Table of Participants' Current Learning Mode

	n	% of Total participants (n=79)
Full-time in person learning	36	46%
A mix of in-person learning and remote learning	43	54%

Table 8 The Number of Days Participants Attend School in-person Weekly

	n	% of total participants (n=79)
Around 1 day a week	1	1%
Around 2 days a week	1	1%
Around 3 days a week	6	8%
Around 4 days a week	3	4%
Around 5 days a week	67	85%
More than 5 days a week	1	1%

4.3. Analyses of Validity and Reliability of the COVID-19 at School Scale and the School Climate Scale

In this part of the analysis, the goal was to explore how items in this survey related to one another, and to provide evidence supporting the underlying constructs of these items using Exploratory Factor Analysis (EFA). EFA helps to investigate if certain items on a scale “go together”, and therefore possibly measure the same underlying construct. Basic descriptive statistics such as the correlation between items in these two scales will also be provided.

Before presenting the results, I would like to explain why the Exploratory Factor Analysis better fits the purpose of this analysis than the Confirmatory Factor Analysis (CFA). While EFA helps to discover underlying construct among items, CFA aims to confirm how well items fit a proposed theoretical structure. Since there were three underlying proposed constructs (peer relationships, teacher-student relationships, and school connectedness) identified in the School Climate Scale, one could argue CFA is better at investigating how well these three underlying constructs held up in this present study. The decision to conduct EFA instead of CFA specifically in analysing items on the School Climate Scale was because of the mix of new and existing items in constructing the School Climate Scale. The addition of new items and altered wording of existing items might affect how they relate to one another, which in turn, could affect underlying constructs proposed in previous studies. EFA, on the other hand, can help to explore underlying relations among items, and corroborate how the three proposed underlying constructs held up in the School Climate Scale in this present study.

4.3.1. Correlations and EFA Results of the COVID-19 at School Scale

Relationships among the 5 items on COVID-19 at school scale were evaluated using the Pearson correlation coefficient presented in Table 9. Values are rounded to two decimal places.

Table 9 Correlation Matrix of the COVID-19 at School Scale

	COVID1	COVID2	COVID3	COVID4	COVID5
COVID1	1				
COVID2	-.02	1			
COVID3	.56**	.08	1		
COVID4	.10	.22	.07	1	
COVID5	.19	-.12	.03	.15	1

** $p < .01$ (2-tailed)

For the EFA on the 5 items on the COVID-19 at School Scale, I selected the direct oblimin rotation. The direct oblimin rotation allows the components extracted from the EFA to be correlated. As the 5 items on the COVID-19 at School Scale were newly developed, there was no reason to believe the extracted components shouldn't be correlated with one another.

In identifying the underlying components/constructs in these 5 items, the first step was to calculate the eigenvalue of the extracted components, shown in Table 10. The Eigenvalues tell us how much variance extracted components account for. In this case, extracted components with an Eigenvalue greater or equal to 1 will be considered. This is because an extracted component with an eigenvalue of 1 explains the same amount of variance as a single item on this scale. Logically speaking, an extracted component should account for at least the same or more variance than a single item on this scale in identifying the underlying construct among these items. Therefore only components with an eigenvalue greater than or equal to 1 will be considered.

Table 10 Eigenvalues of the COVID-19 at School Scale

	Initial Eigenvalues		Eigenvalues with Direct Oblimin Rotation
	Total	% of variance	Total
Component 1	1.65	32.96	1.58
Component 2	1.19	23.81	1.22
Component 3	1.08	21.53	1.15

Note: Rounded to 2 decimal places.

Once the three components were extracted, the next question one should ask is how the 5 items correlate with these three components. Items that correlate with the same component "go together". In Table 11, correlations between the 5 items and the

three extracted components are presented. This correlation matrix is known as the structure matrix. Note, correlations higher or equal to 0.40 were underlined.

Table 11 Structure Correlation Matrix of the COVID-19 at School Scale with Direct Oblimin Rotation

	Component		
	1	**2**	**3**
I worry about getting COVID-19 while I am in school.	.88	.02	.23
I think social distancing and mask wearing are effective ways to protect me from getting COVID-19 while I am in school.	.06	.80	-.34
I prefer to stay home rather than go to school because of my worry about getting COVID-19 while I am in school.	.89	0.10	-.05
I wish school could go back to the way it was last year before the COVID-19 pandemic.	-.08	.76	.42
Attending school in-person feels different this year because of the COVID-19 pandemic.	.12	-.02	.90

In summary, the EFA extracted three components with an eigenvalue higher than 1 from the COVID-19 at School Scale.

4.3.2. Correlations and EFA Results of the School Climate Scale

Nearly identical procedures were performed in evaluating the underlying factors of the 11 items on the School Climate scale, as to the COVID-19 pandemic.

First, inter-item correlations were evaluated using the Pearson correlation coefficient. These are presented in the Table 12.

Table 12 Correlation Matrix of the School Climate Scale

	SCPR 1	SCPR 2	SCPR 3	SCPR 4	SCST 1	SCST 2	SCST 3	SCST 4	SCSC 1	SCSC 2	SCSC 3
SCPR 1	1										
SCPR 2	.63**	1									
SCPR 3	.19	.14	1								
SCPR 4	.50**	.61**	.24*	1							
SCST 1	.37**	.41**	.31**	.46**	1						
SCST 2	.25*	.29*	.18	.40**	.65**	1					
SCST 3	.36**	.45**	.23*	.52**	.57**	.46**	1				
SCST 4	.08	.23*	.37**	.43**	.64**	.54**	.45**	1			
SCSC 1	.22	.32**	.25*	.48**	.32**	.29*	.28*	.29**	1		
SCSC 2	.29**	.46**	.22	.46**	.50**	.31**	.70**	.49**	.34**	1	
SCSC 3	.49**	.54**	.36**	.45**	.56**	.48**	.60**	.34**	.47**	.45**	1

Note: Rounded to 2 decimal places.
**. Correlation is statistically detectable at the 0.01 level (2- tailed).
*. Correlation is statistically detectable at the 0.05 level (2-tailed).

Moving on to the EFA analysis. Using the same rule of eigenvalue greater than 1, 2 components were extracted from the School Climate Scale and displayed in Table 13. The structure matrix is presented in Table 14 showing how the 11 items on the School Climate Scale correlated with these 2 extracted components. Note, correlations higher or equal to 0.60 were underlined.

Table 13 Eigenvalues of the School Climate Scale

	Initial Eigenvalues		Eigenvalues with Direct Oblimin Rotation
	Total	**% of variance**	**Total**
Component 1	5.09	46.31	4.27
Component 2	1.33	12.09	3.39

Note: Rounded to 2 decimal places.

Table 14 Structure Correlation Matrix of the School Climate Scale with Direct Oblimin Rotation

	Component	
	1	2
My schoolmates and I know each other well.	.27	-.84
I consider my schoolmates my friends.	.43	-.87
I am satisfied with how often I get to hang out and talk with my schoolmates while we are at school.	.31	-.12
My schoolmates support and care about me.	.57	-.71
My teachers understand my problems.	.85	-.40
My teachers are available when I need to talk to them.	.77	-.26
It is easy to talk with teachers at my school.	.78	-.55
My teachers care about me.	.81	-.10
I enjoy coming to school.	.37	-.42
I have good relationships with teachers and other adults at my school.	.72	-.50
I feel like I belong at my school.	.60	-.66

Note: Rounded to 2 decimal places.

In summary, the EFA extracted 2 components with an eigenvalue higher than 1.

4.4. Results of the COVID-19 at School Scale

4.4.1. Descriptive Statistics of the COVID-19 at School Scale

To address the first research question, I created a simple bar chart for each of the statements on the COVID-19 at school scale depicting students' subjective evaluation of the impact of the COVID-19 pandemic on their schooling experience. The percentages on these figures were rounded up to the nearest whole percent.

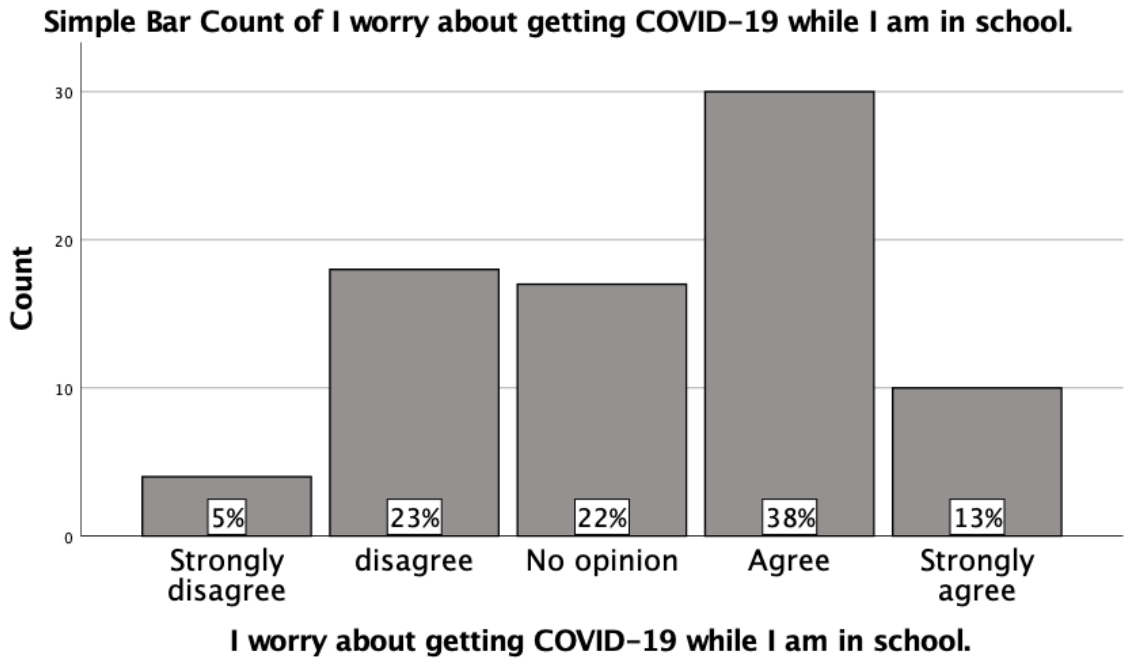

Figure 1 **Simple Bar Count of I worry about getting COVID-19 while I am in school**

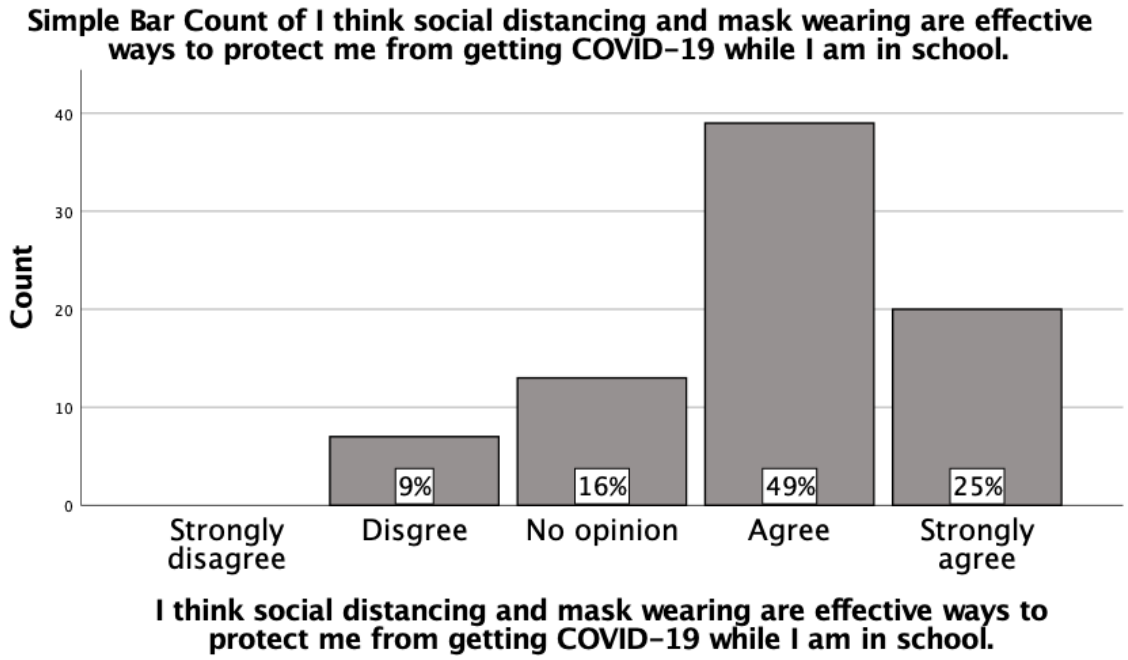

Figure 2 **Sample Bar Count of I think social distancing and mask wearing are effective ways to protect me from getting COVID-19 while I am in school**

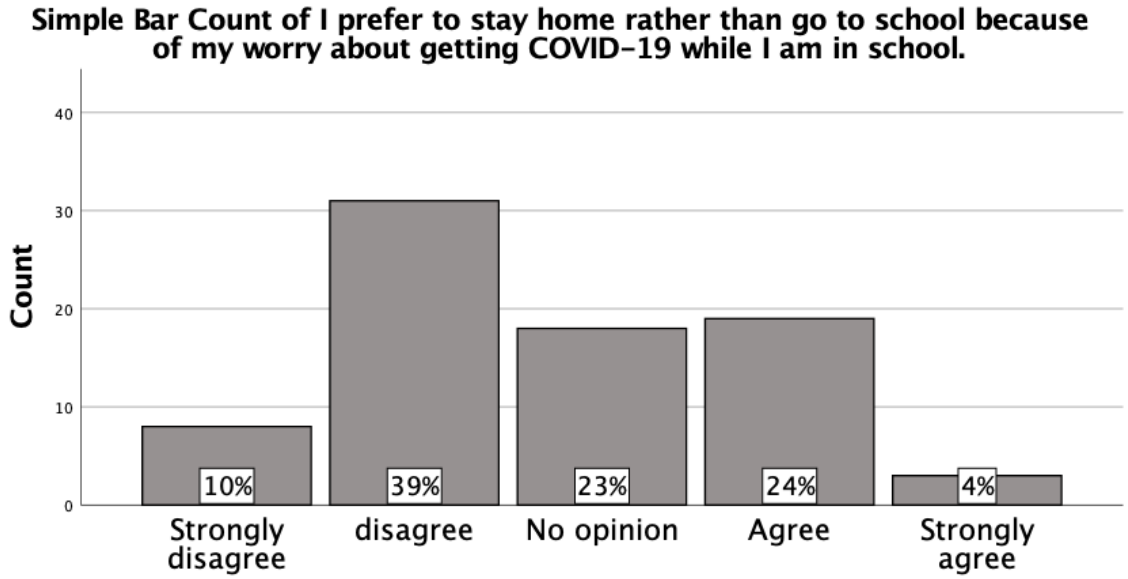

Figure 3 **Sample Bar Count of I prefer to stay home rather than go to school because of my worry about getting COVID-19 while I am in school**

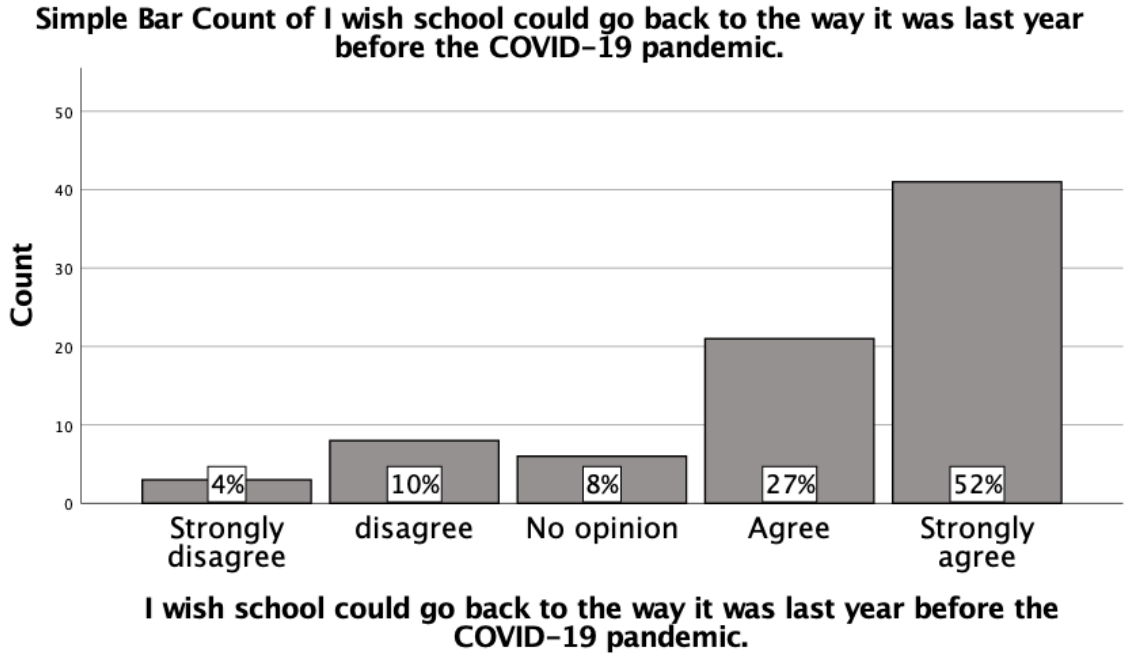

Figure 4 **Simple Bar Count of I wish school could go back to the way it was last year before the COVID-19 pandemic**

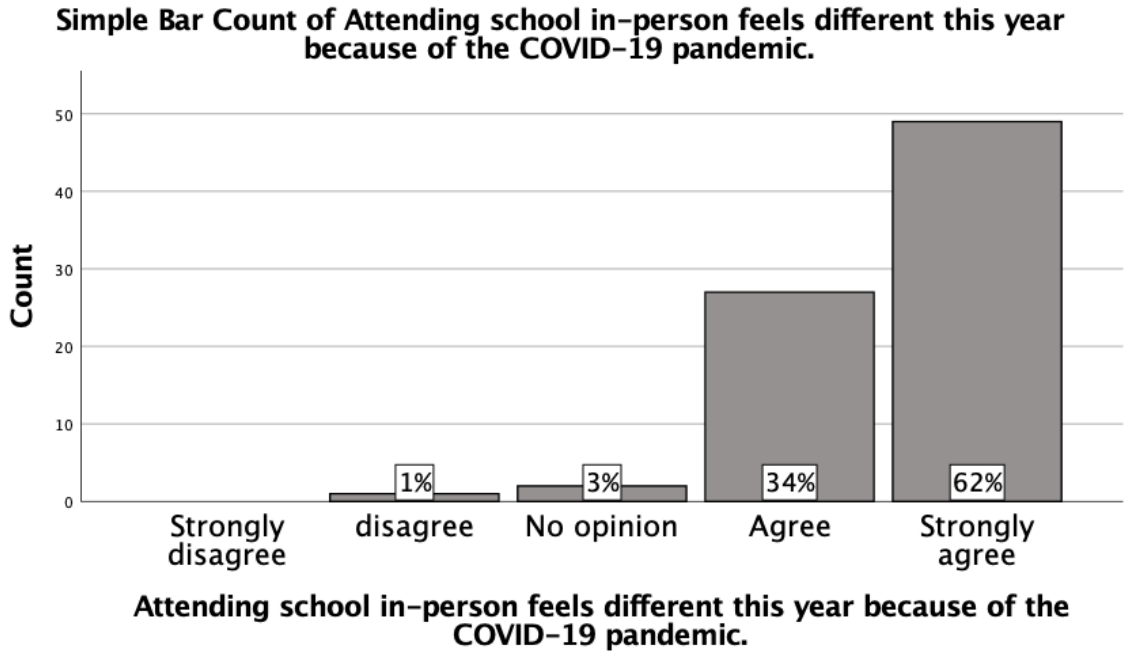

Figure 5 **Simple Bar Count of Attending school in-person feels different this year because of the COVID-19 pandemic.**

To summarize these results: (1) About 50% of participants said they worry about getting COVID-19 while they are in school. (2) About 75% of participants perceived social distancing and mask wearing as effective preventative measure against COVID-19. (3) About 49% of participants reported their worry of getting COVID-19 didn't make them want to stay at home more than attending school in-person. (4) Around 79% of participants said they would like school to go back to the way it was before the COVID-19 pandemic. And (5) around 96% of participants stated attending school in-person felt different this year because of the COVID-19 pandemic.

4.4.2. Between-group Differences of the COVID-19 at School Scale

In comparing between-group differences, I decided to only compare between-group differences based on participants' gender (males, females), grade level, and learning mode. Categories such as participants' birth year and days of attending school in-person per week have an extremely uneven number of participants in each group, which makes the results of these statistical tests inaccurate and potentially misleading. All the values reported for between-group differences were rounded to the two decimal places unless doing so would create an ambiguity in comparing these values.

I selected the independent-samples *t*-test (2-tailed) to statistically detect between-group differences based on participants' gender and learning mode. In addition, Levene's test for equality of variances was conducted to determine if the between-group difference in variance was statically detectable. If a between-group difference in variances was statically detectable, I then report the *t* and *p* values assuming variances are not equal. These values are underlined in tables. If not specifically stated, all *t* and *p* values reported in this analysis and related tables assumed variances between-group are not different.

To examine between-group differences based on participants' grade level, I used the one-way ANOVA test, which can compare the between-group differences when there are more than two groups. Since there was only one participant who was in a mix-grade 11 and 12 classroom, I included this participant in the grade 12 group. This decision was made based on there being more participants in grade 11 than in grade 12.

I selected the alpha level of 0.05 for these tests (independent-samples *t*-test, Levene's test for equality of variances, and one-way ANOVA test). In simple terms, a *p*-value is the probability of observing a difference if the two groups are indeed indistinguishable on a given measure. In this case, I am comparing the means between groups of participants identified by self-reported gender, learning mode, and grade level.

First, no statistically detectable difference on any of the 5 items on the COVID-19 at school scale was found based on participants' gender although there were many more female participants (n = 51) than male participants (n = 20). The result of this analysis is listed in Table 15.

Table 15 Independent-Samples t-test on Gender Difference: COVID-19 at School Scale

Item	Gender	M	SD	*t*	*p*
I worry about getting COVID-19 while I am in school.	M	0.00	1.21	-1.12	.27
	F	0.33	1.09		
I think social distancing and mask wearing are effective ways toto protect me from getting COVID-19 while I am in school.	M	-1.00	0.97	-0.52	.61
	F	-.89	0.82		
I prefer to stay home rather than go to school because of my worry about getting COVID-19 while I am in school.	M	-.56	1.10	-0.99	.33
	F	-27	1.04		
I wish school could go back to the way it was last year before the COVID-19 pandemic.	M	1.10	0.97	0.01	1.00
	F	1.10	1.27		
Attending school in-person feels different this year because of the COVID-19 pandemic.	M	1.45	0.83	-1.00	.33
	F	1.65	0.48		

Second, there was a statistically detectable difference between the group who attended school full-time in-person (n = 36, M = 1.42, SD = 1.16) compared to the group who attended school in a mix of in-person learning and remote learning (n = 43, M = 0.88, SD = 1.12) on one item: I wish school could go back to the way it was last year before the COVID-19 pandemic; (t_{77} = 2.08, p = .04). In interpreting this finding, one should keep in mind the increased likelihood of committing the type-1 error when conducting the independent-samples *t*-test with two groups with an uneven number of participants. The result of this analysis is listed in Table 16.

Table 16 Independent-Samples t-test on Learning modes: COVID-19 at School Scale

Item	Learning Mode	M	SD	*t*	*p*
I worry about getting COVID-19 while I am in school.	Full-time	0.44	1.11	1.03	.31
	Part-time	0.19	1.12		
I think social distancing and mask wearing are effective ways toto protect me from getting COVID-19 while I am in school.	Full-time	-.0.75	0.97	1.50	.14
	Part time	-1.05	0.79		
I prefer to stay home rather than go to school because of my worry about getting COVID-19 while I am in school.	Full-time	-0.14	1.02	1.07	.29
	Part-time	-0.40	1.09		
I wish school could go back to the way it was last year before the COVID-19 pandemic.	Full-time	1.42	1.16	2.08	.04*
	Part-time	0.88	1.12		
Attending school in-person feels different this year because of the COVID-19 pandemic.	Full-time	1.64	0.54	0.92	.36
	Part-time	1.51	0.67		

* Statistically detectable difference at alpha = 0.05

Last, no statistically detectable difference was found using the one-way ANOVA test across participants from different grade levels. The result of this analysis is listed in Table 17.

Table 17 One-way ANOVA Test on Grade levels: COVID-19 at School Scale

Item	Sum of Squares	df	Mean Square	*F*	*p*
I worry about getting COVID-19 while I am in School.	2.80	4	0.70	0.55	.70
I think social distancing are effective ways to protect me from getting COVID-19 while I am in school.	1.72	4	0.43	0.54	.71
I prefer to stay home rather than go to school because of my worry about getting COVID-19 while I am in school.	6.62	4	1.65	1.51	.21
I wish school could go back to the way it was last year before the COVID-19 pandemic.	9.47	4	2.37	1.84	.13
Attending school in-person feels different this year because of the COVID-19 pandemic.	1.37	4	0.34	0.91	.47

4.5. Results of the School Climate Scale

The School Climate Scale measured participants' perceptions of peer relationships, student-teacher relationships, and school connectedness. The mean response on all 11 items is reported in Table 18. As a reminder, the school climate scale ranges from -2 (strongly disagree) to +2 (strongly agree). A higher mean value indicates more positive perceptions on a given statement. Items in Table 9 are ordered from the lowest to the highest means.

Table 18 The Mean of Participants' Responses on the School Climate Scale

	Mean	Standard Deviation
I am satisfied with how often I get to hang out and talk with my schoolmates while we are at school.	-.11	1.34
My teachers understand my problems.	-.04	1.18
I enjoy coming to school.	0.27	1.11
It is easy to talk with teachers at my school.	0.44	1.02
I feel like I belong at my school.	0.47	1.08
My schoolmates and I know each other well.	0.56	1.14
My teachers care about me.	0.61	0.88
My teachers are available when I need to talk to them.	0.68	0.95
My schoolmates support and care about me.	0.68	0.91
I have good relationships with teachers and other adults at my school.	0.81	0.89
I consider my schoolmates my friends.	0.81	1.00

4.5.1. Between-group Differences of the School Climate Scale

In comparing the mean of these 11 items based on between-group differences, an alpha level of 0.05 was selected.

First, in analysing the between-group difference based on gender, a statistically detectable difference was found on one item: I have good relationships with teachers and other adults at my school; (t_{69} = -2.43, p = .02), between males (n = 20, M = 0.60, SD = 0.75) and females (n = 51, M = 1.08, SD = 0.74). The results of this analysis are listed in Table 19.

Table 19 Independent-Samples t-test on Gender Difference: School Climate Scale

Item	Gender	M	SD	t	p
My schoolmates and I know each other well.	M	0.45	1.23	-0.89	.38
	F	0.71	1.03		
I consider my schoolmates my friends.	M	1.00	0.92	0.58	.57
	F	0.86	0.89		
I am satisfied with how often I get to hang out and talk with my schoolmates while we are at school.	M	-0.30	1.34	-0.89	.38
	F	0.02	1.38		
My schoolmates support and care about me.	M	0.80	0.83	-0.02	.99
	F	0.80	0.80		
My teachers understand my problems.	M	0.10	0.91	0.15	.88
	F	0.06	1.24		
My teachers are available when I need to talk to them.	M	0.90	0.79	0.94	.35
	F	0.67	0.99		
It is easy to talk with teachers at my school.	M	0.50	0.95	-0.27	.79
	F	0.57	0.98		
My teachers care about me.	M	0.80	0.62	0.99	.33
	F	0.61	0.98		
I enjoy coming to school.	M	0.40	1.10	0.30	.77
	F	0.31	1.10		
I have good relationships with teachers and other adults at my school.	M	0.60	0.75	-2.43	.02*
	F	1.08	0.74		
I feel like I belong at my school.	M	0.80	0.77	1.35	.18
	F	0.49	1.08		

*Statistically detectable difference at alpha = 0.05

Second, no statistically detectable difference was found between groups who attended school full-time in-person (*n* = 36), and who attended school in a mix of in-person learning and remote learning (*n* = 43). The results of this analysis are listed in Table 20.

Table 20 Independent-Samples t-test on Learning modes: School Climate Scale

Item	Learning Mode	M	SD	t	p
My schoolmates and I know each other well.	Full-time	0.67	1.17	0.78	.44
	Part-time	0.47	1.12		
I consider my schoolmates my friends.	Full-time	0.86	1.07	0.41	.68
	Part-time	0.77	0.95		
I am satisfied with how often I get to hang out and talk with my schoolmates while we are at school.	Full-time	0.08	1.38	1.20	.23
	Part-time	-0.28	1.30		
My schoolmates support and care about me.	Full-time	0.61	1.05	-0.64	.52
	Part-time	0.74	0.79		
My teachers understand my problems.	Full-time	-0.14	1.31	-0.68	.50
	Part-time	0.05	1.07		
My teachers are available when I need to talk to them.	Full-time	0.56	1.00	-1.09	.28
	Part-time	0.79	0.91		
It is easy to talk with teachers at my school.	Full-time	0.39	1.10	-0.43	.67
	Part-time	0.49	0.96		
My teachers care about me.	Full-time	0.61	0.84	0.03	.97
	Part-time	0.60	0.93		
I enjoy coming to school.	Full-time	0.11	1.19	-1.14	.26
	Part-time	0.40	1.03		
I have good relationships with teachers and other adults at my school.	Full-time	0.92	1.00	0.97	.34
	Part-time	0.72	0.80		
I feel like I belong at my school.	Full-time	0.31	1.28	-1.19	.24
	Part-time	0.60	0.88		

Last, no statistically detectable difference was found between groups from different grade levels. The results of this analysis are listed in Table 21.

Table 21 One-Way ANOVA Test on Grade Levels: School Climate Scale

Item	Sum of Squares	*df*	Mean Square	*F*	*p*
My schoolmates and I know each other well.	3.24	4	0.81	0.61	.66
I consider my schoolmates my friends.	1.75	4	0.44	0.42	.79
I am satisfied with how often I get to hang out and talk with my schoolmates while we are at school.	8.36	4	2.09	1.18	.33
My schoolmates support and care about me.	1.38	4	0.35	0.40	0.81
My teachers understand my problems.	0.97	4	0.24	0.17	0.96
My teachers are available when I need to talk to them.	3.97	4	0.99	1.10	0.37
It is easy to talk with teachers at my school.	6.10	4	1.53	1.50	0.21
My teachers care about me.	0.24	4	0.06	0.07	0.99
I enjoy coming to school.	4.51	4	1.13	0.92	0.46
I have good relationships with teachers and other adults at my school.	6.25	4	1.56	2.07	0.09
I feel like I belong at my school.	4.15	4	1.04	0.88	0.48

4.5.2. Correlation between the COVID-19 at School Scale and the School Climate Scale

In addressing the third research question about the association between participants' perceptions of the impact of the COVID-19 at school and their perceptions of school climate, I used the Pearson correlation coefficient and computed a bivariate correlation test. In quantifying the variable of perceptions of the impact of COVID-19 at school and the variable of perceptions of school climate, First, I calculated Cronbach's alpha for the COVID-19 at School Scale and the School Climate Scale to check for their internal consistency: respectively, the COVID-19 at School Scale had an α = .447 and the School Climate Scale had an α = .872. On a related note, I would like to explain why using the composite score of the COVID-19 at School Scale was justified, despite of the

low Cronbach's alpha. First, the low Cronbach's alpha could be partly explained by the low number of items on this scale. In short, a scale with low items tends to produce a low Cronbach's alpha from a mathematical standpoint. Perhaps a more important reason of why it is okay to combine item scores together has more to do with how I intend to interpret the composite score. The composite score is not a representation of a specific COVID-19 related issue (a specific domain) at school. The composite score is merely a value of how much impact the COVID-19 pandemic had on participants' perceptions of school life (in various domains). Therefore, it's suitable to use to composite score as long as one does not make any inference or interpretation on the homogeneity of items on this scale.

I then calculated the sum of the 5 items (variable named as SUMCOVID) on the COVID-19 at school scale and the sum of all 11 items (variable named as SUMSC) on the school climate scale to represent correspondingly the individual participant's perception of the impact of COVID-19 at school, and their perception of school climate. A higher score of SUMCOVID represented a higher perceived impact of the COVID-19 at school. On the other hand, a higher score of SUMSC represented a more positive perception of school climate. Finally, individual scores on the SUMCOVID and SUMSC were entered into the Pearson Correlation test in SPSS.

The Pearson correlation between SUMCOVID and SUMSC was statistically detectable r_{77} = -.29, p = .01 (2-tailed), indicating that an increase in one variable tends to coincide with a decrease in the other variable. This correlation does not indicate a causal relationship between the two variables.

This correlation could be interpreted in any of the following four ways:

1. participants who report a higher impact of COVID-19 at school tend to report more negative perceptions of school climate
2. participants who report a lower impact of COVID-19 at school tend to report more positive perceptions of school climate
3. participants who report more negative perceptions of school climate tend to report a higher impact of COVID-19 at school
4. participants who report more positive perceptions of school climate tend to report a lower impact of COVID-19 at school

Figure 6 displays a scatterplot of individual values of SUMCOVID and SUMSC

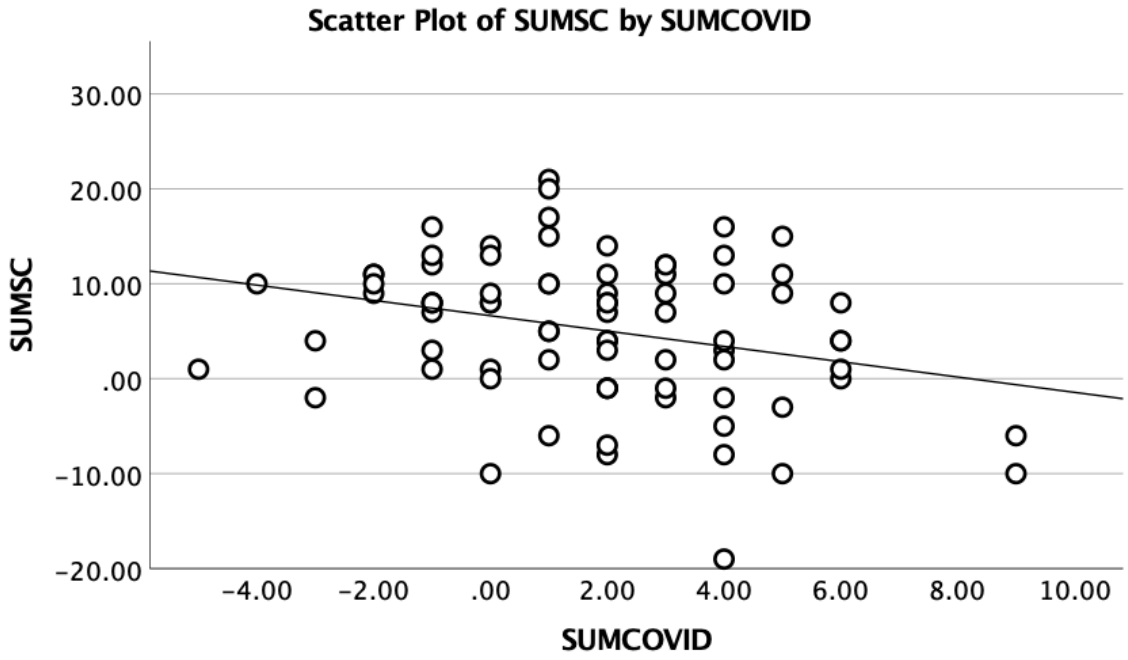

Figure 6 Scatter Plot of SUMSC by SUMCOVID

4.6. Results of the Thought Experiment

The thought experiment provided an opportunity to study how the progression of the COVID-19 pandemic might affect participants' perceptions of peer relationships, student-teacher relationships, and school connectedness (the fourth research question). Using the A/B test function in Survey Monkey, participants were randomly assigned to be presented with either the improved scenario description or the worsened scenario description. Then, participants were asked to fill out the school climate survey again, except this time, they were asked to choose either less, no change, or more considering the respective COVID-19 scenario.

Table 22 describes the percentage of less, no change, and more to each statement, organized into responses from the improved scenario group and the worsened scenario group. The mode is the most frequently response on an item. For clarification purposes, when there were two most frequent responses on an item, both were presented in the mode. Below, I highlight a few patterns of response.

First, items with the mode of no change in both groups overlapped considerably, 6 out of the 11 items shared no change as their mode. Second, among the 6 overlapped items, 4 of these items belonged to the student-teacher relationship domain. Last, 3 items out of 4 from the peer relationship domain had an opposite pattern, "more" was the mode in the improved group, and "less" was the mode in the worsened group.

Table 22 Results of Thought Experiment

	Improved Scenario (*N* = 37)				Worsened Scenario (*N* = 42)			
	Less	**No change**	**More**	**Mode**	**Less**	**No change**	**More**	**Mode**
My schoolmates and I know each other _____ well.	11%	32%	57%	More	52%	26%	21%	Less
I consider my schoolmates my friends _____.	14%	38%	49%	More	41%	41%	19%	No change & Less
I am _____ satisfied with how often I get to hang out and talk with my schoolmates while we are at school.	19%	22%	60%	More	69%	24%	7%	Less
My schoolmates support and care about me _____.	11%	62%	27%	No change	21%	64%	14%	No change
My teachers understand my problems _____.	22%	68%	11%	No change	21%	64%	14%	No change
My teachers are _____ available when I need to talk to them.	16%	43%	41%	No change	33%	55%	12%	No change
It is _____ easy to talk with teachers at my school.	19%	41%	41%	No change & More	36%	55%	10%	No change
My teachers care _____ about me.	16%	78%	5%	No change	14%	69%	17%	No change
I enjoy coming to school _____.	27%	38%	35%	No change	62%	29%	10%	Less
I have _____ good relationships with teachers and other adults at my school	11%	65%	24%	No change	45%	38%	17%	Less
I feel like I belong at my school _____.	14%	62%	24%	No change	31%	62%	7%	No change

In analysing the results from the thought experiment, I assigned the numeric values of -1, 0, and 1 to the responses of less, no change, and more, respectively. I then combined participants' scores of all 11 items and created an individual sum score of thought experiment, a variable named SUMTE during the data analysis in SPSS. A higher SUMTE score represented an overall positive change (becoming more) in perceptions of school climate, and a lower SUMTE score represented an overall negative change (becoming less) in perceptions of school climate. Figure 7 depicts individual scores organized by the groups, improved and worsened, in the thought experiment.

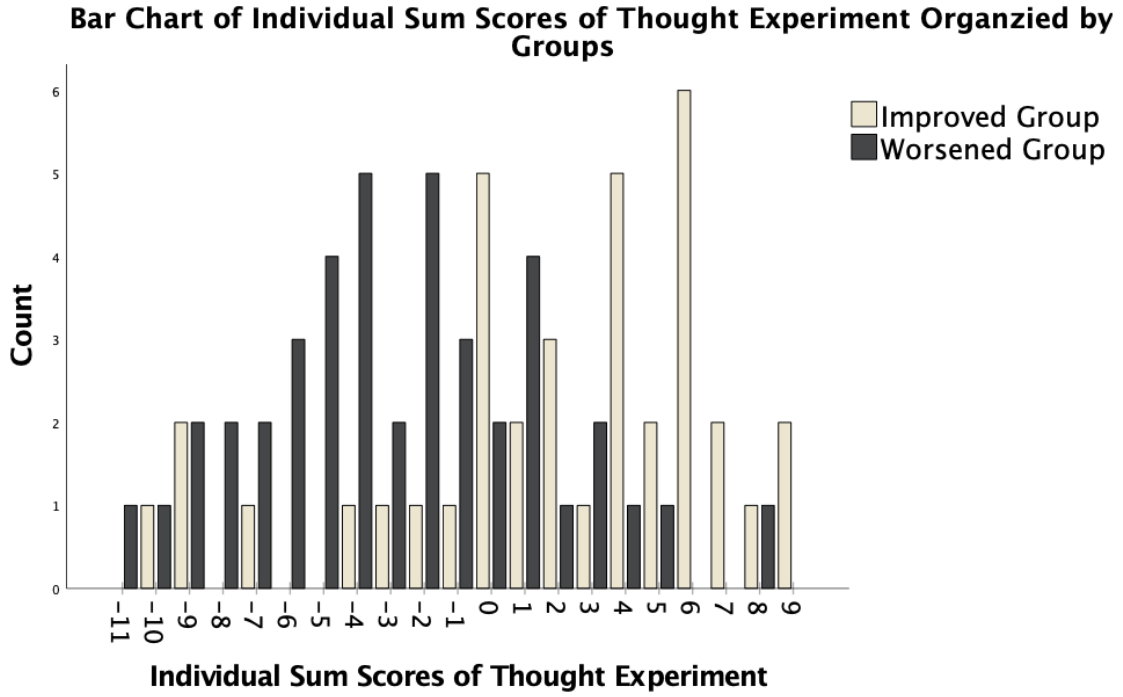

Figure 7 **Bar Chart of Sum Scores of Thought Experiment Organiized by Groups**

Note: there were 37 participants in the improved group, and 42 participants in the worsened group.

From a visual perspective, the distribution of scores in these two groups had an overlapping and bimodal pattern. The distribution of scores from participants of the worsened group leaned more toward the left side (more negative, negative skew), while the improved group leaned more toward the right side (more positive, positive skew). Therefore, I conducted an independent-samples *t*-test (2-tailed) comparing the means of individual sum scores (SUMTC) between these two groups. The mean of SUMTC was

1.95 for the improved group and -2.79 for the worsened group. This mean difference was statistically detectable ($t_{77} = 4.55$, $p < .001$).

4.7. Summary of Results

Key findings are summarized here. In the next chapter, I elaborate and discuss the significance of these findings.

1. About half of the participants worried about getting COVID-19 in school, while the other half had no opinion or did not worry.

2. Almost all participants felt attending school was different this year, and preferred that school go back to the way it was before the COVID-19 pandemic

3. A statistically detectable difference between participants who attended school full-time in-person and participants who attended school in a mix of in-person learning and remote learning was found on one item: I wish school could go back to the way it was last year before the COVID-19 pandemic. Participants who attended school full-time in-person expressed stronger agreement on this item.

4. Overall, participants' perceptions of peer relationships, student-teacher relationships, and school connectedness were on the positive side.

5. A statistically detectable difference was found between males and females on one item: I have good relationships with teachers and other adults at my school. Female participants reported a more positive perception on this statement than male participants.

6. There was a small but statistically detectable correlation ($r_{77} = -.29$, $p = .01$) between participants'' perceptions of the impact of COVID-19 at school and their perceptions of school climate

7. Based on the results of the thought experiment, while participants in the improved scenario tended to report improved perceptions of school climate and participants in the worsened scenario tended to report worsen perceptions of school climate, the impact of the COVID-progression on participants' perceptions of school climate differed across items on the School Climate Scale. Not all items on the School Climate Scale were impacted by the progression of the COVID-19.

8. Inter-item correlations were low on the COVID-19 at School Scale and high on the School Climate Scale.

9. Based on the results of EFA, 3 components were extracted from the COVID-19 at School Scale and 2 from the School Climate Scale.

Chapter 5. Discussion

This study focused on students' schooling experience and their perceptions of school climate during the COVID-19 pandemic. The 5 items on the COVID-19 at School Scale investigated student opinions on COVID-19 related changes in school and concerned COVID-19 related COVID-19 safety issues in school. Because of reduced social interaction in school, this study also measured students' perceptions of peer relationships, student-teacher relationships, and school connectedness (the community domain of school climate).

To provide some evidence on the potential effects of the COVID-19 pandemic on perceptions of school climate, a thought experiment was included in the study to explore how students' perceptions of school climate might change depending on how the COVID-19 pandemic progresses.

5.1. The Impact of COVID-19 at School

One concern related to the COVID-19 pandemic and in-person learning was safety. Specifically, were students worried about getting COVID-19 while they were in school? The simple answer to this question would be "yes." The majority (51%) of students either agreed or strongly agreed to feeling worried about getting COVID-19 in school. In contrast, only around 28% of students reported they would prefer to stay home rather than go to school because of worry about getting COVID-19 in school. There was a statistically detectable positive correlation (r = .56) between students' worries about getting COVID-19 in school and wanting to stay home. Students who worried about getting COVID-19 while they were in school were also more likely to prefer to stay home instead of going to school.

In interpreting or making generalization of this desire to attend school in-person despite worrying about getting COVID-19 in school, one should consider that students in remote learning were not part of the study. Since students in B.C. did have the option of opting for remote learning, it may be that students who had a strong preference to continue their education at home rather than go to school in person had already done so. Therefore, the student preference to go to school instead of staying home during the pandemic might not be representative of the B.C. student population. The decision to

exclude students in remote learning was justified by the focus of present study on student “in-schooling” experience during the COVID-19 pandemic.

The COVID-19 at School Scale also revealed that almost all students in this study thought attending school in-person was different this year and they would like things to return to the way it was before the COVID-19 pandemic. These unsurprising results provide evidence that the COVID-19 pandemic did cause unwanted changes to students’ school lives. This finding on students’ in-person schooling experience during the COVID-19 pandemic is reflective largely on students in the Province of BC. Secondary school students from other provinces or school districts with different safety measures could have different opinions or experience with what in-person schooling felt like during the COVID-19 pandemic.

In analyzing between-group difference in the COVID-19 at School Scale, a statistically detectable difference between participants who attended school full-time in-person and participants who attended school in a mix of in-person learning and remote learning was found on one item: I wish school could go back to the way it was last year before the COVID-19 pandemic. Logically, a stronger opinion about wanting school to go back to the way it was in students who attended school full-time in-person makes sense. Students who attended school full-time in-person, compared to students who attended school in-person part-time, had an increased exposure to the new COVID-19 related changes and safety measure in the school. As a result, such increased exposure might lead to a stronger preference in wanting school to go back to the way it was.

5.2. Students’ Perceptions of School Climate during the COVID-19 Pandemic

Based on the results of the School Climate Scale, students’ mean response on these items landed somewhere between no opinion to agree. In past studies, such as the School Connectedness Subscale in the CAYCI School Experience Survey and student-teacher relationships from EDSCLS, similar results were observed (Anderson-Butcher, Amorose, et al., 2016b; National Center for Education Statistics, 2015). For example, the mean of the school connectedness items in the CAYCI was between no opinion to agree.

Since the School Climate Scale was not a complete replica of past surveys, and no pre-pandemic results were collected, it would not be appropriate to infer any conclusion related to changes in students' perceptions of school climate because of the COVID-19 pandemic solely based on the School Climate Scale. In a recent article published 1 month before writing this thesis, Duckworth et al. (2021) conducted a longitudinal survey comparing high school students' social, emotional, and academic well-being between students who attended school remotely and in person, before and during the COVID-19 pandemic. The results of their study indicated that students who attended school remotely had more negative social, emotional, and academic well-being compared to students who attended school in-person. As I will discuss in the section on limitations and future studies, longitudinal studies like that of Duckworth et al. (2021) are necessary for evaluating changes in student perceptions of schooling experience and school climate before, during, and after the COVID-19 pandemic.

Among this scale, I would like to discuss in-depth the two items on the School Climate Scale with a negative mean score (I am satisfied with how often I get to hang out and talk with my schoolmates while we are at school, and my teachers understand my problems). Reduced social interaction is perhaps the most prominent COVID-19 related change in school for students. Students were expected to stay within their own learning bubbles, and often discouraged from engaging in close interaction with their peers. The stage-environment fit model demonstrates the discrepancy between students' needs for social interaction and how much peer interaction they are receiving in school as a source of students' dissatisfaction with their schooling experience. While such social distancing procedures are important in controlling the spread of COVID-19, the negative impact on students' social relationship with peers/friends should also be addressed. I discuss some potential creative strategies to provide safe in-school peer interaction in later paragraphs.

The other item with a negative mean score was students' perceptions of how much their teachers understand their problems. Prescribed by the bio-ecological theory, the impact of the COVID-19 pandemic often affects multiple domains of students' lives. The COVID-19 pandemic affects students' personal, social, emotional, physical, familial, and school domains. Therefore, students' feeling or thoughts of not being understood by teachers could be a reflection of the wide variety of changes or problems students were facing during the COVID-19 pandemic. As teachers only make up a portion of students'

life, it's understandable that some students problems might require beyond the help of teachers. I discuss some of the implications of this finding and the collective effort required to provide a better school experience during and after the COVID-19 pandemic.

Regarding the statistically detectable difference suggesting males have less quality relationships with teachers and adults than females (I have good relationships with teachers and other adults at my school), the validity of this finding should be examined closely. Since there were many more females than males in the present study, there is less precision in inferring males' views. Although previous studies did find some gender differences in measuring perceptions of school climate such as school belongingness and teacher support (typically females expressed better perceptions than males), these between-group differences were relatively small and often were moderated by other variables such as age and grade level (Way et al., 2007; Zhai et al., 2020). For instance, a longitudinal study conducted by Way and her colleagues (2008), found that socio-economic class differences also affected student perception of school climate and behavioural adjustment.

5.3. Did Participants' Perceptions of the Impact of the COVID-19 at School Predict Their Perceptions of School Climate?

As a reminder, perceptions of the impact of the COVID-19 were defined as the sum scores of all 5 items in the COVID-19 at School Scale (SUMCOVID), while perceptions of school climate were defined as the sum scores of all 11 items on the School Climate Scale (SUMSC). As stated previously, a small but statistically detectable correlation was found, $r = -.29$. The problem in interpreting this correlation is that one does not know whether there was a causal relationship between the two variables, and the direction of this causal relationship (see the four ways of interpreting this correlation between SUMCOVID and SUMSC in section 4.5). While it's nearly impossible to conduct a true experiment between the impact of the COVID-19 on schooling experience and student perceptions of school climate, the thought experiment in this study provided an alternative approach to address the causal and directional issues in correlational studies.

In the thought experiment, participants were asked to think about how the progression of the COVID-19 pandemic, either improved or worsened, would affect their

perceptions of school climate. Assuming participants were, in fact, thinking in this logical sequence, then both the causal and directional issues identified above were solved (at least in their thinking process). There was some support for the causal relationship between SUMCOVID and SUMSC, particularly when it came to students' perceptions of peer relationships. First, the progression of COVID-19 had an impact in both groups on 3 out of 4 school climate items related to their peers/schoolmates. Second, the progression of the COVID-19 did not impact perceptions of student-teacher relationships in both groups. Last, the worsened progression of the COVID-19 pandemic led to more negative perceptions of school connectedness although the improved progression of the COIVD-19 pandemic did not lead to more positive perceptions of school connectedness. Here, I break down each of these findings on how they support or not do support the causal relationship from the impact of the COVID-19 at school to perceptions of school climate.

In both the improved and worsened groups, the majority of participants' perceptions of peer relationships did either improve or worsen corresponding to their assigned group. Considering the increased importance of peer relationships as opposed to student-teacher relationship in adolescents as suggested by attachment theory, it makes sense COVID-19 related changes had a greater impact on peer relationships than student-teacher relationships.

Unlike students' perceptions of peer relationships, students in both improved and worsened groups did not change their perceptions of student-teacher relationships depending on the COVID-19 progression. Unlike in elementary schools where teachers may be more "hands-on" and closer to students, secondary school teachers often may be a bit more distant in interacting with students in general. Perhaps, the extra distance put into place because of the COVID-19 pandemic wasn't a great disturbance in how secondary school students and teachers usually interact.

In sum, COVID-19 related changes in school appeared to have a stronger impact on students' projected perceptions of peer relationships than their perceptions of student-teacher relationships or school connectedness. Therefore, the causal relationship from the COVID-19 related changes in school has more support when talking about perceptions of peer relationships.

5.4. Discussion on the Validity and Reliability of COVID-19 at School Scale and the School Climate Scale

In evaluating the validity and reliability of these two scales, between-item correlation, Cronbach's Alpha and EFA were conducted.

5.4.1. Validity and Reliability of the COVID-19 at School Scale

The COVID-19 at School Scale addressed a variety of issues related to COVID-19 such as student opinion on the effectiveness of social distancing and mask wearing, and the level of perceived changes in school because of COVID-19. The low interitem correlations and low Cronbach's Alpha (α = .447) were expected and demonstrated that items on this scale might measure different domains of behaviour.

5.4.2. Validity and Reliability of the School Climate Scale

As the School Climate Scale used in this present survey was meant to measure the community domain of school climate (peer relationships, student-teacher relationships, and school connectedness), relatively high interitem correlations and a high Cronbach's Alpha (α = .872) were expected due to the commonality of the community domain as the underlying theoretical framework of the 11 items. This finding was good news given items in the School Climate Scale were a mix of new items and items from past surveys. Among the 11 items, one item, I am satisfied with how often I get to hang out and talk with my schoolmates while we are at school, had consistently low correlations with other items on this scale. Perhaps, this item had more to do with students' satisfaction with the kind of peer interaction limited by the COVID-19 safety measures rather than their overall perceptions of their peer relationships. In other words, their dissatisfaction with the amount of time they get to interact with their schoolmates impacted by the COVID-19 in-school safety measures might not be a factor that they considered in evaluating the overall quality of their peer relationships.

5.4.3. EFA of the COVID-19 at School Scale

In discussing the results of the EFA on the COVID-19 at School Scale I address each of the components and what they could potentially represent based on items correlated highly with a component.

Components 1 and 3 were relatively easy to interpret. Component 1 likely represented students' perceptions of COVID-19 safety in school, as correlated items included, worry of getting COVID-19 in school, and choosing to stay at home because of worry of getting COVID-19 in school. Component 3, on the other hand, might have more to do with students' subjective evaluation of the impact/disturbance of COVID-19 on their school lives. Items related to component 3 included "attending school in-person this year feel different" and "wishing school could go back to the way it was". Component 2 was, however, a bit harder to interpret. Items: "I think social distancing and mask wearing are effective" and "I wish school could go back to the way it was" highly correlated with component 2. This is a good example that statistical results do not always translate to a theoretical or practical explanation. It's very possible that component 2 was extracted simply due to chance. One should not forcefully seek meaning or interpretation of an underlying variable (component 2) solely because the statistical software detected it.

5.4.4. EFA of the School Climate Scale

There were two components extracted from the School Climate Scale. Unlike on the COVID-19 at School Scale where certain items had high correlations with certain components, many items on the COVID-19 at School Scale were moderately correlated to both components. Specifically, these 11 items were positively correlated with component 1, and negatively correlated with component 2.

Looking closely at component 1, it tends to corelate with items on students' perceptions of teachers. Component 2 on the other hand, tends to correlate more with items on students' perceptions of their peers. The three items on school connectedness seem to be evenly correlated with both components. This finding supports the proposed constructs of students' perceptions of teacher relationships, and peer-relationships as two main domains in the School Climate Scale. In terms of students' perceptions of school connectedness, such perceptions might be depended on both the teacher

relationships domain and the peer-relationships domain. As discussed in Chapter 2, this overlapping in school climate constructs is often the norm rather than the exception. Given the importance of students' interaction with their peers and teachers in their schooling experience, it's safe to assume students' perceptions of school connectedness (relationship with their school) are often depended/related to their perceptions of teacher relationships, and peer relationships.

One way to improve or refine school connectedness item is to relate such items to the teacher relationship and/or peer relationship domain. For example, I can revise item "I enjoy coming to school" to either "I enjoy coming to school because of my peers/friends" or "I enjoy coming to school because of my teachers". These changes make it easier to infer the reason students enjoy coming to school. This also make it easier to develop strategies or activities to improve students' perceptions of school connectedness (targeting their relationship with teachers or peers/friends). Future studies could consider making such changes and see if these revise items would yield a higher correlation with their respective component (perceptions of teacher relationships or peer relationships) than the present study.

5.5. Conclusions, Limitations, and Future Studies

This present survey study measured B.C. secondary school students' perceptions of the impact of the COVID-19 on schooling experience, their perceptions of school climate, and how the progression of the COVID-19 pandemic might affect their perceptions of school climate. Overall, COVID-19 caused a noticeable change in students' school life, and worry of getting COVID-19 in school was reported by many students in this study. Furthermore, many students would prefer school to go back to the way it was before the pandemic. While it's evident that this is pretty much what everyone would want, but the current pandemic and its lasting effect likely won't go away in the near future. As the popular COVID-19 phrase "we are all moving at our own pace" suggests, students are also moving at their own pace. Perhaps, the most important takeaway for professionals working in the educational sector is that students are faced with a wide range of issues, and no universal solution could address all their problems. Therefore, it's crucial to allow and encourage students to voice their opinions and concerns regarding their schooling experience during the COVID-19 pandemic. For example, according to the thought experiment of this present study, the COVID-19

pandemic seems to affect the projected quality of peer relationships more than the quality of teacher relationships.

This rapid survey during the COVID-19 pandemic provided timely feedback and opinions from students about their in-person schooling experience during this unusual year. This study was not meant to be a psychometric testing on school climate survey items nor a comparison between students' perceptions of school climate from previous studies.

Some limitations of this study included uneven representation of gender, age, and grade level. While focusing on the B.C. student population provided more concentrated and locally relevant results, this trade-off minimized the external validity of the results of this study. Another limitation relates to the cross-sectional nature of this study. The findings only represent students' perceptions at one time, therefore this study did not include any findings on how students' perceptions of school climate might change over time. Despite the thought experiment in measuring students' perceptions of school climate in a hypothetical futuristic sense, the lack of longitudinal findings in confirming the actual changes in students' perceptions of school climate also remained a problem.

Future studies should investigate how the impact of the COVID-19 pandemic may affect the commonly identified school climate domains differently (Wang & Degol, 2016). For example, the results of the thought experiment in this study provided some indication that students' perceptions of peer relationships might be more affected by COVID-19 related changes in school than their perceptions of student-teacher relationships or school connectedness. Interviewing students or asking more open-ended questions about their in-person schooling experience during the COVID-19 pandemic might provide more contextual information in identifying specific domains of school climate that were more negatively affected than others.

Let's assume that COVID-19 did indeed have a greater impact on students' peer relationships than their relationships with teachers. With this in mind, strategies and activities should then focus more on rebuilding peer relationships and providing opportunities for peer relationships to thrive as students returned to school. Having a virtual school spirit day connecting all students through video chat, setting up a time

when students can facetime with their peers in school using their own personal device, or making a message board in the classroom where students could share their thoughts with students in the next class, are ways one can bring positivity into the picture during this unusual time. While these activities may not seem much at first glance, but this extra little touch of feeling connected is perhaps all one needs in the time of COVID-19.

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Appendix A.

Informed Consent Form

Consent Form

Students Perceptions of School Climate During the COVID-19 Pandemic

Application number: 3000268

Version: 3

Date: April 1st, 2021

Student Lead:

Chi Hong (Michael) Lao

Master of Arts, Faculty of Education

Email: […]

Principal Investigator:

Dr. Phil Winne

Distinguished SFU Professor, Faculty of Education

Email: […]

Co-Investigator:

Dr. Lucy LeMare

Professor, Faculty of Education

Email: […]

Why am I doing this study?

I want to learn more about what it is like to be a student in school with the ongoing COVID-19 pandemic. This survey will help us learn more about your perceptions of school and learning in this current school year.

Your participation is voluntary:

Your participation is totally voluntary. You have the right to refuse to participate in

the research study. If you decide to participate in the research study, you may still choose to withdraw from this research study at any time by simply closing the application window. There is no incentive associated with completing this survey. You should consult with your parents or caregivers before participating in this study.

Who is eligible to participate in this study?

Please only complete this survey if you are now in grades 8-12 in BC and you attend school in-person full-time or part-time.

How is the study done?

If you do decide to participate in this study, you will be directed to the online survey.

Here is a brief summary of how the survey looks like:

· Part 1: Information about yourself and your school

· Part 2: Your opinions about the impact of COVID-19 at school

· Part 3: Your perceptions of school climate

· Part 4: Your perceptions of school climate in a hypothetical scenario

Is there any way being in this study could be bad for you?

I do not think answering these survey questions can harm you or be bad for you in any way. Risk to you is minimal. If anything in the survey does bring up negative emotions, you should reach out to your school counselor or other trusted adults for support.

How will your identity and responses be protected?

I will totally maintain your confidentiality to the fullest extent. No personal identifiers are collected in this survey. Your responses will be stored first in the Survey Monkey database, then erased from there after they are stored on password-protected

and secure site at Simon Fraser University for up to 1 year while I analyze the information. After that, I will add the totally anonymized data to the secure and protected Canada's Federated Research Data Repository. This maximizes your contribution to understanding more about schooling during the pandemic.

Please note, this survey is hosted by SurveyMonkey a US company, and as such, is subject to the USA Patriot Act and CLOUD Act. These laws allow government authorities to access the records of host services and internet service providers. By choosing to participate, you understand that your participation in this study may become known to US federal agencies."

Where can you find the results of the study?

The results of this research will be reported in a master's thesis and may also be published in scholarly articles or books

Contact for Complaints:

If you have any concerns about your rights as a research participant and/or your experiences while participating in this study, contact

Dr. Jeffrey Toward, Director, Office of Research Ethics
email: […] or
telephone: […]

Do you agree to participate in this study? Please click one box.

(Because this is an anonymized survey, you won't be able to withdraw after the survey responses are submitted)

◊ Yes, I agree to participant

◊ No, I don't agree to participate

If you would like a copy of this consent form, you may choose to take a screenshot, highlight any part of this screen and print, or email the research team at […] for a copy to be returned to you.

Appendix B.

Recruitment Material: Social Media Post

Hello,

My name is Chi Hong (Michael) Lao. I am a graduate student at Simon Fraser University, studying educational psychology. I am conducting a survey study to understand more about students' schooling experience during the COVID-19 pandemic.

If you are currently a secondary school student (grade8-12) in British Columbia, who attends school in-person full-time or part-time, the link to the consent form and survey is listed below.

https://www.surveymonkey.ca/r/MXHPSY3

It would be gladly appreciated if you would share this post with people you know that might also be interested in filling out this survey.

(Please note that sharing, liking, or commenting on the post may link you to the study. We suggest refraining from doing so if you wish to maintain your confidentiality).

Contact info:

Chi Hong (Michael) Lao

Email: […]

Appendix C.

Recruitment Material: Recruitment Script

Hi (name),

This is Chi Hong (Michael) Lao. As a part of my graduate study at Simon Fraser University, I am conducting a survey study to understand more about students' schooling experience during the COVID-19 pandemic.

I would be grateful if you could share the survey link below with secondary school students (grade 8-12) in British Columbia. Please note that you should not feel pressured to share my study because of the existing relationship between you and me. In an effort to protect others' personal identity, please do not send me any contact information of people you know even if they are interested in filling out the survey. Instead, simply share the link listed below to access the consent form and survey.

https://www.surveymonkey.ca/r/MXHPSY3

Contact info:

Chi Hong (Michael) Lao

Email: […]

Appendix D.

Table: Variable Naming for Quantitative Analysis

Name	Item
COVID1	I worry about getting COVID-19 while I am in school
COVID2	I think social distancing and mask wearing are effective ways to protect me from getting COVID-19 while I am in school.
COVID3	I prefer to stay home rather than go to school because of my worry about getting COVID-19 while I am in school.
COVID4	I wish school could go back to the way it was last year before the COVID-19 pandemic.
COVID5	Attending school in-person feels different this year because of the COVID-19 pandemic
SCPR1	My schoolmates and I know each other well.
SCPR2	I consider my schoolmates my friends.
SCPR3	I am satisfied with how often I get to hang out and talk with my schoolmates while we are at school.
SCPR4	My schoolmates support and care about me.
SCST1	My teachers understand my problems.
SCST2	My teachers are available when I need to talk to them.
SCST3	It is easy to talk with teachers at my school.
SCST4	My teachers care about me.
SCSC1	I enjoy coming to school.
SCSC2	I have good relationships with teachers and other adults at my school.
SCSC3	I feel like I belong at my school.
TESCPR1	My schoolmates and I know each other _____ well.
TESCPR2	I consider my schoolmates my friends _____.
TESCPR3	I am _____ satisfied with how often I get to hang out and talk with my schoolmates while we are at school.
TESCPR4	My schoolmates support and care about me _____.
TESCST1	My teachers understand my problems _____.
TESCST2	My teachers are _____ available when I need to talk to them.
TESCST3	It is _____ easy to talk with teachers at my school.
TESCST4	My teachers care _____ about me.

Name	Item
TESCSC1	I enjoy coming to school _____.
TESCSC2	I have _____ good relationships with teachers and other adults at my school
TESCSC3	I feel like I belong at my school _____.

Appendix E.

Survey Used in This Present Study

Students' Characteristics and Demographics Scale

1. **Gender:**
    A. *Male*
    B. *Female*
    C. *Prefer not to say*
    D. *Other: _____*

2. **What is the name of your school?**
    A. _____
    B. *Prefer not to say*

3. **Which grade are you currently in? Select two or more if you are in a mixed grade classroom.**
    A. *Grade 6*
    B. *Grade 7*
    C. *Grade 8*
    D. *Grade 9*
    E. *Grade 10*
    F. *Grade 11*
    G. *Grade 12*

4. **What is your birth year?**
    A. *Before 2000*
    B. *2000*
    C. *2001*
    D. *2002*
    E. *2003*
    F. *2004*
    G. *2005*
    H. *2006*
    I. *2007*
    J. *2008*
    K. *2009*
    L. *After 2009*

5. **Which of the following best describes your current learning mode in this school year?**
    A. *Full time in-person learning*
    B. *Full time remote learning*
    C. *A mix of in-person learning and remote learning*

6. **On average, how many days a week do you attend school in-person in this current school year?**
    A. *I don't attend school in-person*
    B. *1 day a week*
    C. *Around 2 days a week*
    D. *Around 3 days a week*
    E. *Around 4 days a week*
    F. *Around 5days a week*
    G. *More than 5 days a week*

COVID-19 at School Scale (5-point Likert-scale)

7. **I worry about getting COVID-19 while I am in school.**
8. **I think social distancing and mask wearing are effective ways to protect me from getting COVID-19 while I am in school.**
9. **I prefer to stay home rather than go to school because of my worry about getting COVID-19 while I am in school.**
10. **I wish school could go back to the way it was last year before the COVID-19 pandemic.**
11. **Attending school in-person feels different this year because of the COVID-19 pandemic.**

School Climate Scale (5-point Likert-scale)

12. **My teachers understand my problems.**
13. **My teachers are available when I need to talk to them.**
14. **It is easy to talk with teachers at my school.**
15. **My teachers care about me.**
16. **My schoolmates and I know each other well.**
17. **I consider my schoolmates my friends.**
18. **I am satisfied with how often I get to hang out and talk with my schoolmates while we are at school.**
19. **My schoolmates support and care about me.**
20. **I enjoy coming to school.**
21. **I have good relationships with teachers and other adults at my school.**
22. **I feel like I belong at my school.**

Thought experiment group A (3-point Likert-scale)

Now, you will be asked to rate some of the previous statements again. Except this time, please imagine it is beginning of another school year, and the COVID-19 pandemic has improved over the summer break. Safety measures against COVID-19 are not needed anymore at your school.

Please click the option that best describes how you feel about each statement in this improved COVID-19 scenario

Thought experiment group B (3-point Likert-scale)

Now, you will be asked to rate some of the previous statements again. Except this time, please imagine it is the beginning of another school year, and COVID-19 pandemic has worsened over the summer break. Additional safety measures against COVID-19 are in place at your school.

Please click the option that best describes how you feel about each statement in this worsened COVID-19 scenario

1. **My teachers understand my problems_____.**
2. **My teachers are _____ available when I need to talk to them.**
3. **It is _____ easy to talk with teachers at my school.**
4. **My teachers care about me _____.**
5. **My schoolmates and I know each other _____ well.**
6. **I consider my schoolmates my friends _____.**
7. **I am _____ satisfied with how often I get to hang out and talk with my schoolmates while we are at school.**
8. **My schoolmates support and care about me _____.**
9. **I enjoy coming to school _____.**
10. **I have _____ good relationships with teachers and other adults at my school.**
11. **I feel like I belong at my school _____.**