THE SOCIAL SAFETY ECOLOGY:
A MULTI-CONTEXTUAL APPROACH TO
BULLYING, SOCIAL SAFETY, GENDER, AND HEALTH IN ADOLESCENCE

by

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Abstract

Social safety, including connection, protection, and inclusion, is a fundamental human need that may protect us from social threat (Slavich, 2020). One such social threat is bullying. In adolescence, social belonging becomes increasingly important, as youth become more attuned to social cues, which may render social safety even more relevant for health and well-being during this developmental stage. Despite the importance of social safety for health and well-being, current literature has yet to establish a measure that accounts for the multiple contexts in which a youth may perceive social safety (e.g., interpersonal, school, community, societal, etc.), and how these levels may moderate the relationship between bullying victimization and health, concurrently, and over time. The current dissertation is composed of three studies using data from the Health Behavior in School-Aged Children (HBSC) study, which assessed youth in grades 6-10 (n = 26,571 for Studies 1 and 2; n = 118,764 for Study 3). In Study 1, I developed and validated a multi-contextual measure of perceived social safety called the Social Safety Ecology Scale. Our results supported a four-factor solution that identified subscales assessing friend, family, school, and community safety. In Study 2, I used the Social Safety Ecology Scale to examine how perceived social safety at different levels of the social ecology may moderate the relationship between bullying victimization and both psychosomatic symptoms and well-being, and examined this effect between grades (grades 6-8 and grades 9-10) and genders (cisgender boys, cisgender girls, and gender diverse youth). Unexpectedly, the results showed that rather than buffering youth against negative health outcomes, school safety exacerbated this relationship, such that youth who reported higher school safety showed a steeper relationship between bullying victimization and psychosomatic symptoms. Finally, Study 3 expanded its scope to include six different waves of data from the HBSC survey, from 2002 to 2022. The

results showed that the relationship between general bullying victimization and school safety increased in magnitude over cohorts, suggesting that the link between these experiences has become stronger over time. The current dissertation suggests that social safety is a multidimensional construct that evolves across relationships and contexts.

Co-Authorship

Under the supervision of Dr. Wendy Craig, I designed, analyzed, and wrote all three studies included in this dissertation. I obtained the data for this dissertation from the Health Behaviour in School-Aged Children study group and conducted my analyses with the support and advice of Dr. Jill Jacobson. Dr. Wendy Craig offered ongoing feedback and support throughout the design and writing of this dissertation and will be included as co-author on future manuscripts.

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Statement of Originality and Disclosure of Use of Artificial Intelligence

In the preparation of this dissertation, no Artificial Intelligence tools were used.

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Chapter 1 – General Introduction

Bullying is a relationship problem characterized by an imbalance of power. This power imbalance may occur at various social ecological levels, such as the individual adolescent, their interpersonal experiences, their school and community, society, and the sociohistorical context (Espelage & Swearer, 2003). In the case of identity-based bullying, the basis of the power imbalance is social identities, such as gender or sexuality (Mulvey et al., 2018). For example, due in part to the reduced power they are afforded in society, queer and gender diverse youth are more likely than their heterosexual, cisgender counterparts to experience bullying (Testa et al., 2015). These youth also are more likely to report physical and mental health issues as a function of the bullying compared to heterosexual, cisgender youth (e.g., Day & Brömdal, 2024; Fields, 2023; Witcomb et al., 2019). Not all youth who experience bullying, however, will experience physical and mental health problems. Experiencing social safety, in the form of social connection, inclusion, and protection (Diamond & Alley, 2022; Slavich, 2020), may protect youth against these negative developmental outcomes. Guided by social safety theory and a social ecological perspective, in the current dissertation, I aimed to create a social safety scale that measured the many social ecological contexts in which a youth may perceive social safety. In Study 2, I examined how perceived social safety may moderate the relationship between bullying victimization and psychosomatic symptoms and well-being, and how this relationship varied by gender and grade. Finally, in Study 3, I used cross-sectional data from multiple waves of a multi-national study to examine trends in and relationships between these variables over time. This work highlights the multi-contextual nature of social safety across social ecological levels with implications for practice, policy, and future anti-bullying interventions.

Theoretical Perspective

My dissertation is guided by social safety theory and a social ecological framework. Social safety theory (Slavich, 2020) suggests that humans have an innate drive to establish and maintain positive social bonds that protect them from various threats: microbial, physical, or even social in nature. These positive social bonds may help buffer individuals from stress-related disease by reducing associated inflammation and immune responses (Slavich, 2020). In this dissertation, I examine how perceived social safety may protect youth experiencing bullying with a particular focus on gender diverse youth and their experiences. This perspective enables a shift from focusing simply on the presence of stressors to exploring the role of social safety in promoting well-being and buffering youth against health problems. Despite the important role social safety may play in adolescent health and well-being, few measures comprehensively capture the full range of contexts in which adolescents experience social safety. Thus, in this dissertation, my first goal was to develop a systematic, theory-driven measure of perceived social safety.

Adolescence is a critical period for the development of social safety (Slavich, 2020). During the teenage years, social belonging and threat become increasingly salient cues (O'Brien & Bowles, 2013; Tomova et al., 2021). Although popular culture portrays teenagers as risk-takers, youth actively avoid social risk and are very motivated to avoid being excluded by their peers (Tomova et al., 2021). In fact, adolescents increasingly interact with their peers with the focus of their social world orienting away from the family unit (Bos, 2013; Cosme et al., 2022). Their relationships may either provide social safety, such as supportive friendships, or sources of social threat, like bullying (Alley et al., 2025; Blakemore & Mills, 2014; Brown & Larson, 2009). Through these social interactions, youth may internalize beliefs about their own self

efficacy when it comes to navigating social threat and may continue to develop an understanding of how likely they are to encounter social safety or social threat in a situation (Slavich et al., 2023). The teenage years also represent a developmental period with a high prevalence of internalizing disorders, which may contribute to a feedback loop of internalization and negative social safety schemas (Gómez-Odriozola & Calvete, 2021). While youth are exploring their identities and sense of autonomy, they develop schemas related to social safety that influence their approach to interpersonal interactions and their expectations in various social settings (Slavich et al., 2023). Not all relationships, however, are positive. For instance, rates of bullying peak during school transitions (Pepler et al., 2008) and may be a significant threat to adolescents' well-being and sense of social safety.

Bullying victimization is associated with a wide range of negative developmental outcomes, including psychological problems (Wallace et al., 2024), academic issues (Lacey & Cornell, 2013), and physical health issues (Armitage, 2021; Zou et al., 2013). Social safety may buffer bullied youth against these adverse outcomes. For example, Tsomokos and Slavich (2024) found that individuals who were bullied in childhood exhibited more mental health symptoms in adulthood, but this relationship was partially explained by interpersonal distrust, a marker of low social safety. Being victimized by bullying is a social threat that, in the absence of social safety, can lead youth to develop chronic threat-vigilance, defined as a persistent state of heightened awareness and readiness to respond to potential threats or dangers (Diamond & Alley, 2022). Youth who experience chronic threat-vigilance may thus be more prone to negative physical and mental health (Conley et al., 2023), potentially perpetuating a cycle of stigma, social unsafety, and health issues (Hatzenbuehler & Pachankis, 2016).

These health issues may be more severe for gender diverse youth experiencing identity-based bullying because their victimization is rooted in an unchangeable social identity (Xu et al., 2020). Although most people are likely to identify their gender as woman or man, boy or girl, gender is not binary but rather bimodal. Some youth will identify with a gender that differs from their sex assigned at birth (transgender) or have a gender identity that differs from binary societal gender expectations (non-binary and/or gender diverse youth; Reisner et al., 2022). Gender diverse youth face an elevated risk of bullying (Kiekens et al., 2024) and are more likely to report mental and physical health issues compared to cisgender youth (Day & Brömdal, 2024; Fields, 2023; Witcomb et al., 2019). Across development, youth become more aware of both the power they hold, as well as their peers' perceived deviance from social norms, and can use these developing skills to target their peers (Pepler et al., 2008). With this more sophisticated skillset, youth may wield their social power to perpetrate targeted, identity-based aggression, such as homophobic or transphobic bullying (Pepler et al., 2006). Identity-based bullying often isolates youth, undermining their sense of social belonging (Burgess et al., 2023). This lack of belonging can lead to chronic exclusion and marginalization, as it impedes adolescents' ability to access safe social networks they need to develop in a healthy way (Burgess et al., 2023).

Minority stress theory is a popular theoretical model that posits that discrepancies in health outcomes between LGBTQ+ individuals and their heterosexual counterparts are due to the cumulative stress experiences that come along with being a part of a stigmatized group in society (Meyer, 2003). This chronic stress arises from a combination of objective events (including discrimination) and one's psychological interpretation of those events (including internalized homophobia) (Meyer, 2003). Research has shown that minority stress is associated with mental health problems for queer adolescents (Dürrbaum & Sattler, 2020; Goldbach, Rhoades, et al.,

2021; Hoy-Ellis, 2023; Hunter et al., 2021). When it comes to physical health, however, research findings have been less consistent (Diamond et al., 2021; Diamond & Alley, 2022). For example, a meta-analysis by Flentje and colleagues (2020) found mixed evidence for the relationship between minority stress and physical health outcomes, with fewer than half of the reported studies finding significant relationships between minority stress and biological outcomes. Diamond and Alley (2022) posit that this missing puzzle piece is *social safety*. When we detect sufficient social safety cues in our environment, we can downregulate our chronic threat-vigilance, which can enable us to rest and thrive (Diamond & Alley, 2022). Minority stress theory and social safety theory are not mutually exclusive: together, they can create a holistic framework that combines elements of social safety and threat.

The negative outcomes associated with bullying are not universal among bullied youth. Perceiving social safety in different contexts (family, peers, school community) may act as a buffer, shielding people who experience it from some of the negative health effects of bullying victimization. For gender diverse youth, understanding social safety is especially important because their susceptibility to bullying is linked to their lack of power and privilege in the broader social ecology in which they reside (Mayne & Craig, 2024). By recognizing how social safety exists at various levels of the social ecological framework, we can better identify protective factors at various levels that can mitigate the harmful effects of bullying and enhance the overall well-being of youth.

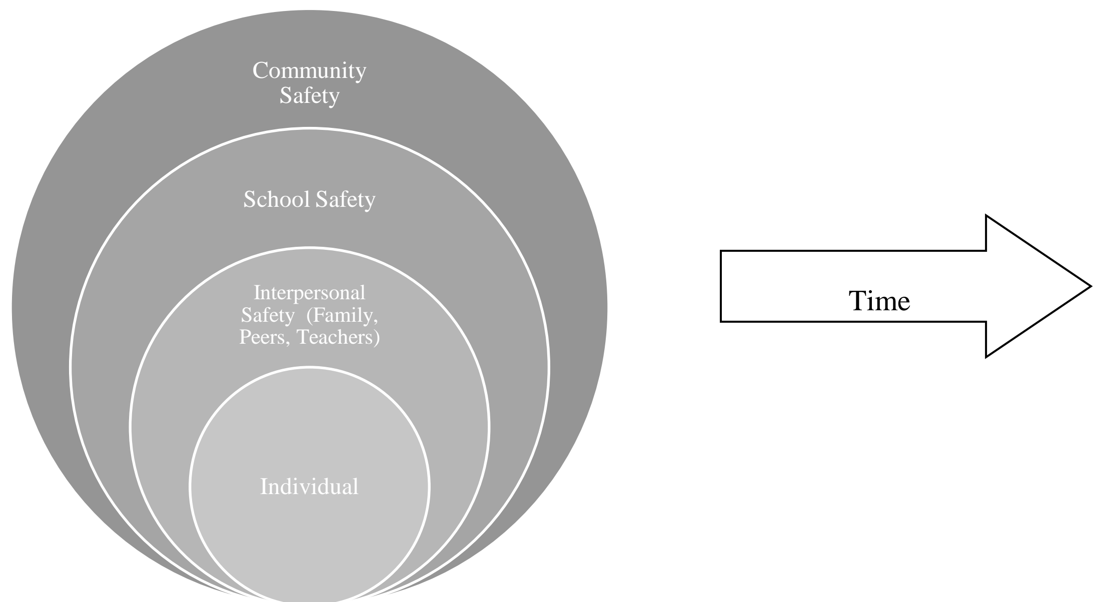
Situating Social Safety in the Social Ecology

According to social safety theory (Slavich, 2020), individuals are located within concentric social safety circles that extend from the individual to family, peers, and teachers; to school; to neighbourhood and community; and to the larger society and its values over time (see

Figure 1.1). These circles and the contexts they represent influence individuals' health and behaviour through their effects on perceptions of social safety and social threat (Slavich et al., 2023). The various levels exert bidirectional influences on each other and are important areas to investigate to understand the processes underlying the negative outcomes associated with bullying victimization, across the lifespan. To this end, my dissertation will adopt a systematic approach to developing a comprehensive measure of perceived social safety at the individual, interpersonal, school, and community levels. This measure will facilitate the examination of how perceived social safety may moderate the relationship between bullying victimization and psychosomatic symptoms and well-being, and examine potential changes in social safety over time.

Figure 1.1

The Overlapping Levels of the Social Safety Ecology



Changes in the Social Safety Ecology over Time

Social safety is not a static construct; it may change over time. In the past two decades, there has been much progress regarding the rights and freedoms of many marginalized groups in Canadian society. After the decriminalization of same-sex sexual activity in 1969, we still had a long way to go to ensure that queer people had equitable rights and freedoms concerning their expression, protection, inclusion, and relationships (Busby, 2020). Since then, public opinion has overall become more supportive of LGBTQ+ people and their rights. For example, in 2005, Canada legalized same-sex marriage, and in 2017, gender identity and gender expression became protected categories under the Canadian Human Rights Act (Canadian Heritage, 2017; Government of Canada, 2005). Unfortunately, progress is not always linear. In recent years, there has been an uptick in conservative backlash to queer acceptance, resulting in limitations on transgender healthcare and a rise in transphobic sentiment in Canada (DeGagne, 2021; Ipsos, 2024; Tasker, 2023)

Over time, societal attitudes and norms have shifted regarding the treatment of gender diverse, sexual minority, and other minoritized individuals. Younger generations (i.e., Generations Z and Alpha) in particular are endorsing multiculturalism and equity as integral parts of Canadian identity (Brink, 2023; Environics Institute for Survey Research, 2022). These changes may, in turn, promote a broad sociocultural shift towards anti-discrimination and inclusion, which may be associated with adolescents' perceptions of social safety and experiences of bullying over time (Baams & Kaufman, 2023). In Studies 1 and 2, I focused on bullying victimization and perceived social safety at one time point, and in Study 3 I broadened my scope to explore both general and identity-based bullying victimization and school and community safety, over time.

Current Studies

The current dissertation is comprised of three studies informed by the social safety ecology framework. In Chapter 2, I developed a measure of perceived social safety at different levels of the social ecology. In Chapter 3, I tested the moderating effect of perceived social safety at interpersonal, school, and community levels on the relationship between bullying victimization and psychosomatic symptoms and well-being. I also tested how this relationship may differ by grade and gender. Finally, in Chapter 4, I examined potential cohort effects of social safety and identity-based bullying (and the relationship among these constructs) from 2002 to 2022. I also analyzed the potential moderating roles of gender and grade on this relationship. Taken together, these studies advance the field by providing a theoretically grounded framework and measure for understanding how social safety functions across different contexts, how it shapes the developmental issues associated with bullying, and how these relationships differ across cohorts and diverse groups of youth.

Chapter 2 – Measuring the Social Safety Ecology

Abstract

Adolescence is an important period for the development of social safety, which comprises one's experiences of connection, protection, and inclusion. Although social safety has been theorized to be a multidimensional construct (Slavich, 2020), to date, no comprehensive measure assesses adolescents' perceptions of social safety across different levels of the social ecology. In the current study, I developed and validated the Social Safety Ecology Scale using data from the 2021-2023 Canadian Health Behaviour in School-Aged Children (HBSC) study (n = 26,571; ages 11-16). I first identified items reflecting social safety from extant survey measures and tested their factor structure. My results supported a four-factor solution consisting of family safety, friend safety, school safety, and community safety. This four-factor structure highlighted the distinct yet interrelated roles of different contexts in shaping adolescents' perceptions of social safety, supporting a social ecological perspective on social safety. The scale demonstrated measurement invariance across gender (cisgender boys, cisgender girls, gender diverse youth) and grade groups (6-8 vs. 9-10), showing its utility across diverse groups. The scale also showed evidence of convergent and discriminant validity through its associations with help-seeking, loneliness, bullying victimization, school enjoyment, psychosomatic symptoms, and life satisfaction. The Social Safety Ecology Scale may be used to further understand contextual differences in social safety with many theoretical, methodological, and practical applications.

Introduction

Developing and maintaining friendly social bonds is a motivation that underlies much of human behaviour (Slavich, 2020). Social safety, defined as the experience of connection, protection, and inclusion, has been increasingly recognized as a key factor for healthy development, yet remains understudied in adolescence (Slavich et al., 2023). Different from the mere absence of threat, social safety may enable regulation of the stress response system, support identity exploration (Wong & Hamza, 2024), and foster resilience (Slavich, 2022). When adolescents experience and perceive social safety in different contexts, from their interpersonal relationships with friends, family/caregivers, and teachers, to school settings, to broader community environments, these interrelated contexts can affect adolescents' sense of safety and well-being (Diamond & Alley, 2022). Despite growing theoretical interest in social safety, few studies have examined how social safety operates across multiple levels of the social ecology or how these levels interact to shape adolescents' physical and mental health (see Slavich et al., 2023). Additionally, although avoiding threat is an important element of well-being, it is only one piece of the puzzle. To feel a sense of social safety, an adolescent must feel connection and belongingness in various contexts (Trout et al., 2022). Although some studies have explored aspects of social *unsafety*, such as interpersonal distrust (Tsomokos & Slavich, 2024), no comprehensive measures assess the multiple contexts in which an adolescent may experience social *safety*. In the current study, I addressed this gap by developing a multidimensional measure to assess adolescents' perceptions of social safety at the interpersonal, school, and community levels of the social ecological model.

Social safety, which includes reliable experiences of connection, protection, recognition, acceptance, and inclusion within social environments, is an intrinsic human need (Diamond &

Alley, 2022). As such, it plays an important role in shaping developmental outcomes across the lifespan (Diamond & Alley, 2022). From an early age, humans develop social safety schemas based on both their social experiences and their interpretations of those experiences (Slavich et al., 2023). These developing social safety schemas reflect one's beliefs about their self, including their ability to cope with social threat, their social world, including beliefs about whether others are trustworthy or hostile, and the future, including future expectations of either isolation or support (Alley et al., 2025; Slavich, 2022). As adolescents develop, these social safety schemas become important parts of how they evaluate and respond (both biologically and psychosocially) to social situations (Alley et al., 2025).

Adolescence is a key time for the development and reorientation of social safety schemas, as pubertal youth are navigating social relationships, developing autonomy, and participating in increasingly goal-directed activities, such as applying to jobs and university, all activities with a high risk of rejection (Slavich et al., 2023; Steinberg, 2005). During the teenage years, youth may encounter more opportunities to freely interact with their peers and form relationships that may change their social safety schemas in both positive and negative ways (Brown & Larson, 2009). For example, if an adolescent's peers consistently treat them with kindness and respect, they may anticipate acceptance and belonging in their social environments. On the other hand, if an adolescent's peers commonly exclude them from social activities, they may come to believe that other people are hostile and untrustworthy. As their social relationships expand and become increasingly salient, so does their vulnerability to both social threat and social safety (Blakemore & Mills, 2014). Early adolescence is a developmental period marked by heightened sensitivity to peer evaluation and a social reorientation towards peers (Blakemore & Mills, 2014; Bos, 2013; Brown & Larson, 2009).

As youth move into middle adolescence (grades 9-10), their social roles typically expand. This period is when many adolescents may begin to navigate higher-stakes social contexts, such as romantic relationships and academic transitions (Slavich, 2022). Data from the Canadian Health Behaviour in School-Aged Children (HBSC) survey showed differences between elementary-aged youth in grades 6 to 8 and high-school-aged youth in grades 9 and 10 in psychosocial functioning. For example, older students have reported more emotional problems and lower well-being than their younger peers (Reid et al., 2015). These findings align with current knowledge about the social and physical changes that are occurring during these periods (Sawyer et al., 2018). Given the increase in social pressure and heightened emotional risk during adolescence, it is particularly important to understand how social safety develops during this period and to ensure that our measure adequately captures social safety experiences across both early and middle adolescence.

Gender is another important consideration when developing a measure of social safety. Gender diverse youth report higher rates of bullying and other social threat compared to their cisgender peers (Diamond & Alley, 2022; Matsick et al., 2024; Watson et al., 2019). This increased risk occurs across multiple settings, including friends, families, schools, and communities (Prokopenko & Hango, 2022; Riley, 2018; Saewyc et al., 2020). Bullying and other social threats are linked to elevated rates of anxiety, depression, and other stress-related health problems, underscoring the importance of assessing how social safety operates in this population (Witcomb et al., 2019). Yet, gender diverse youth are often underrepresented in research. The lack of representation of gender diverse youths limits our knowledge of how these social safety schemas function across groups. By including – and centering – gender diverse adolescents, this

study aims to ensure that measures of social safety adequately capture the experiences of the youth who are the most likely to encounter social threat.

The Social Safety Ecology

According to social safety theory (Slavich, 2020), individuals are located within concentric social safety circles, extending from the individual, to family, peers, and teachers, to school, to neighbourhood and community, to the larger society and its values over time. These circles and the contexts they represent influence individuals' health and behaviour through their effects on experiences of social safety and social threat (Slavich et al., 2023). For example, broader systems, such as school climate or community norms, may influence the quality of interpersonal relationships and individual well-being, but interpersonal interactions also can reshape expectations and policies within these larger systems (Lombardi et al., 2019). For instance, a school-wide anti-bullying initiative may promote peer support and teacher responsiveness, but sustained peer advocacy and family engagement also can pressure schools to implement these initiatives in the first place. Despite the multilevel nature of this theory, no studies to date have empirically measured the multiple contexts that contribute to an adolescent's sense of social safety. The goal of the current study, therefore, was to develop a measure that assesses perceived social safety at multiple levels of the social ecology.

Interpersonal Safety

Interpersonal relationships play a crucial role in whether adolescents anticipate threat or safety in their day-to-day interactions (Slavich et al., 2023). The interpersonal safety level includes interactions with caregivers, peers, and teachers. The quality of caregiver-child relationships significantly impacts later psychosocial functioning (Raudino et al., 2013). For example, a longitudinal study by Hazel and colleagues (2014) found that high-quality parent-

child relationships, indicative of social safety, buffered the relationship between peer stressors and depressive symptoms from childhood to adolescence. Supportive caregiver-child relationships may also help youth develop the skills necessary to buffer against mental and physical health problems (Gee & Cohodes, 2023; Hall, 2018; Roe, 2017).

Additionally, in adolescence, youth reorient towards their peers, rendering them a salient source of social safety (Cosme et al., 2022). Friend support is related to connectedness and finding meaning in life (Weinhardt et al., 2019), both of which may be associated with improved mental and physical health. Budge and colleagues (2014) found that individuals who reported higher friend support used more facilitative coping strategies, such as seeking help, which was associated with reduced anxiety symptoms. Thus, peer social safety is another critical area of interpersonal social safety that may buffer youth experiencing bullying from health problems.

Teacher relationships also constitute a central element of interpersonal safety for youth (Dessel et al., 2017). Youth are more likely to feel affirmed and safe when their teachers are trained and empowered to intervene when they see bullying and harassment take place. Teachers who model accepting behaviours can help to promote belongingness and dismantle heteronormativity in their classrooms (Zacko-Smith & Smith, 2010). By creating a classroom environment where students feel socially safe, teachers can help alleviate distress while students explore their identity (Katz-Wise et al., 2017). Indeed, more inclusive teachers foster higher classroom satisfaction and lower student friction, both of which correlate with student success (Boyle et al., 2020; Monsen & Frederickson, 2004). Through fostering inclusive practices and modeling acceptance, teachers play in important role in upholding socially safe environments that support both the well-being and academic success of all students. In the current study, I included caregivers, peers, and teachers together under the interpersonal safety level because

they represent proximal sources of support for youth and play an interconnected role in supporting mental and physical health.

School Safety

At the broader school level of the social safety ecology, school climate and policies significantly contribute to perceptions of social safety. School policies that support diversity, foster positive climates, and reduce bullying are critical indicators of social safety for gender diverse and cisgender youth alike (Russell et al., 2016). The implementation and enforcement of these policies have been associated with improved outcomes for gender diverse youth, including decreased bullying, lower substance use, reduced truancy, and enhanced academic performance (Baams et al., 2017; De Pedro et al., 2017; Proulx et al., 2019). These academic and psychosocial benefits also extend beyond gender diverse youth to encompass youth of all genders (Sousa & Gato, 2024).

Community Safety

The shaping of social safety schemas also is influenced by community contexts. Strong, affirmative community ties are integral to social safety, allowing youth to bypass chronic threat vigilance and navigate society feeling accepted (Diamond & Alley, 2022). Youth spend significant time in their neighbourhoods (Sichling & Plöger, 2018). Feeling a sense of safety and belonging in one’s neighbourhood reduces involvement in risky behaviours (Brooks et al., 2012) and may buffer youth against stressful life events (Kingsbury et al., 2020). Adolescents’ perceptions of neighbourhood safety have also been linked to mental health, such that youth who live in neighbourhoods with a higher sense of community are more likely to report better well-being and fewer depressive symptoms than youth who live in less cohesive neighbourhoods (Shareck et al., 2023; Zhang et al., 2024).

Current Study

The primary goal of this study was to develop and validate a comprehensive measure of social safety that captures adolescents' perceptions of social safety in interpersonal relationships (with peers/friends, teachers, and parents/caregivers), the school environment, and the broader community. I had three objectives. The first objective was to develop a measure of social safety that assessed perceived safety at three levels of the social ecological model: interpersonal, school, and community. Second, I examined measurement invariance between cisgender and gender diverse youth and between youth in grades 6 to 8 and grades 9 and 10. I hypothesized that the measure would demonstrate configural, metric, and scalar invariance across these groups. Third, I evaluated the psychometric properties of the measure, including internal consistency and construct validity. I hypothesized that interpersonal safety would demonstrate convergent validity through positive associations with help-seeking and negative associations with loneliness. I expected school safety would correlate positively with school enjoyment and negatively with bullying victimization. Finally, I hypothesized that community safety would show positive associations with well-being and negative associations with problematic social media use.

Method

Procedure

I used archival data from the Health Behaviour in School-Aged Children (HBSC) study, a cross-national survey that is conducted every four years on youth in grades 6 to 10 (W. Craig et al., 2023, 2025). This study collects a diverse, nationally representative sample of youth from across Canada. For the current study, I used only the most recent Canadian sample, collected between 2021 and 2023.

All provinces (except New Brunswick) and two territories (Yukon and the Northwest Territories) participated in the survey. Schools were randomly selected from a list of eligible and consenting school jurisdictions. After obtaining consent, students completed questionnaires about a variety of different health-related topics during school classes in a 45-70-minute session. Depending on the school board, some schools provided passive consent, meaning that the parents were sent information about the study and youth could “opt-out”, whereas other schools provided active consent, meaning that parents needed to return a signed consent form in order for their child(ren) to be eligible to participate. The Research Ethics boards of both Queen’s University and the Public Health Agency/Health Canada granted ethical clearance.

Participants

Participants were 26,571 youth ages 11 to 16 years, with an average age of 13.9 years. Most participants (65.7%) were in grades 6-8, with approximately a third (34.3%) in grades 9-10. Although a majority of the participants identified as white (65.3%), many other diverse racial/ethnic identities were included as well (see Table 2.1). The percentage of cisgender girls (45.8%) and cisgender boys (48.2%) was similar, and 6% of the sample identified as transgender or gender diverse.

Table 2.1

Demographic Information for 2021-2023 HBSC Survey

	Black (e.g., African, Afro-Caribbean, African Canadian descent)	**5.3% (*N* = 1409)**
	East Asian	3.4% (*N* = 891)
	First Nations	6.6% (*N* = 1745)

Race/Ethnicity*	Métis	5.0% (*N* = 1320)
	Inuk/Inuit	0.6% (*N* = 157)
	Latino/Latina	2.2% (*N* = 585)
	Middle Eastern	2.7% (*N* = 717)
	South Asian	2.8% (*N* = 738)
	Southeast Asian	4.3% (*N* = 1144)
	White	65.3% (*N* = 17333)
	Other	3.3% (*N* = 863)
	Don't know	10.3% (*N* = 2719)
	Prefer not to answer	2.8% (*N* = 747)
Gender	Cisgender girl	45.8% (*N* = 11982)
	Cisgender boy	48.2% (*N* = 12593)
	Transgender/gender diverse youth	6.0% (*N* = 1575)
Grade	Grade 6-8	65.7% (*N* = 17456)
	Grade 9-10	34.3% (*N* = 9113)

****Note.*** Percentages may not add up to 100% because participants were able to choose multiple options.

Measures

Demographics

Students reported their grade, ethnicity, sex assigned at birth, and gender identity. Students were able to identify their gender as boy, girl, neither boy nor girl, or other (an open text box in which they could further specify their gender). Participants also indicated what sex

they were registered at birth, with the options of male or female. From these two questions, I computed a variable to identify youth who were transgender or gender diverse. For the current study, gender diverse youth will include both youth who identified their gender as neither boy nor girl and/or youth whose gender did not align with their sex registered at birth. In line with previous literature using this dataset (e.g., Clayborne et al., 2025; Mark et al., 2006), for my analyses, I divided the students into two grade groups (grades 6-8 and 9-10) to reflect the developmental and academic changes that occur between these groups.

Social Safety Ecology Scale

To create my measure of the social safety ecology, I organized relevant existing items from various scales in the HBSC survey that reflected interpersonal, school, and community safety. These items were selected to represent core components of perceived social safety, defined by connection, protection, and inclusion.

To validate my structure of the measure, two trained research assistants categorized the items into the levels. To do this categorization, I randomized the order of the items I had selected as relevant to perceived social safety and provided a table labelled with each factor (interpersonal safety, school safety, and community safety) for the research assistants to sort the items into. The interrater reliability for this measure was 100%. These items were used in my exploratory and confirmatory factor analyses to test whether they cluster together into the three hypothesized factors.

Interpersonal Safety

Family Safety. Family safety was measured with nine items. Participants answered questions about their home life on a five-point scale (1 = *strongly agree*, to 5 = *strongly*

disagree). Sample items included: "My parent(s)/guardian(s) really understand me" and "I get the emotional help and support I need from my family". Higher scores indicated higher safety.

Friend/Peer Safety. To measure friend/peer safety, participants answered four questions about their relationships with their friends and peers on a five-point scale (1 = *strongly agree*, to 5 = *strongly disagree*). Sample items included: "I can count on my friends when things go wrong" and "Other students accept me as I am." Higher scores indicated higher safety.

Teacher Safety. Teacher safety was measured with six items. Participants answered questions about how supported they feel by their teachers on a five-point scale (1 = *strongly agree*, to 5 = *strongly disagree*). Sample items included: "I feel that my teachers care about me as a person" and "I feel a lot of trust in my teachers". Higher scores indicated higher safety.

School Safety

Students answered several questions that assessed school climate and general school support. Respondents rated five items on a 5-point scale (1 = *strongly agree*, to 5 = *strongly disagree*) about their experiences in the school environment. Sample items included: "Our school is a nice place to be" and "The rules in this school are fair". Higher scores indicated higher safety.

Community Safety

To measure community safety, I included six questions on a five-point scale (1 = *strongly agree*, to 5 = *strongly disagree*) to assess how participants feel about the area where they live (see García-Moya et al., 2013). Sample items included: "It is safe for younger children to play outside during the day" and "You can trust people around here". Higher scores indicated higher safety.

Help-seeking

To measure help-seeking, students indicated how easy it was for them to talk to their father, mother, and best friend about things that really bother them, on a scale from 1 (*very easy*) to 4 (*very difficult*). This scale was reverse coded, so that higher scores indicate higher ease of help-seeking.

Loneliness

Students reported how often in the last 12 months they have felt lonely on a scale from 1 (*never*) to 5 (*always*). Higher scores indicated higher loneliness. This single-item measure has been used in previous studies to assess loneliness (e.g., Madsen et al., 2024; Qualter et al., 2021) and is highly correlated with other, more elaborate scales (Mund et al., 2023).

School Enjoyment

Students answered how they feel about school at present, from 1 (*I like it a lot*) to 4 (*I don't like it at all*). This item was reverse coded, so that higher scores indicate higher school enjoyment.

Bullying Victimization

To assess bullying victimization, I used an adapted version of the revised Olweus Bully/Victim Questionnaire (Olweus, 1996). Participants read the following definition of bullying before answering the questions:

> *We say a student is BEING BULLIED when another student, or a group of students, say or do nasty or unpleasant things to him or her. It is also bullying when a student is teased repeatedly in a way her or she does not like or when they are deliberately left out of things. But it is NOT BULLYING when students of about the same strength or power argue or fight. It is also not bullying when a student is teased in a friendly and playful way.*

Students then answered questions about how many times they had been victimized at school in the past two months. This measure contained 10 items that measured relational, verbal, physical, sexual, and identity-based (weight-based, racial, religious, gender-based, and sexuality-based) bullying. Participants responded using a five-point scale that ranged from 0 (*I have not been bullied this way in the past couple of months*) to 4 (*I have been bullied this way several times a week in the past few months*). To measure bullying victimization, I calculated a mean score. Higher scores indicated higher bullying victimization. This scale demonstrated excellent internal consistency, $\alpha = .87$.

Life Satisfaction

I assessed life satisfaction using the Cantril ladder (Cantril, 1965), a widely used life satisfaction measure. Participants place how they feel their life is at the moment using a scale from 0 (*worst possible life for you*) to 10 (*best possible life for you*). Higher scores indicate higher well-being. This scale has shown good reliability and convergent validity to other well-being measures in adolescent samples (Levin & Currie, 2014).

Psychosomatic Symptoms

To further assess physical and mental health, I used the HBSC Symptom Checklist (HBSC-SCL; see Gariepy et al., 2016). This scale contained eight items about various mental and physical health symptoms, and students responded using a five-point scale that ranged from 1 ([*I experience this symptom*] *about every day*) to 5 ([*I experience this symptom*] *rarely or never*). This scale showed excellent internal consistency, $\alpha = 0.9$. I recoded this scale so that higher scores indicated higher psychosomatic symptoms.

Problematic Social Media Use

The Social Media Disorder Scale (van den Eijnden et al., 2016) assessed problematic social media use. Students answered yes or no to nine items assessing problematic social media behaviours. Sample items included: "During the past year [I have] regularly felt dissatisfied because [I] wanted to spend more time on social media" and "During the past year [I have] regularly neglected other activities (e.g., hobbies, sports) because [I] wanted to use social media." This scale showed good internal consistency, $\alpha = .81$.

Data Analysis

I tested the factor structure of the Social Safety Ecology Scale using several steps. Prior to conducting the exploratory factor analysis (EFA), I examined the inter-item correlations. I also assessed the suitability of the data using Bartlett's test of sphericity, which tests whether the correlation matrix is significantly different from an identity matrix (i.e., whether the variables are sufficiently correlated to justify a factor analysis; Carpenter, 2018) and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy, which assesses the proportion of shared variance among variables (Kaiser, 1974; Steiner & Grieder, 2020).

I conducted my data analyses in R version i386 4.4.2 (R Core Team, 2025). I randomly split the dataset into two equal halves to enable exploratory and confirmatory analyses on independent samples. To evaluate the underlying factor structure of the newly developed Social Safety Scale, I first conducted an EFA using principal axis factoring (PAF) with oblique rotation on one half of the sample ($n = 13{,}285$), using the psych package (Revelle, 2025). In each of the models, the factors correlated substantially, suggesting that an orthogonal rotation would not be justified. Coinciding with best practices in factor analysis (Fabrigar & Wegener, 2012), several criteria guided my factor retention decisions, including fit indices and factor loadings. A Root Mean Square Error of Approximation (RMSEA) value below .08 is typically considered

acceptable, with values under .05 indicating good fit and those under .01 reflecting excellent fit (MacCallum et al., 1996). For the Root Mean Square Residual (RMSR), values less than .08 are generally regarded as indicating good fit (Hu & Bentler, 1999). Similarly, a Comparative Fit Index (CFI) value of .95 or higher is often used as a benchmark for good model fit (Hu & Bentler, 1999). I used a factor loading of at least .34 as the minimum threshold for a salient item (Worthington & Whittaker, 2006). Additionally, I examined each factor loading based on its magnitude, with values above .71 considered excellent, above .63 very good, above .55 good, and above .45 fair (Comrey & Lee, 2013). To handle missing data, I used full Information maximum likelihood (FIML). I compared competing models (1-6 factors) to determine the most parsimonious and theoretically coherent solution.

Next, I conducted a confirmatory factor analysis (CFA) on the second half of the sample (n = 13,286) using the lavaan package (Rosseel, 2012) to test the fit of the four-factor model derived from the EFA. I evaluated the model fit using the same fit indices. To address model misfit, following best practices outlined by Hair and colleagues (2019) and Worthington and Whittaker (2006), I examined modification indices greater than 10 to identify potential sources of misfit. Decisions to modify the model were theory-driven and aimed at improving model fit without compromising the construct validity.

To assess the measurement invariance of the Social Safety Scale, I conducted a series of nested models across gender (cisgender boys, cisgender girls, and gender diverse youth) and grade groups (Grades 6-8 vs. Grades 9-10) in a stepwise sequence: configural, metric, scalar, and strict invariance (Putnick & Bornstein, 2016). I compared the models using chi-square difference tests and changes in CFI (ΔCFI), with $\Delta\text{CFI} \leq .01$ indicating acceptable invariance (Cheung & Rensvold, 2002). According to Chen (2007), if the sample size is greater than 300, then a change

of CFI of .01 or less or a change in RMSEA of .015 or less would be better criteria, even when the chi square test is significant due to the large sample size. Because of my large sample size, I thus relied more on changes in fit indices than chi square difference tests to confirm measurement invariance across gender and grade.

Finally, I calculated descriptive statistics, scale reliability (Cronbach's alpha and omega), and bivariate correlations among subscales to evaluate the internal consistency and measurement validity of the four subscales. I assessed convergent validity by correlating each subscale with theoretically relevant constructs, such as school enjoyment, bullying victimization, loneliness, psychosomatic symptoms, and communication ease with caregivers.

Rationale for Conceptualizing Social Safety as a Latent Variable

In this study, I conceptualized social safety as a latent variable, rather than an emergent variable, because it represents an underlying psychological experience that is not directly observable, but that youth can perceive based on multiple indicators. The current measure primarily assesses social safety schemas rather than observing the moment-to-moment experiences of social safety. These schemas are psychological constructs that are inferred from consistent patterns in how youth perceive different relationships and social contexts and are expected to group into a broader construct of social safety. Thus, driven by theory and empirical rationale, I used exploratory and confirmatory factor analyses to further refine our understanding of this construct.

Results

Inter-item Correlations and Descriptive Statistics

Item correlations for the initial 32 items can be seen in Table 2.2. Inter-item correlations ranged from .12 to .78, with the majority falling in the moderate range. In general, items within

the same domain (e.g., school, family, friend safety) were more strongly correlated with one another than with items from other domains, supporting the conceptual distinction between these subscales. For example, teacher relationship items (items 11-16) demonstrated strong inter-item correlations, as did items assessing emotional support from family (items 25-28) and peer support (items 29-32).

Some items in the community safety domain (items 1-5) showed comparatively lower correlations with items from other domains, suggesting that this group of variables may be more distinct compared with the others. Among all items, “I can count on my friends when things go wrong” (item 30) and “My family really tries to help me” (item 25) demonstrated among the strongest correlations with other indicators of peer and family safety, respectively. In contrast, reverse-coded items assessing family expectations and independence (items 22-23) were more weakly correlated with other items.

Bartlett’s test of sphericity was significant, χ^2 (630) = 289,758.70, $p < .001$, indicating that the correlation matrix was not an identity matrix. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.938, suggesting that the data were highly suitable for factor analysis (Kaiser, 1974).

Table 2.2

Inter-item Correlations for Social Safety Ecology Scale

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1	1																															
2	0.69	1																														
3	0.12	0.53	1																													
4	0.52	0.41	0.28	1																												
5	0.19	0.44	0.64	0.55	1																											
6	0.22	0.56	0.52	0.57	0.16	1																										
7	0.42	0.38	0.73	0.74	0.39	0.21	1																									
8	0.34	0.69	0.35	0.53	0.48	0.59	0.59	1																								
9	0.44	0.67	0.25	0.62	0.64	0.61	0.7	0.62	1																							
10	0.49	0.62	0.56	0.59	0.43	0.46	0.41	0.22	0.35	1																						
11	0.39	0.41	0.32	0.14	0.58	0.38	0.47	0.49	0.53	0.67	1																					
12	0.43	0.47	0.38	0.55	0.64	0.6	0.6	0.66	0.36	0.21	0.68	1																				
13	0.26	0.23	0.69	0.5	0.31	0.48	0.31	0.38	0.34	0.39	0.39	0.74	1																			
14	0.7	0.41	0.51	0.67	0.2	0.26	0.28	0.33	0.4	0.45	0.29	0.59	0.5	1																		
15	0.16	0.47	0.43	0.38	0.44	0.64	0.56	0.51	0.56	0.48	0.46	0.51	0.32	0.54	1																	
16	0.45	0.5	0.55	0.39	0.3	0.58	0.39	0.39	0.41	0.41	0.29	0.61	0.44	0.34	0.32	1																
17	0.27	0.28	0.64	0.6	0.3	0.4	0.62	0.56	0.6	0.36	0.56	0.6	0.64	0.28	0.42	0.45	1															
18	0.34	0.15	0.58	0.46	0.48	0.27	0.54	0.6	0.51	0.43	0.45	0.26	0.56	0.5	0.48	0.44	0.24	1														
19	0.25	0.3	0.6	0.25	0.48	0.19	0.5	0.4	0.71	0.37	0.68	0.35	0.19	0.65	0.55	0.68	0.7	0.46	1													
20	0.28	0.63	0.37	0.69	0.6	0.4	0.48	0.51	0.39	0.25	0.44	0.25	0.4	0.5	0.26	0.41	0.42	0.18	0.38	1												
21	0.41	0.49	0.32	0.55	0.47	0.37	0.23	0.4	0.35	0.4	0.53	0.19	0.54	0.45	0.63	0.19	0.64	0.35	0.43	0.39	1											
22	0.58	0.46	0.66	0.77	0.2	0.17	0.47	0.61	0.5	0.39	0.68	0.63	0.56	0.38	0.47	0.39	0.51	0.58	0.23	0.58	0.67	1										
23	0.37	0.43	0.54	0.5	0.25	0.6	0.22	0.28	0.33	0.64	0.7	0.27	0.45	0.53	0.65	0.26	0.54	0.58	0.32	0.47	0.33	0.32	1									
24	0.67	0.34	0.73	0.15	0.78	0.15	0.39	0.58	0.38	0.71	0.7	0.38	0.28	0.42	0.4	0.21	0.65	0.73	0.31	0.66	0.44	0.42	0.26	1								
25	0.68	0.48	0.61	0.35	0.57	0.33	0.33	0.4	0.52	0.25	0.28	0.49	0.27	0.66	0.36	0.66	0.56	0.46	0.64	0.65	0.26	0.48	0.45	0.29	1							
26	0.72	0.22	0.52	0.42	0.33	0.7	0.53	0.63	0.66	0.22	0.33	0.49	0.58	0.22	0.55	0.31	0.39	0.15	0.63	0.49	0.61	0.5	0.67	0.52	0.49	1						
27	0.19	0.36	0.32	0.42	0.25	0.33	0.54	0.27	0.39	0.29	0.44	0.64	0.42	0.44	0.64	0.44	0.28	0.37	0.43	0.61	0.57	0.33	0.45	0.55	0.53	0.45	1					
28	0.41	0.61	0.64	0.51	0.38	0.67	0.12	0.51	0.34	0.31	0.53	0.18	0.42	0.12	0.36	0.4	0.36	0.47	0.44	0.24	0.44	0.37	0.35	0.15	0.61	0.24	0.4	1				
29	0.43	0.33	0.57	0.53	0.25	0.6	0.18	0.56	0.38	0.49	0.73	0.28	0.56	0.44	0.55	0.41	0.49	0.73	0.48	0.55	0.65	0.42	0.57	0.34	0.26	0.45	0.35	0.49	1			
30	0.55	0.34	0.33	0.43	0.31	0.53	0.39	0.78	0.44	0.41	0.29	0.58	0.39	0.45	0.55	0.46	0.42	0.6	0.52	0.24	0.11	0.34	0.32	0.34	0.32	0.4	0.27	0.3	0.49	1		
31	0.48	0.64	0.49	0.61	0.45	0.22	0.31	0.43	0.61	0.36	0.56	0.76	0.52	0.69	0.2	0.4	0.38	0.53	0.43	0.47	0.45	0.35	0.65	0.43	0.41	0.51	0.43	0.47	0.72	0.55	1	
32	0.43	0.36	0.38	0.74	0.51	0.36	0.5	0.66	0.49	0.71	0.62	0.44	0.38	0.49	0.3	0.33	0.27	0.55	0.53	0.36	0.56	0.4	0.3	0.34	0.47	0.44	0.33	0.44	0.46	0.51	0.35	1

Legend

1. People say hello in the street	17. Students enjoy being together
2. It is safe for younger children to play	18. Students are kind and helpful
3. You can trust people around here	19. Other students accept me as I am
4. Good places to spend free time	20. Parents/guardians understand me
5. Could ask for help from neighbours	21. I have a happy home life
6. The rules in this school are fair	22. My parent(s)/guardian(s) expect too much of me.
7. Our school is a nice place to be	23. There are times I would like to leave home.
8. I feel I belong at this school	24. Parents/guardians trust me
9. I am encouraged to express my views	25. Family tries to help me
10. I can get extra help at school	26. I get emotional help from family
11. Teachers accept me as I am	27. I can talk about problems with family
12. Teachers care about me as a person	28. Family helps me make decisions
13. I trust my teachers	29. Friends try to help me
14. Teachers are interested in me	30. I can count on my friends
15. Most teachers are friendly	31. I can share feelings with friends
16. Teachers treat us fairly	32. I can talk about problems with friends

Exploratory Factor Analysis

To determine the optimal number of factors to retain, I considered several criteria: a parallel analysis, fit indices, and overall theoretical coherence (Finch, 2020). A parallel analysis based on EFA eigenvalues suggested retaining 11 factors. The sequential chi-square model tests indicated a higher number of 26 factors, whereas the lower bound of the RMSEA 90% confidence interval suggested 8 factors. Finally, the Akaike Information Criterion (AIC) favored a 25-factor solution. With the goal of avoiding over-factoring, I examined the scree plot and eigenvalues separately to determine a more parsimonious solution. My examination of the scree plot suggested a four- or five-factor model, with a steep drop-off after the first few factors, followed by a clear plateau after the fifth factor. Thus, I decided to analyze and compare one-, two-, three-, four-, five-, and six-factor solutions to determine which had the best fit.

I initially tested a one-factor model, but it did not provide an adequate fit to the data (see Table 2.3 for details). Subsequent models with two and three factors demonstrated improved fit. The four-factor solution offered further improvements in model fit while retaining interpretability in factor loadings. Although five- and six-factor models showed slight improvements in fit, these models introduced substantial cross-loadings that complicated interpretability. Additionally, the change in RMSEA between these models was smaller than .015, suggesting no substantial improvement in fit (Finch, 2020). In all of my models, two items ("My parent(s)/guardian(s) expect too much of me" and "There are times I would like to leave home") did not load significantly onto any factor, so I dropped these items in subsequent analyses. Based on the balance of statistical fit and theoretical coherence, I retained the four-factor model.

Table 2.3

1- to 6-Factor Solutions

Model	χ^2 (df)	RMSR	TLI	BIC	CFI	SRMR	RMSEA	Model Comparison	ΔRMSEA	ΔCFI	ΔSRMR
1-Factor	133481.0 (464)	0.13	0.434	129075.6	0.61	0.14	0.147				
2-Factor	89093.1 (433)	0.09	0.596	84982	0.72	0.1	0.124	1- vs. 2-factor	-0.023	0.11	-0.04
3-Factor	48016.5 (403)	0.06	0.767	44190.2	0.82	0.07	0.094	2- vs. 3-factor	-0.03	0.1	-0.03
4-Factor	31601.1 (374)	0.04	0.835	28050.2	0.89	0.05	0.079	3- vs. 4-factor	-0.015	0.07	-0.02
5-Factor	23094.7 (346)	0.03	0.87	19809.7	0.91	0.04	0.07	4- vs. 5-factor	-0.009	0.02	-0.01
6-Factor	19957.1 (319)	0.03	0.878	16928.4	0.94	0.03	0.068	5- vs. 6-factor	-0.002	0.03	-0.01

The four-factor model accounted for 51% of the total variance. I evaluated the factor loadings using a threshold of .34 for meaningful interpretation. Fourteen items loaded onto factor one, four items loaded onto factor two, seven items loaded onto factor three, and five items loaded onto factor four. I labeled the first factor, which accounted for 22% of the variance, *school safety*, and it consisted of items related to school climate, including social belonging and peer/teacher relationships (e.g., "I feel like I belong at this school," "Our teachers treat us fairly"). I labeled the second factor, which accounted for 12 % of the variance, *family safety*, and it reflected family trust and support (e.g., "I have a happy home life," "My family really tries to help me"). I called the third factor, which took up 9% of the variance, *friend safety*, and this factor captured friend emotional support schemas (e.g., "My friends really try to help me," "I can count on my friends when things go wrong"). Finally, I titled the fourth factor, which accounted for 7% of the variance, *community safety*, and it was associated with community support (e.g., "You can trust people around here," "It is safe for younger children to play outside during the day"). See Table 2.4 for more details.

Table 2.4

Exploratory Factor Analysis Factor Loadings

Item	Factor 1 – School Safety	Factor 2 – Friend Safety	Factor 3 – Family Safety	Factor 4 – Community Safety
People say hello and often stop to talk to each other in the street.	-0.07	0.03	0.01	**0.62**
It is safe for younger children to play outside during the day.	-0.03	-0.02	-0.02	**0.71**
You can trust people around here.	0.02	0.01	0	**0.75**
There are good places to spend your free time (e.g., leisure centres, parks, shops).	0.06	0.02	-0.01	**0.53**
I could ask for help or a favour from neighbours.	-0.03	0.04	0.02	**0.68**
The rules in this school are fair.	**0.68**	-0.02	-0.02	-0.04
Our school is a nice place to be.	**0.78**	0.03	-0.02	0.01
I feel I belong at this school.	**0.71**	0.07	0.02	0.08
I am encouraged to express my own views in my class(es).	**0.68**	0.07	-0.02	0.04
When I need extra help at school, I can get it.	**0.58**	0.02	0.04	0.03
I feel that my teachers accept me as I am.	**0.74**	-0.03	0.03	-0.01
I feel that my teachers care about me as a person.	**0.75**	-0.02	0.02	-0.05
I feel a lot of trust in my teachers.	**0.76**	-0.01	0.03	-0.04
My teachers are interested in me as a student.	**0.74**	0.01	0.01	0
Most of my teachers are friendly.	**0.74**	-0.02	-0.02	-0.04
Our teachers treat us fairly.	**0.77**	-0.02	0	-0.07
The students in my class(es) enjoy being together.	**0.48**	0.06	-0.05	0.12
Most of the students in my class(es) are kind and helpful.	**0.53**	0.12	-0.08	0.13
Other students accept me as I am.	**0.53**	0.12	-0.01	0.15
My parent(s)/guardian(s) understand me.	0.24	-0.16	**0.58**	0.15
I have a happy home life.	0.21	-0.15	**0.53**	0.2

Item	Factor 1 – School Safety	Factor 2 – Friend Safety	Factor 3 – Family Safety	Factor 4 – Community Safety
My parent(s)/guardian(s) trust me.	0.22	-0.14	**0.46**	0.15
My family really tries to help me.	-0.05	0.1	**0.83**	-0.04
I get the emotional help and support I need from my family.	-0.02	0.03	**0.89**	-0.02
I can talk about my problems with my family.	-0.01	0.02	**0.85**	0
My family is willing to help me make decisions.	-0.04	0.08	**0.83**	-0.02
My friends really try to help me.	0.04	**0.82**	0.08	-0.02
I can count on my friends when things go wrong.	0.02	**0.86**	0.05	0.01
I can share both my happy feelings and my sad feelings with my friends.	0.01	**0.89**	0	0.01
I can talk about my problems with my friends.	0.01	**0.87**	-0.03	0.03

Confirmatory Factor Analysis

I conducted the initial CFA using the lavaan package in R (Rosseel, 2012) to evaluate the established measurement model of perceived social safety, which included four latent factors: school safety, family safety, friend safety, and community safety. The four-factor model had an RMSEA of .092 and a CFI of .81, indicating poor fit. Modification indices suggested significant residual covariances between items assessing overlapping constructs (e.g., parental emotional support, peer kindness), which were theoretically justified and which I thus subsequently added. Please see Table 2.5 for the residual covariances.

Table 2.5

Residual Covariances Added as a Result of High Modification Indices

LHS Variable	Operator	RHS Variable	MI	EPC	SEPC (LV)	SEPC (ALL)	SEPC (NOX)
Parents understand me	~~	Happy home life	2804.285	0.302	0.302	0.438	0.438
Share feelings with friends	~~	Talk about problems with friends	2992.364	0.425	0.425	0.63	0.63
Friends help me	~~	Count on friends	2165.366	-0.084	-0.084	-0.483	-0.483
Students enjoy being together	~~	Students are kind	2341.334	0.303	0.303	0.396	0.396
Students are kind	~~	Students accept me	1927.345	0.25	0.25	0.328	0.328
Parents understand me	~~	Parents trust me	1994.312	0.233	0.233	0.3	0.3

The improved model demonstrated acceptable to good model fit, with a CFI of .93 and a Tucker-Lewis Index (TLI) of .92. The Root Mean Square Error of Approximation (RMSEA) was .06, 90% CI [.057, .063], and the Standardized Root Mean Square Residual (SRMR) was .069, all of which indicate an acceptable to good model fit (Hu & Bentler, 1999). The final scale contained 30 items.

Measurement Invariance across Gender and Grade

To examine whether the measurement model demonstrated invariance across genders, I tested a series of nested models: configural, metric, scalar, and strict invariance. The configural model, which allowed all parameters to vary across groups, showed acceptable fit to the data, $\chi^2(1257) = 2879.80$, CFI = .912, RMSEA = .068, SRMR = .075. Constraining the factor loadings to be equal across gender (metric invariance) resulted in a small decrease in model fit, $\chi^2(1311) = 2977.20$, CFI = .910, RMSEA = .067, SRMR = .081. Although the chi-square difference test was

significant, $\Delta\chi^2(54) = 97.46$, $p < .001$, the changes in fit indices were not substantial (ΔCFI = .002), thus supporting metric invariance (Chen, 2007). Adding constraints on item intercepts (scalar invariance) further decreased model fit, $\chi^2(1365) = 3203.40$, CFI = .900, RMSEA = .069, SRMR = .082. The chi-square difference was again significant, $\Delta\chi^2(54) = 226.17$, $p < .001$, but the change in CFI (ΔCFI = .010) met the threshold for scalar invariance. Finally, constraining residual variances to equality across gender (strict invariance) led to a further decrease in fit, $\chi^2(1427) = 3378.50$, CFI = .894, RMSEA = .070, SRMR = .083, with a significant chi-square difference, $\Delta\chi^2(62) = 175.07$, $p < .001$, and a ΔCFI = .006, which still remained below Chen's cut-off (cf. Cheung & Rensvold, 2002). In sum, measurement invariance was supported, so comparisons can be made between gender groups.

Next, I tested invariance of the perceived social safety measurement model across grade groups (Grades 6-8 and Grades 9-10). The configural model demonstrated acceptable fit, indicating that the factor structure was consistent across grade groups, $\chi^2(838) = 2262.30$, CFI = .924, RMSEA = .063, 90% CI [.060, .066], SRMR = .071. When factor loadings were constrained to be equal across groups (metric invariance), the model fit slightly decreased, $\chi^2(865) = 2304.43$, $\Delta\chi^2(27) = 42.13$, p = .032, CFI = .923, RMSEA = .062, SRMR = .073. Although the chi-square difference test was significant, the change in CFI (ΔCFI = .001) remained below the threshold of ≤ .01 (Chen, 2007; Cheung & Rensvold, 2002), supporting metric invariance. The scalar invariance model, which constrained both loadings and intercepts, showed further decline in fit, $\chi^2(892) = 2390.60$, CFI = .920, RMSEA = .063, SRMR = .074. Despite a statistically significant chi-square difference, $\Delta\chi^2(27) = 86.17$, p < .001, the change in CFI from the metric model was only .003, and still within acceptable bounds. Finally, the strict invariance model, which additionally constrained residual variances, showed a significant drop

in fit, $\chi^2(923) = 2453.30$, CFI = .918, RMSEA = .062, SRMR = .074. The chi-square difference was significant, $\Delta\chi^2(31) = 62.77$, $p < .001$, but nonetheless, the change in CFI between scalar and strict models was only .002. In sum, perceived social safety was invariant across grade groups, supporting meaningful comparisons of latent constructs between grades 6-8 and grades 9-10.

Psychometric Properties

Next, I examined descriptive statistics, and internal consistency estimates for the four perceived social safety subscales: school safety, family safety, friend safety, and community safety. The scale means ranged from 3.12 (*SD* = 1.09) for friend safety to 3.67 (*SD* = .79) for community safety. Internal consistency was excellent for school safety ($\alpha = .94$), family safety ($\alpha = .92$), and friend safety ($\alpha = .93$), and good for community safety ($\alpha = .80$). All four subscales were significantly and positively related. See Table 2.6 for details.

To further understand scale reliability, I conducted a bifactor reliability analysis. The school safety scale demonstrated excellent internal consistency, $\omega t = .94$. The family safety scale demonstrated excellent internal consistency, $\omega t = .94$. The friend safety scale demonstrated excellent internal consistency, $\omega t = .95$. Finally, the community safety scale demonstrated good internal consistency, $\omega t = .83$.

Table 2.6

Factor Correlations and Reliabilities

	1.	2.	3.	4.
1. School safety	-			
2. Family safety	.43**	-		
3. Friend safety	.27**	.39**	-	
4. Community safety	.36**	.31**	.20**	-

Note. * $p < .05$; ** $p < .01$; *** $p < .001$.

Factor Validity

To assess the validity of the perceivedsocial safety subscales, I calculated Pearson correlations between each subscale (school safety, family safety, friend safety, and community safety) and a range of theoretically related constructs (see Table 2.7). Consistent with theoretical expectations, each safety construct demonstrated moderate to strong associations with variables that should be conceptually related. School safety showed a strong positive correlation with school enjoyment and a moderate positive association with well-being. Similarly, family safety correlated moderately to strongly with communication with parents. Friend safety showed its strongest association with ease of talking to a best friend, as anticipated. Community safety demonstrated moderate correlations with well-being. These patterns align with theoretical expectations and support convergent validity. The safety constructs also showed appropriately low correlations with variables that should be conceptually distinct. For example, friend safety demonstrated weak associations with problematic social media use. Community safety, family safety, and school safety showed small correlations with talking to a best friend. Thus, I found support for the convergent and discriminant validity of the perceived social safety subscales.

Table 2.7

Convergent Validity Correlations

	Bullying Vic	School Enjoyment	Well-being	Psychosomatic Symptoms	Loneliness (Past 12 Months)	Talk to Dad	Talk to Mom	Problematic Social Media Use	Talk to Best Friend
School safety	-0.34	0.67	0.50	-0.43	-0.38	0.31	0.33	-0.25	0.19
Family safety	-0.25	0.25	0.50	-0.45	-0.44	0.45	0.54	-0.29	0.14
Friend safety	-0.18	0.16	0.25	-0.16	-0.22	0.14	0.15	-0.08	0.46
Community safety	-0.14	0.24	0.34	-0.22	-0.26	0.25	0.25	-0.16	0.17

Discussion

Social safety is a fundamental component of healthy development, supporting adolescents in connecting and thriving physically and socially (Slavich, 2020). Drawing on

social safety and social ecological theory, I sought to understand and quantify adolescents' perception of safety within their interpersonal relationships, school environments, and broader communities. In the current study, I developed and validated a measure of social safety that assesses perceptions of social safety at various levels of the social ecology. I found support for a four-factor scale structure, including community safety, school safety, friend safety, and family safety. This measure of perceived social safety has strong psychometric properties and was invariant across different ages and genders.

In the EFA, although the items loaded differently to my initial conceptualization of perceived social safety, the final factor structure was theoretically coherent and aligned with prior literature on adolescent development. Specifically, although I initially predicted a single interpersonal factor including caregivers, peers, and teachers, family and friend safety were, in fact, separate factors. The distinction between these two relationship types aligns with developmental research suggesting that relationships with caregivers and friends serve unique functions for adolescents (Mak et al., 2023; Schacter & Margolin, 2019). In the adolescent years, friendships become integral to youth's socioemotional functioning (Bos, 2013). Family relationships, on the other hand, although still important, may not be as important to an adolescent's developing sense of self (Prioste et al., 2020).

Moreover, teacher-related items, which I originally expected to load with the interpersonal safety construct, instead clustered with other school climate variables. Thus, adolescents may perceive teacher support as a feature of the school environment rather than an interpersonal source of safety. This perspective is similar to how we conceptualize related constructs such as school climate, whereby teachers form an important cornerstone of how youth perceive their school environment (Aldridge & Fraser, 2016). Interpersonal relationships among

staff, students, and teachers, all help to shape youth's perception of school climate (Kartal & Bilgin, 2009), which may, in turn, influence their perceptions of social safety at school. Additionally, teachers also serve as a representation of the school's rules, fairness, and overall climate (Eccles & Roeser, 2011), thus aligning with more institutional aspects of school safety.

Peer relationships, which I had initially hypothesized to cluster with friend-related items, also fell under the school safety domain, demonstrating peers' role in creating a safe school environment (Cowie & Smith, 2010). These differences from the hypothesized structure still line up with our understanding of adolescent development: specifically, the unique contributions of different relationships and environments. For example, during adolescence, youth may differentiate between close friendships and more distal peer interactions at school (e.g., chosen friends versus classroom peers; Brown & Larson, 2009). Thus, peer interactions at school may be experienced as part of the institutional environment rather than as personal relationships. This finding is further supported by the peer items, which specifically refer to peer relationships at school (e.g., "Most of the students in my class(es) are kind and helpful"). The framing of these items may contribute more to an adolescent's perception of safety at *school* than to their understanding of safety within interpersonal relationships.

Taken together, the four-factor scale structure supports several aspects of the social ecological model as it applies to social safety. First, adolescents experience safety across multiple, distinct levels (Diamond & Alley, 2022; Slavich et al., 2023). The emergence of family and friend safety as separate factors underscores that interpersonal contexts do not all operate the same. Instead, they may represent domains of safety with distinct functions during adolescence. Similarly, school and community safety were separate factors also demonstrating that broader social ecological settings each play a unique role in shaping adolescents' perceptions of social

safety. Thus, the factor structure reflects both more proximal contexts, with family and friends, and more distal contexts such as school and community, consistent with the concentric levels Slavich (2020) originally posited. By empirically distinguishing these four domains, my findings validate that social safety is a multidimensional construct.

The four domains were distinct yet interrelated. As expected, all subscales correlated positively with each other and with theoretically related constructs. The patterns of these associations however, showed that not all of these contexts function the same. Family safety showed the strongest links with caregiver communication and well-being, underscoring the protective role of close family relationships. School safety was most strongly associated with school enjoyment. Community safety was moderately positively associated with well-being and negatively associated with psychosomatic symptoms, suggesting that feeling safe in one's broader environment could help adolescents' overall psychosocial adjustment. Friend safety was most strongly associated with well-being and communication with one's best friend. In sum, these findings reflect unique but related domains through which adolescents perceive social safety.

Limitations and Future Directions

Although this study does have many strengths, several limitations must be acknowledged. First, although the Health Behaviour in School Aged Children dataset is large and diverse, allowing me to look at minoritized groups such as transgender and gender diverse youth, it relies on self-report measures. Self-report measures may be subject to biases such as social desirability or recall error (e.g., de Nicola & Giné, 2012; Van de Mortel, 2008). Second, because I was working with archival data, I was limited to the measures that currently existed within the dataset. Although I argue that these measures assess relational and environmental elements of

perceived social safety quite well, they were not originally inserted into the survey with this purpose in mind. Despite strong interrater reliability in item selection and high internal consistency of subscales, future research should consider refining and validating this measure incorporating more items designed to measure social safety.

Furthermore, this measure captures perceptions of social safety and not the more biological and immunological tenets of the theory. Future studies may want to incorporate biological markers of stress or safety, such as cortisol levels or other physiological measures when examining how social safety is associated with health. Additionally, given that these data come from a large, multi-national study, cross-cultural research would help validate the utility of this measure in different countries and contexts.

It is important to highlight that this measure does not capture nuances when it comes to chosen family relationships. Many youth will develop connections outside of their family of origin that could contribute to their sense of social safety (Gardella et al., 2021). Additionally, the Social Safety Ecology Scale asks youth to collapse across all teachers when answering questions. This approach may erase some important variability, as some youth may have a strong, protective relationship with one or a few teachers but not others (Roorda et al., 2019). Future research should integrate these chosen family relationships and a more nuanced measure of teacher relationships to better understand the complexities involved.

By including the multiple contexts in which a youth may encounter social safety, the Social Safety Ecology Scale may help to fill a crucial gap in the literature. Past research has focused on individual relationships, such parental support or peer belonging (e.g., Kiefer et al., 2015), without assessing adolescents' perceptions of safety in the broader systems in which they exist (Blum et al., 2022). Additionally, many studies fail to measure social safety directly.

Instead, these studies use measures of social unsafety or threat as proxies (e.g., interpersonal distrust; Tsomokos & Slavich, 2024). Focusing solely on social threat, does not comprehensively assess social safety theory, which also emphasizes that chronic threat-vigilance can be downregulated only when individuals experience sufficient safety (Diamond & Alley, 2022). For instance, Troxel and colleagues (2025) investigated how adverse childhood experiences and discrimination relate to health in minoritized emerging adults. Although this work is important, it centers deficit and harm rather than safety. Safety, then, is not the opposite of threat. Instead, it is a separate construct, which must be consistently perceived in one's environment to successfully downregulate stress and improve health (Diamond & Alley, 2022).

Additionally, we cannot assume that experiencing social threat precludes us from experiencing aspects of social safety; the two constructs are not mutually exclusive and can coexist. For example, an adolescent may experience bullying at school (a social threat) but may feel that their friends will defend them and support them through their problems (a social safety schema). Using a strength-based approach may allow us to further understand how different types of social safety are linked to both social threat, and developmental outcomes such as health and well-being.

Conclusion

In sum, I developed a psychometrically valid, multidimensional measure of the social safety ecology, using a large, nationally representative Canadian sample. The Social Safety Ecology Scale is a promising tool to understand adolescents' perceptions of social safety at various levels of the social ecology. The factor structure showed four distinct but related social safety dimensions: family, friend, school, and community safety. The measure also demonstrated strong psychometric properties, including internal consistency, convergent and discriminant

validity, and performed relatively equivalently across gender identity and grade level. The Social Safety Ecology Scale provides an assessment tool that enables us to focus on social safety rather than the absence of social threat.

Chapter 3 – Exploring the Moderating Role of Social Safety on the Health and Well-Being of Adolescents Experiencing Bullying

Abstract

When adolescents have social safety – that is, they feel connected, protected and included – they may be buffered from some of the health problems associated with social threats like bullying (Slavich, 2020). Little research has examined whether perceived social safety in different contexts changes the relationship between bullying and health and whether these patterns differ by gender or grade. In the current study, I used data from youth in grades 6-10 from the 2022-2023 Canadian Health Behaviour in School-Aged Children survey, n = 26,571, to test whether friend, family, school, and community safety moderated the association between bullying victimization, well-being, and psychosomatic symptoms. I conducted multigroup path analyses to compare gender (cisgender boys, cisgender girls, gender diverse youth) and grade group (6-8 vs. 9-10). Across all groups, as hypothesized, bullying victimization was associated with lower well-being and higher psychosomatic symptoms. In contrast, perceived social safety was positively related to well-being and negatively related to psychosomatic symptoms, but contrary to my hypotheses, perceived social safety did not consistently buffer bullied youth from negative health. Unexpectedly, the association between bullying and negative health was often *stronger* at higher levels of perceived safety. Moreover, the significant school safety moderation effect did not differ significantly across gender or grade groups. Thus, school safety plays a complex role in the relationship between adolescent bullying and health, such that when bullying occurs in an environment where one expects to be safe, the violation of expectation may heighten its impact on health and well-being.

Introduction

Social safety, defined as the experience of connection, protection, and inclusion across interpersonal, school, and community contexts, is a key factor in human well-being (Slavich, 2020). In adolescence, these supportive contexts may be especially important for protecting youth from physical, microbial, or social threats, and their related health risks (Slavich, 2022). One such social threat is bullying, a relationship problem characterized by a power imbalance (Pepler, Craig et al., 2008). Bullying involves repeated, intentional aggression that may be verbal, emotional, physical, sexual, and/or cyber in nature (Vaillancourt et al., 2008). In childhood and adolescence, bullying is linked to a range of negative health outcomes, including anxiety, depression, backaches, and headaches (Agostini et al., 2019; Zou et al., 2013). Not all youth who experience bullying, however, will experience these adverse outcomes. Few studies have examined how social safety operates across multiple ecological contexts to buffer the health impacts of bullying victimization. Even fewer have explored whether this effect differs by gender identity or developmental stage. The current study bridges this gap by investigating whether perceived social safety at the friend, family, school, and community levels moderates the association between bullying victimization and physical and mental health among cisgender boys, cisgender girls, and gender diverse youth as well as across grade groups.

Bullying victimization is associated with a variety of physical and mental health problems (e.g., Biebl et al., 2011). For example, youth who experience bullying often face increased risks of anxiety, depression, and low self-esteem than do their non-bullied peers, potentially creating a developmental trajectory towards future victimization and poor health in adulthood (Copeland et al., 2013). These consequences are not limited to mental health issues. The stress associated with bullying also may result in psychosomatic symptoms, or physical

symptoms that worsen with stress (Gini, 2008; Greene & Walker, 1997). These symptoms may include headaches, gastrointestinal problems, sleep disturbances, and even increased susceptibility to cardiovascular problems (Gini & Pozzoli, 2013). Youth who experience bullying may also experience chronic threat-vigilance (Diamond & Alley, 2022). Chronic threat-vigilance is a constant state of heightened alertness and reactivity to threat cues with the goal of self-protection (Diamond & Alley, 2022). Although chronic threat-vigilance is often evolutionarily considered adaptive, it can be taxing over time (Diamond & Alley, 2022). In combination with the isolation and feelings of helplessness that bullied youth often face, it may also further exacerbate cycles of poor health (McDougall & Vaillancourt, 2015).

Being bullied, however, does not mean that a youth is destined to experience poor health and well-being across the lifespan. Social safety theory offers a promising framework for understanding how supportive social environments may contribute to youth health (Slavich, 2020). The brain has evolved to constantly scan the environment for threat, whether physical, microbial, or social (Slavich et al., 2023). When one learns to expect safety in their environment and relationships, they may be buffered from some of the harmful effects of stress. This buffering is done through downregulating the body's stress response systems, such as the hypothalamic-pituitary-adrenal (HPA) axis (Slavich, 2020). As such, social safety is expected to have a direct, positive association with adolescent health outcomes (Bränström et al., 2024; Slavich, 2022). However, little research has investigated experience how perceived social safety at different levels of that social ecology may serve to shield, even people experiencing social threat, from negative health.

Within a bullying context, social safety may act as a protective moderator, buffering against both the physiological and psychological toll of victimization (Renley et al., 2024).

Adolescents who perceive high and reliable levels of safety from friends, caregivers, teachers, or their broader community may experience lower stress compared to peers who feel unsafe (Bränström et al., 2024; Slavich, 2022). These perceptions form social safety schemas, which are cognitive representations of safety from the self, the social world, and the future (Slavich, 2020). Social safety schemas then inform how people interpret negative, neutral, and positive signals in their social world (Slavich, 2020), such that youth who hold positive social safety schemas may have a reduced stress response to bullying. Thus, youth with high social safety may be less likely to experience health problems than do youth with low social safety, perhaps even in the face of social threat. In fostering safe social relationships and environments at multiple levels – friend, family, school, and community – perceived social safety may play an important role in promoting well-being and mitigating health disparities associated with bullying (Alley et al., 2025).

Social safety may be especially relevant for youth who face systemic marginalization (Mulvey et al., 2018; Xu et al., 2020). For example, gender diverse youth experience higher rates of both bullying victimization and its negative mental and physical health consequences (Budge et al., 2014; Russell et al., 2014). Additionally, these youth are more likely than their cisgender peers to experience chronic social stressors, such as peer rejection (Cyrus, 2017; Hatzenbuehler, 2009) and systemic barriers (e.g., attending schools with only binary washrooms). Both of these experiences can compound the harmful effects of bullying victimization (Harris, 2009). Much of the literature has focused on the additional stressors that gender diverse youth face rather than exploring what social safety factors may help protect them against negative outcomes and allow them to explore positive identity-related factors like community, gender euphoria, and pride (Beischel et al., 2022; Budge et al., 2014). And many studies continue to prioritize measuring the

role of *stress* rather than the role of *safety* on health (e.g., Tsomokos & Slavich, 2024). To explore this question, I examined the moderating role of perceived social safety (from friends, family, school, and community) in the relationship between bullying and health with a specific focus on comparing gender diverse youth, cisgender boys, and cisgender girls.

In addition to exploring gender differences, I also investigated whether the relationship between bullying victimization, perceived social safety, and health and well-being varied by grade. Generally, bullying rates decline throughout adolescence, peaking in middle school (Bellmore et al., 2017; Kretschmer et al., 2017). This decline in bullying overlaps with the increased emergence of mental health challenges, such as depression and anxiety, especially during middle to late adolescence (Blakemore, 2019). Transitional periods, such as the move from middle school to high school around grade nine, may represent particularly important developmental stages (Låftman et al., 2024). These transitions often coincide with significant social and academic shifts. For example, youth may have to contend with new peer groups, evolving social hierarchies, changing academic demands, and a heightened sense of insecurity and uncertainty (Madjar et al., 2018; Sundqvist et al., 2024). Because of the developmental changes that occur during this time, we need to examine whether grade differences in perceived social safety moderate the relationship between bullying victimization and health.

Current Study

In the current study, I tested whether the social safety ecology buffers the relationship between bullying victimization and both psychosomatic symptoms and well-being. I hypothesized that perceived social safety at all levels (family, friend, school, and community) would buffer youth experiencing bullying from experiencing psychosomatic symptoms and increase well-being. Second, I tested whether the moderating effect of perceived social safety on

the relationship between bullying victimization and health may differ by gender and grade. I hypothesized that although social safety would be protective across groups, the strength of this buffering effect would vary. Specifically, I expected the buffering effect of perceived social safety to be weaker for gender diverse youth and cisgender girls, compared to cisgender boys, meaning that even at high levels of safety, the negative effects of bullying victimization might remain stronger for these groups. I also hypothesized that the buffering effect would be weaker for older youth (grades 9 and 10) compared to younger youth (grades 6 to 8).

Method

Procedure

I used data from the Health Behaviour in School-Aged Children (HBSC) study, a cross-national survey that is conducted every four years on youth in grades 6 to 10. This study collects a diverse, nationally representative sample of youth from across Canada. I specifically used the most recent Canadian sample, collected between 2022 and 2023.

All provinces (except New Brunswick) and two territories (Yukon and the Northwest Territories) participated in the survey. Schools were randomly selected from a list of eligible and consenting school jurisdictions; some used active consent procedures, whereas others used passive consent. After obtaining consent, students completed questionnaires about a variety of different health-related topics during school classes in a 45-70-minute session. The Research Ethics boards of both Queen's University and the Public Health Agency/Health Canada granted ethical clearance.

Participants

Overall, participants comprised 26,571 youth ages 11 to 16 years, with an average age of 13.9 years. Most participants (65.7%) were in grades 6-8, with approximately a third (34.3%) in

grades 9-10. Although a majority of the participants identified as white (65.3%), many other diverse racial/ethnic identities were included as well (see Table 1.1). The percentage of cisgender girls (45.8%) and cisgender boys (48.2%) was similar, with 6% of the sample identifying as transgender or gender diverse.

Measures

Demographics

Students reported their grade, ethnicity, sex assigned at birth, and gender identity. For my analyses, I divided the students into two grade groups: 6-8 and 9-10. Students could identify their gender as boy, girl, neither boy nor girl, or other (an open text box in which they could further specify their gender). Participants also indicated what sex they were registered at birth, with the options of male or female. From these two questions, I was able to compute a variable to identify youth who were transgender or gender diverse.

Social Safety Ecology Scale

The Social Safety Ecology scale was developed to assess adolescents' perceived social safety across multiple levels of the social ecology. Guided by social safety theory (Slavich, 2020, 2022), I selected and adapted items from existing HBSC survey questions to capture adolescents' sense of connection, protection, and inclusion in key social contexts. The final scale consisted of 30 items across four theoretically informed domains: family safety (7 items), friend safety (4 items), school safety (14 items), and community safety (5 items). As seen in Chapter 2, an exploratory and confirmatory factor analysis supported a four-factor structure. Each domain represents a distinct level of adolescents' social ecology, which were analyzed as separate subscales rather than as a combined total score to preserve the conceptual distinctions between different sources of safety.

The school safety subscale captured students' sense of belonging, fairness, and support from both peers and teachers (e.g., "I feel I belong at this school," "Our teachers treat us fairly," "I feel that my teachers care about me as a person"). Internal consistency was excellent (α = .94). The family safety subscale comprised items like "My parent(s)/guardian(s) understand me," "I get the emotional help and support I need from my family," and "My family is willing to help me make decisions". Internal consistency was excellent (α = .92). The friend safety subscale encompassed emotional support and reliability among friends (e.g., "My friends really try to help me," "I can count on my friends when things go wrong," "I can share both my happy and sad feelings with my friends"). Internal consistency was excellent (α = .93). The community safety subscale assessed perceived safety within the broader neighbourhood or community (e.g., "You can trust people around here," "It is safe for younger children to play outside during the day"). Internal consistency was good (α = .80).

Responses were recorded on five-point scales ranging from 1 (*strongly disagree* or *never*) to 5 (*strongly agree* or *always*), depending on item wording. Higher scores indicated higher perceived safety. The overall scale demonstrated excellent internal consistency (α = .93), supporting the reliability of the measure across ecological domains.

Bullying Victimization

To assess bullying victimization, I used an adapted version of the revised Olweus Bully/Victim Questionnaire (Olweus, 1996). Participants read a definition of bullying before answering the questions. Students then answered questions about how many times they had been bullied at school in the past two months. This measure contained 10 items that measured relational, verbal, physical, sexual, and identity-based (weight-based, racial, religious, gender-based, and sexuality-based) bullying. Participants responded using a five-point scale that ranged

from 0 (*I have not been bullied this way in the past couple of months*) to 4 (*I have been bullied this way several times a week in the past few months*). Higher scores indicated higher bullying involvement. This scale demonstrated excellent internal consistency, α = .87.

WHO-5 Well-being Index

To get a general measure of mental health and well-being, I used the WHO-5 Well-being index (World Health Organization, 1998). This scale is comprised of five items as follows: "I have felt cheerful and in good spirits," "I have felt calm and relaxed," "I have felt active and energetic," "I woke up feeling rested," and "My daily life has been filled with things that interest me." Students responded to each of these questions by stating how often they felt each measure, with a five-point scale ranging from 0 (*At no time*) to 5 (*All of the time*). This scale demonstrated excellent internal consistency, α = .89. Higher scores indicated better well-being.

Psychosomatic Symptoms

To further assess physical and mental health, I used the HBSC Symptom Checklist (HBSC-SCL; see Gariepy et al., 2016). This scale contained eight items about various mental and physical health symptoms, and students responded using a five-point scale that ranged from 1 ([*I experience this symptom*] *about every day*) to 5 ([*I experience this symptom*] *rarely or never*). This scale showed excellent internal consistency, α = 0.90. I recoded this scale so that higher scores indicated higher psychosomatic symptoms.

Data Analysis

To analyze my data, I first looked at Pearson bivariate correlations in R i386 4.4.2 (R Core Team, 2025) using the psych package (Revelle, 2025). The correlation matrix included bullying victimization, four dimensions of perceived social safety (friend, community, family, and school safety), grade group (dummy coded: 0 = grades 6-8; 1 = grades 9-10), well-being, and

psychosomatic symptoms. I then conducted a multigroup path analysis. I estimated the models using the lavaan package (Rosseel, 2012) with maximum likelihood estimation and robust standard errors (MLR). The model included bullying victimization as the predictor, four subscales of perceived social safety (friend, community, family, and school safety) as moderators, and well-being and psychosomatic symptoms as outcome variables. All continuous predictors were mean-centered prior to computing interaction terms. To assess moderation, I modeled both the simple effects of bullying and social safety, as well as their interaction terms, on each outcome.

To examine whether the associations between bullying victimization, social safety, and psychosomatic symptoms/well-being varied by gender and grade, I conducted a multigroup path analysis with structural equation modeling (SEM) in R i386 4.4.2 (2024) using lavaan (Rosseel, 2012). The model included bullying victimization and four types of social safety (community, family, friend, and school) as predictors, and psychosomatic symptoms and well-being as outcomes. I also included grade or gender in the model as a covariate.

To test for gender and grade differences in the paths themselves, I systematically constrained each interaction term to equality across groups and compared these constrained models to the fully unconstrained model using scaled chi-square difference tests (Satorra & Bentler, 2001). When the moderation effects varied significantly by gender or grade, I then ran follow-up models that constrained the relevant interaction path to equality between two gender or grade groups at a time (e.g., cisgender boys and cisgender girls; cisgender boys and gender diverse youth; cisgender girls and gender diverse youth). Because my primary research question centered on whether perceived social safety differentially moderates the impact of bullying across gender and grade groups, rather than whether the simple effects of bullying or perceived

social safety alone differ by group, I systematically constrained only the interaction terms to probe whether there were differences between genders and grade groups on the interactions.

In addition, I tested the significant interactions between bullying victimization and each social safety type to further understand the moderating effect of perceived social safety on the relationship between bullying and psychosomatic symptoms and well-being. To test which groups differed, I conducted simple slopes analyses using the modsem package (Slupphaug et al., 2025) in R i386 4.4.2 (R Core Team, 2025), testing the association between bullying victimization and psychosomatic symptoms or well-being at lower (-1 *SD*), mean, and higher (+1 *SD*) levels of each safety type.

Results

Bivariate Correlations

To explore the associations between study variables, I conducted Pearson bivariate correlation analyses. As shown in Table 3.1, bullying victimization was associated with lower social safety, lower well-being, and higher psychosomatic symptoms. Each dimension of perceived social safety was positively associated with well-being and negatively associated with psychosomatic symptoms, supporting their protective role in adolescent health. The four social safety subscales were positively interrelated, reflecting shared variance across ecological contexts. Grade group showed small but significant correlations with several variables, suggesting slight declines in perceived safety and well-being among students in grades 9-10. These patterns are consistent with the broader literature and underscore the central role of social safety in relation to both bullying and adolescent health.

Table 3.1

Bivariate Correlations Between Study Variables

Variable	1	2	3	4	5	6	7	8
1. Bullying victimization	—							
2. Friend safety	-.16***	—						
3. Community safety	-.16***	.20***	—					
4. Family safety	-.24***	.39***	.31***	—				
5. School safety	-.35***	.27***	.36***	.43***	—			
6. Grade group	-.05***	.01	-.02**	-.10***	-.09***	—		
7. WHO-5 Well-being	-.26***	.25***	.34***	.50***	.50***	-.14***	—	
8. Psychosomatic symptoms	.35***	-.16***	-.22***	-.45***	-.43***	.15***	-.56***	—

Note. * $p < .05$; ** $p < .01$; *** $p < .001$.

Intraclass Correlations

To assess the degree of clustering within schools, I estimated two unconditional (null) multilevel models using the lavaan package in R i386 4.4.2 (R Core Team, 2025; Rosseel, 2012), with school specified as the clustering variable. These models examined the extent to which scores on well-being and psychosomatic symptoms varied between versus within schools.

Although both ICCs were statistically significant (*ps* < .001; see Table 3.2 for more details), they indicated that only a small proportion of variance in outcomes was attributable to school-level clustering. Additionally, gender groups differed substantially in size, and no study hypotheses focused on school-level effects. Based on the low ICCs, unbalanced group sizes, and the absence of a theoretical rationale for modeling school-level predictors (Hox et al., 2017), I proceeded with a single-level multigroup path analysis rather than a multilevel SEM.

Table 3.2

Intraclass Correlations and Variance Components for Outcome Variables

Outcome	Between-School Variance	*SE*	Within-School Variance	*SE*	ICC
WHO-5 Well-being	0.06	0.007	1.34	0.012	.040
Psychosomatic Symptoms	0.05	0.005	0.94	0.008	.047

Gender Multigroup Path Analysis

The unconstrained multigroup model demonstrated perfect fit as expected for a fully saturated model. The model explained 39.2% of the variance in well-being and 36.8% of the variance in psychosomatic symptoms for cisgender boys, 32.2% of the variance in well-being and 21.7% in psychosomatic symptoms for cisgender girls, and 33.9% of the variance in well-being and 28.1% in psychosomatic symptoms for gender diverse youth.

To test for gender differences, I compared a constrained model in which all regression paths and intercepts were set equal across groups to the unconstrained model. The constrained model fit significantly worse than the unconstrained model, $\Delta\chi^2$ (40) = 2232, $p < .001$, indicating that at least some associations differed across gender groups. See Table 3.3 for a table summarizing the simple effects and interaction effects by gender. This table also notes which interaction effects differed between groups.

Table 3.3

Path Coefficients from Unconstrained Multigroup Path Analysis Predicting Well-being and Psychosomatic Symptoms by Gender Group

Predictor (x Outcome)	*b*	*b*	*b*	Interaction Differed by Group?
	Cisgender Boys	**Cisgender Girls**	**Gender Diverse Youth**	
Psychosomatic Symptoms				
Bullying victimization	**0.424*****	**0.321*****	**0.338*****	
Friend safety	0.009	0.006	**0.064****	
Community safety	-0.007	**-0.034****	**-0.014**	
Family safety	**-0.262*****	**-0.189*****	**-0.262*****	
School safety	**-0.342*****	**-0.177*****	**-0.341*****	
Grade group	**0.328*****	**0.133*****	**0.179*****	
Bullying x Friend safety	-0.010	-0.017	-0.038	No
Bullying x Community safety	-0.024	0.005	-0.019	No
Bullying x Family safety	**0.033***	-0.029	0.040	Yes
Bullying x School safety	**0.109*****	**0.050***	**0.100****	No
Well-Being				
Bullying victimization	**-0.109*****	**-0.138*****	**-0.119****	
Friend safety	**0.050*****	**0.052*****	0.002	
Community safety	**0.180*****	**0.200*****	**0.092***	
Family safety	**0.316*****	**0.285*****	**0.318*****	
School safety	**0.480*****	**0.397*****	**0.485*****	
Grade group	**-0.250*****	**-0.199*****	**-0.104***	
Bullying x Friend safety	**0.035****	-0.019	0.006	Yes
Bullying x Community safety	0.025	**-0.047***	**0.105****	Yes
Bullying x Family safety	-0.015	0.021	-0.033	No
Bullying x School safety	**-0.073****	-0.012	-0.058	No

Note. *b* = unstandardized estimate. P-values are two-tailed. Items are bolded to indicate statistical significance. * $p < .05$; **$p < .01$; ***$p < .001$.

Psychosomatic Symptoms

For psychosomatic symptoms, the bullying victimization by family safety interaction showed significant gender differences. The bullying victimization by school safety, bullying

victimization by friend safety, and bullying victimization by community safety interactions did not significantly differ by gender. See Table 3.4 for more details.

Table 3.4

Chi-Square Difference Tests Comparing Gender-Constrained and Freely Estimated Models

Constrained Path	$\Delta\chi^2$ (df = 2)	*p*
Bully x Friend Safety → Psychosomatic	0.90	.639
Bully x Community Safety → Psychosomatic	1.16	.561
Bully x Family Safety → Psychosomatic	**7.73**	**.021**
Bully x School Safety → Psychosomatic	4.66	.097
Bully x Friend Safety → Well-being	**7.02**	**.030**
Bully x Community Safety → Well-being	**13.99**	**.001**
Bully x Family Safety → Well-being	2.90	.234
Bully x School Safety → Well-being	3.71	.156

Note. $\Delta\chi^2$ values reflect Satorra-Bentler scaled chi-square difference tests. All comparisons test whether a single interaction term can be constrained across gender groups without significant loss of model fit.

Next, I followed up the significantly different interactions to see which specific gender groups differed. For the bullying victimization by family safety interaction predicting psychosomatic symptoms, there was a significant difference between cisgender boys and cisgender girls, whereby this interaction was significant for cisgender boys but not cisgender girls. See Table 3.5. To examine the nature of the significantly different interactions, I conducted simple slopes analyses for each gender group. For cisgender boys, a significant interaction between bullying victimization and family safety predicted psychosomatic symptoms. Simple slopes analyses showed that bullying victimization was not significantly associated with psychosomatic symptoms at lower levels of family safety (-1 *SD*; $b = -0.052$, $SE = 0.029$, $p = .073$, 95% CI [-0.110, 0.005]), but was significantly associated at average ($b = 0.262$, $SE = 0.010$, $p < .001$, 95% CI [0.240, 0.281]) and higher levels of family safety (+1 *SD*; $b = 0.576$, *SE*

= 0.027, $p < .001$, 95% CI [0.520, 0.629]). Thus, the association between bullying victimization and psychosomatic symptoms became positive and stronger as family safety increased.

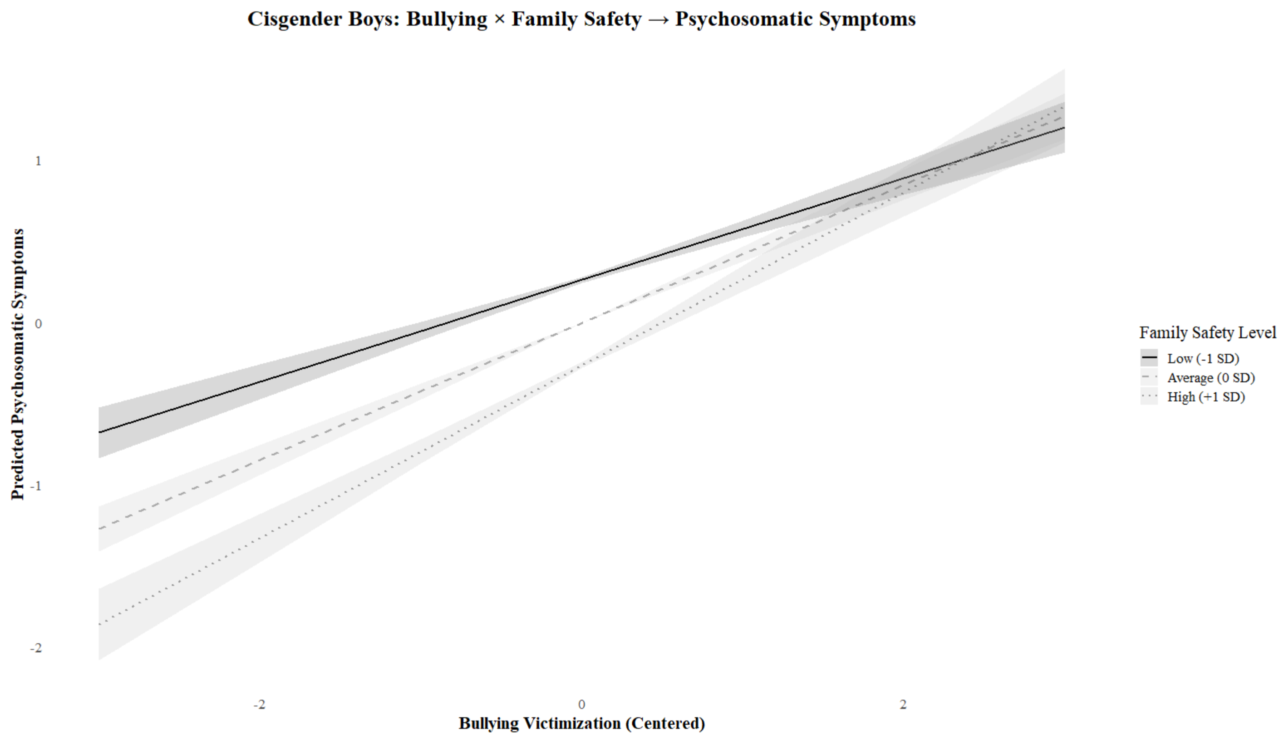
Table 3.5

Pairwise Comparisons of Gender Differences in Bullying Victimization by Social Safety Interactions

Interaction Term (Outcome)	**Group Comparison**	**$\Delta\chi^2$ (df = 1)**	***p***
Bully x Friend Safety → Well-being	**Cis Boys vs. Cis Girls**	**6.34**	**.012**
	Cis Boys vs. Gender Diverse	0.93	.336
	Cis Girls vs. Gender Diverse	0.77	.381
Bully x Community Safety → Well-being	**Cis Boys vs. Cis Girls**	**6.53**	**.011**
	Cis Boys vs. Gender Diverse	2.81	.093
	Cis Girls vs. Gender Diverse	**10.66**	**.001**
Bully x Family Safety → Well-being	**Cis Boys vs. Cis Girls**	**6.51**	**.011**
	Cis Boys vs. Gender Diverse	0.03	.860
	Cis Girls vs. Gender Diverse	2.96	.085

Figure 3.1

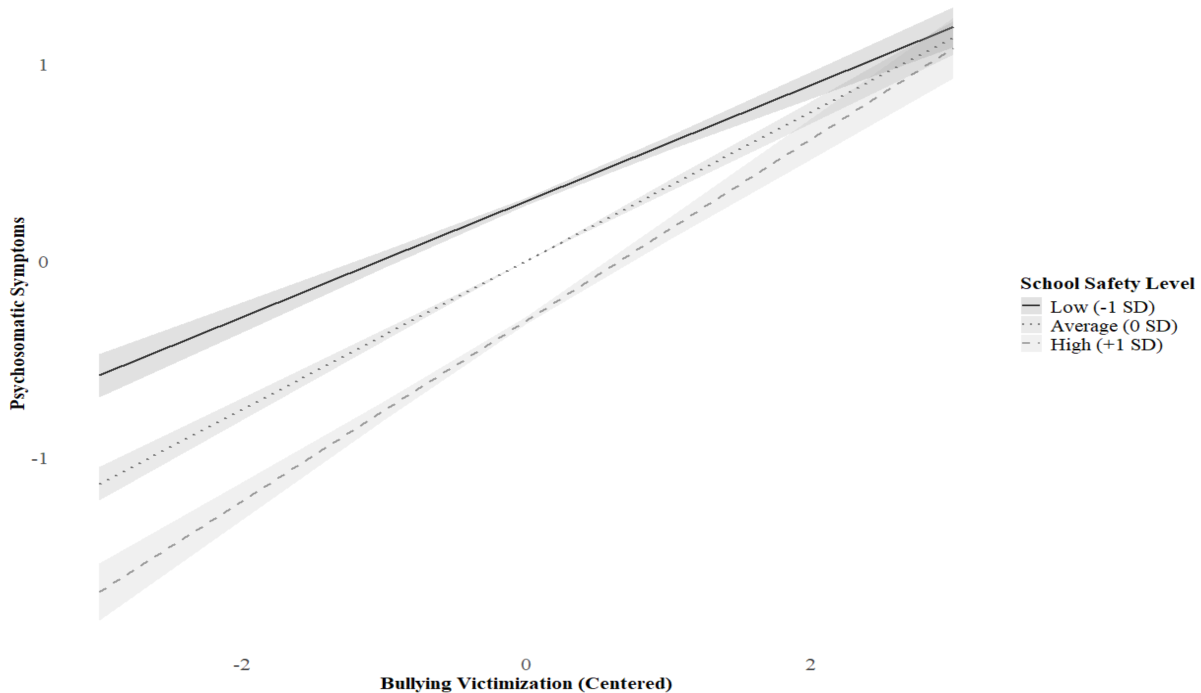
Simple Slopes Plot of the Interaction Between Bullying Victimization and Family Safety on Psychosomatic Symptoms Among Cisgender Boys



The bullying victimization by school safety interaction was significant for all gender groups but did not differ across them, so I examined the simple slopes collapsed across gender to understand the nature of the interaction. Bullying victimization was significantly positively associated with psychosomatic symptoms at all levels of school safety, with the strength of the association significantly stronger at higher levels of school safety: at lower school safety, b = 0.30, SE = 0.02, $p < .001$, 95% CI [0.26, 0.33], at average school safety, b = 0.38, SE = 0.01, $p < .001$, 95% CI [0.35, 0.41], and at higher school safety, b = 0.46, SE = 0.03, $p < .001$, 95% CI [0.41, 0.51]. See Figure 3.2.

Figure 3.2

Simple Slopes Plot of the Interaction Between Bullying Victimization and School Safety on Psychosomatic Symptoms



Well-Being

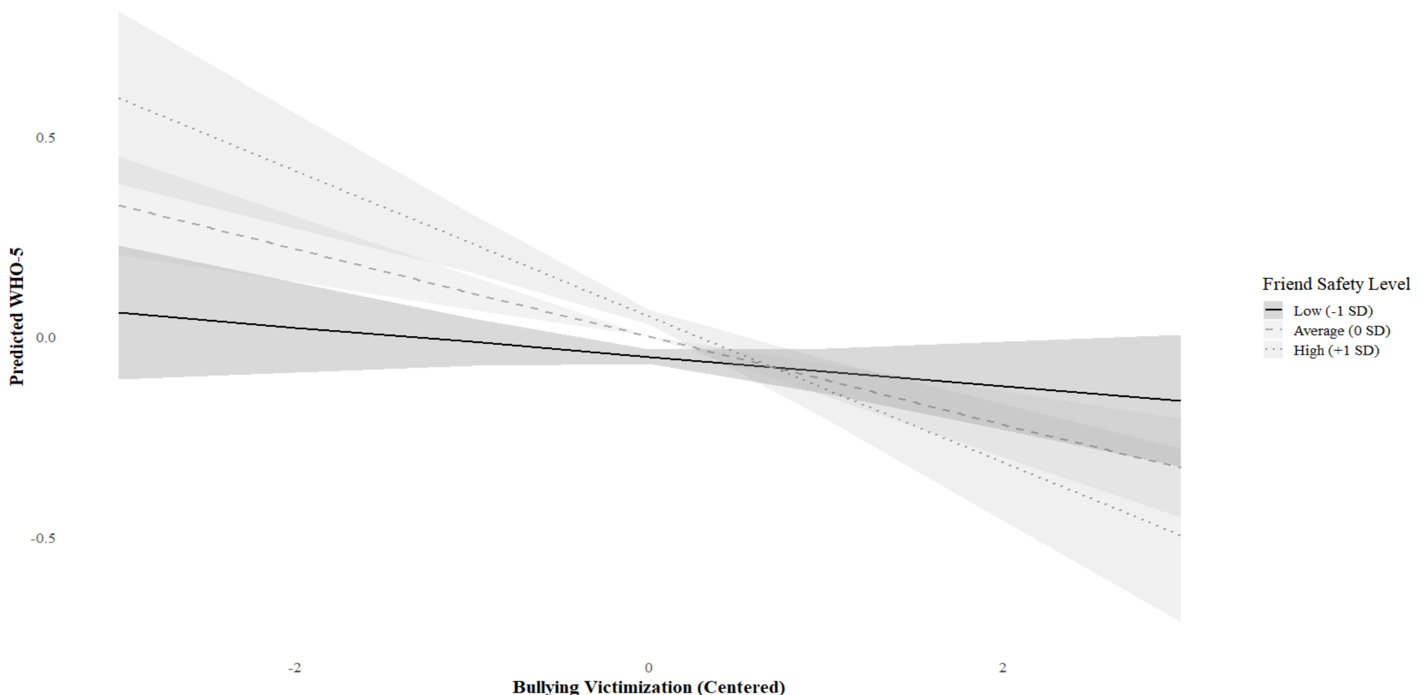
For well-being, constraining the bullying victimization by friend safety interaction to equality across gender significantly made the model fit worse, indicating that this interaction differed by gender. Similarly, constraining the bullying victimization by community safety interaction also resulted in a significant deterioration of model fit. In contrast, I found no significant gender differences when constraining the bullying victimization by family safety interaction, or the bullying victimization by school safety interaction, suggesting that these interactions did not differ by gender. See Table 3.4 for more details.

I then followed up to examine which specific gender groups differed for each significant interaction. For the bullying victimization by friend safety interaction, the difference between cisgender boys and cisgender girls was significant, indicating that the effect of friend safety

differed between these groups. For cisgender boys, the negative association between bullying victimization and well-being was strongest when friend safety was higher. At lower levels of friend safety (-1 *SD*), the association between bullying victimization and well-being was nonsignificant, $b = -0.010$, $SE = 0.030$, $p = .658$, 95% CI [-0.072, 0.046]. At average levels of friend safety, bullying victimization was significantly associated with lower well-being, $b = -0.109$, $SE = 0.021$, $p < .001$, 95% CI [-0.150, -0.069], and this association was significantly stronger at higher friend safety (+1 *SD*), $b = -0.132$, $SE = 0.038$, $p = .001$, 95% CI [-0.207, -0.057]. See Figure 3.3. For cisgender girls, this interaction effect was non-significant.

Figure 3.3

Simple Slopes Plot of the Interaction Between Bullying Victimization and Friend Safety on Well-being Among Cisgender Boys



For the bullying victimization by community safety interaction predicting well-being, there was a significant difference between cisgender boys and cisgender girls. See Table 3.5 for more details. For cisgender boys, the bullying victimization by community safety interaction was

not significant for well-being, whereas for cisgender girls, this interaction was significant. Simple slopes analyses indicated that for cisgender girls, bullying victimization was significantly negatively associated with well-being across all levels of community safety: at low community safety (-1 *SD*; $b = -0.306$, $SE = 0.038$, $p < .001$, 95% CI [-0.380, -0.233]), at average community safety (0 *SD*; $b = -0.397$, $SE = 0.017$, $p < .001$, 95% CI [-0.431, -0.363]), and at high community safety (+1 *SD*; $b = -0.488$, $SE = 0.032$, $p < .001$, 95% CI [-0.551, -0.425]). The strength of the association between bullying victimization and well-being became significantly stronger at higher levels of community safety. See Figure 3.4 in the Appendix.

There was also a significant difference between cisgender girls and gender diverse youth for the bullying victimization by community safety interaction predicting well-being, such that the interaction effect was stronger for cisgender girls than for gender diverse youth. Among gender diverse youth, the bullying victimization by community safety interaction was also significant for well-being. Simple slopes analyses revealed that bullying victimization was not significantly associated with well-being at low community safety (-1 *SD*; $b = -0.031$, $SE = 0.062$, $p = .611$, 95% CI [-0.153, 0.090]), but was significantly negatively associated at average ($b = -0.092$, $SE = 0.041$, $p = .024$, 95% CI [-0.172, -0.012]) and high levels of community safety (+1 *SD*; $b = -0.153$, $SE = 0.072$, $p = .033$, 95% CI [-0.294, -0.012]). See Figure 3.5 in the Appendix.

Grade Multigroup Path Analysis

To examine whether the associations between bullying victimization, perceived social safety, and psychosomatic symptoms/well-being varied by grade group, I conducted a multigroup path analysis using structural equation modeling. The unconstrained multigroup model, in which parameters were freely estimated for youth in grades 6-8 and grades 9-10, demonstrated perfect fit, as expected for a fully saturated model. Among youth in grades 6-8 (*n* =

14,334), the model accounted for 40.3% of the variance in well-being and 34.5% of the variance in psychosomatic symptoms. Among youth in grades 9-10 (n = 7,676), the model accounted for 33.8% of the variance in well-being and 32.6% of the variance in psychosomatic symptoms. Interaction effects were mostly nonsignificant, with the exception of the bullying victimization by school safety interaction predicting psychosomatic symptoms. All other interaction terms (bullying victimization by friend, community, and family safety) were nonsignificant for both outcomes. See Table 3.6 for more details.

Table 3.6

Path Coefficients from Unconstrained Multigroup Path Analysis Predicting Psychosomatic Symptoms and Well-Being by Grade Group

Predictor (x Outcome)	***b***	***b***	**Interaction Differed by Group?**
	Grades 6-8	**Grades 9-10**	
Psychosomatic Symptoms			
Bullying victimization	**0.387*** **	**0.411*** **	
Friend safety	**0.032*** **	**0.064*** **	
Community safety	**-0.033** **	**-0.031* **	
Family safety	**-0.270*** **	**-0.309*** **	
School safety	**-0.289*** **	**-0.295*** **	
Gender identity	**-0.177*** **	**-0.315*** **	
Bullying x Friend safety	-0.001	-0.034	Yes
Bullying x Community safety	-0.013	0.011	No
Bullying x Family safety	-0.009	-0.007	Yes
Bullying x School safety	**0.056** **	**0.139*** **	No
Well-Being			
Bullying victimization	**-0.153*** **	**-0.140*** **	
Friend safety	**0.025** **	0.012	
Community safety	**0.192*** **	**0.205*** **	
Family safety	**0.349*** **	**0.343*** **	
School safety	**0.479*** **	**0.433*** **	
Gender identity	**0.086*** **	**0.149*** **	
Bullying x Friend safety	0.004	-0.001	No

Predictor (x Outcome)	***b***	***b***	**Interaction Differed by Group?**
Bullying x Community safety	0.005	-0.025	No
Bullying x Family safety	0.021	-0.037	No
Bullying x School safety	**-0.045***	-0.033	No

Note. *b* = unstandardized estimate. P-values are two-tailed. Items are bolded to indicate statistical significance. * $p < .05$; ** $p < .01$; *** $p < .001$.

I then compared a constrained model in which all regression paths and intercepts were set equal across students in Grades 6-8 and Grades 9-10 to the unconstrained grade-stratified model. The constrained model fit significantly worse than the unconstrained model, $\Delta\chi^2$ (22) = 380.36, $p < .001$, indicating that at least some associations varied across grade groups.

To test whether specific interaction effects differed by grade group, I constrained each significant interaction path individually and compared each constrained model to the unconstrained multigroup model. Constraining the effect of the bullying victimization by friend safety interaction on psychosomatic symptoms significantly worsened model fit, indicating that this interaction varied across grade groups. Similarly, constraining the bullying victimization by family safety interaction on psychosomatic symptoms also led to a significant decrease in model fit. See Table 3.7 for more details. In the unconstrained model, none of these interactions were statistically significant within either grade group when tested individually.

Table 3.7

Chi-Square Difference Tests Comparing Grade-Constrained and Freely Estimated Models

Constrained Path	$\Delta\chi^2$ (df = 1)	*p*
Bully x Friend Safety → Psychosomatic	**4.75**	**.029**
Bully x Community Safety → Psychosomatic	0.03	.852
Bully x Family Safety → Psychosomatic	**5.77**	**.016**
Bully x School Safety → Psychosomatic	0.01	.922
Bully x Friend Safety → Well-being	0.58	.447
Bully x Community Safety → Well-being	0.24	.624
Bully x Family Safety → Well-being	2.80	.094
Bully x School Safety → Well-being	0.50	.478

Discussion

Adolescence is a critical developmental period during which experiences of social connection, or the lack thereof, can shape mental and physical health and well-being (Baker et al., 2025). I examined whether perceived social safety moderated the association between bullying victimization and psychosomatic symptoms and well-being in adolescence. I also tested whether these patterns varied by gender identity and grade level. As anticipated, all forms of perceived social safety were positively associated with well-being and negatively associated with psychosomatic symptoms. Counter to my hypotheses, perceived social safety generally did not play a buffering role on the relationship between bullying victimization and health and well-being, but rather at high levels of social safety these relationships were exacerbated, particularly for school safety. These patterns were similar across genders, suggesting that despite gender diverse adolescents' increased likelihood of bullying victimization and negative health, social safety may serve a relatively similar role for all youth.

The Moderating Role of Social Safety

Unexpectedly, perceived social safety did not buffer the relationship between bullying victimization and health outcomes. Instead, in some cases, it exacerbated the negative effects of bullying victimization. School safety was the only consistent moderator across gender groups,

with bullying victimization more strongly associated with psychosomatic symptoms when school safety was perceived to be high. Several explanations may account for this pattern. Most adolescent bullying occurs at school (Swearer & Espelage, 2004), making the salience of school safety particularly relevant in the relationship between bullying victimization and health and well-being. During adolescence, peer evaluation and social belonging at school become even more central components of one's psychosocial functioning (Allen et al., 2018; Arslan & Coşkun, 2020). When youth perceive their overall school environment as safe, victimization can seem incongruent with their expectations in that environment. When adolescents are faced with such contexts, they may reason that if their school is safe, yet they are still targeted, the cause must lie within themselves. This socio-cognitive process can foster self-blame, where youth attribute victimization inward to personal flaws rather than to external or systemic factors (Weiner, 1985; Yun & Juvonen, 2020).

Additionally, when students experience bullying in an environment they otherwise perceive as safe, this mismatch may trigger a sense of expectancy violation, which could, in turn, lead to heightened distress (Burgoon, 2015; Mendes et al., 2007). The match/mismatch hypothesis (e.g., Santarelli et al., 2014) posits a similar explanation, where a person's environment shapes coping mechanisms in a way that makes them more adapted to face similar environments in the future, even when that environment is stressful. As a result, environments perceived as safe may lower one's baseline threat-vigilance, making instances of bullying feel destabilizing. Youth who perceive low safety at school may already be experiencing chronic threat-vigilance (Diamond & Alley, 2022), meaning they may already be in a state of activation and thus less differentially impacted by bullying experiences. Additionally, youth who report low school safety may be already experiencing other social threats, such as isolation, aggression, and

other forms of exclusion, all of which may lead them to experience a variety of mental and physical health problems (Slavich et al., 2023). For these youth, bullying victimization, while still harmful, may be perceived as more normative or “just one more stressor”, so the additional impact on symptoms may be less distinct than those who perceive high school safety.

This finding coincides with research on institutional betrayal, whereby people who experience a trauma in a trusted context where they expect support, may experience compounded trauma and stress-related health outcomes (Smith & Freyd, 2013, 2017). Thus, when youth experience victimization in settings they believe should protect them, they experience both an interpersonal and institutional betrayal, potentially exacerbating negative health. This experience may be particularly threatening for youth with high perceptions of school safety, for whom such violations represent both a social and institutional threat.

Gender and Grade Differences

Social safety may not function the same for all genders. For cisgender girls, bullying victimization was associated with lower well-being across all levels of community safety. Interestingly, the strength of this association became more negative at higher levels of community safety. In other words, rather than buffering against the effects of bullying victimization, higher levels of community safety exacerbated the negative association between bullying victimization and well-being. This counterintuitive finding implies that when cisgender girls see their neighbourhood and communities as safe, the relative impact of bullying victimization on their well-being may be stronger than when they do not see their communities as safe. This pattern corresponds with previously discussed perspectives such as the expectancy violation framework and the match/mismatch hypothesis (Burgoon, 2015; Mendes et al., 2007;

Santarelli et al., 2014), which suggest that experiencing an unexpected social threat when one is expecting safety may be more harmful than if one is accustomed to experiencing social threat.

For gender diverse youth, this moderation effect had a different pattern than for cisgender girls. At low levels of community safety, bullying victimization was not significantly associated with well-being. However, at average and high levels of community safety, bullying victimization was significantly linked to poorer well-being, with the association strengthening as community safety increased. This finding again suggests that when gender diverse youth perceive higher levels of safety in their community, experiencing bullying may run counter to their expectations of inclusion and safety, intensifying its negative impact on well-being (Prokopenko & Hango, 2022). An important next step would be to explicitly examine *where* these youth are experiencing bullying to further probe the relevance of these theoretical perspectives. In this way, examining the specific contexts in which bullying occurs may clarify whether the mismatch between perceived safety in a specific context and lived experiences of bullying in that same context contributes to the stronger negative effects observed at higher levels of community safety.

There also was a significant difference between cisgender boys and girls for friend safety moderating the relationship between bullying victimization and well-being, whereby the interaction was significant for cisgender boys but not girls. This finding may give further insight into how gendered socialization may influence the development of friend safety in adolescence. The friend safety items in this study emphasized intimacy and emotional vulnerability ("I can share my feelings," "I can talk about my problems," "I can count on my friends"), qualities that the literature has shown are less normative in boys' friendships, compared to girls' (Way, 2011). Cisgender boys' friendships often focus more on companionship and shared activities over

emotional disclosure (Rose & Rudolph, 2006; Rudolph & Dodson, 2022; Way, 2011). When boys reported low levels of friend safety, bullying victimization was not significantly associated with well-being. In contrast, when boys reported high levels of friend safety, the negative association between bullying victimization and well-being was strongest. It is possible that, for cisgender boys, relying on emotionally supportive friendships may then heighten their vulnerability when bullying occurs. This pattern again aligns with expectancy violation and betrayal frameworks (e.g., Burgoon, 2015; Mendes et al., 2007; Smith & Freyd, 2013).

Girls also are more likely to defend their peers from bullying than are boys (Batanova et al., 2014; Porter, 2009; Trach et al., 2010), and they are more likely to maintain that defending role across different friendship groups (Salmivalli et al., 1998). Thus, for boys experiencing bullying, if their expectations of safety from their friends are not met, the relationship between bullying victimization and well-being may be more negative. Although strong friendships can be protective, when boys experience bullying, it may intensify the negative impact of bullying victimization if their friends do not defend them, because it violates the trust and support expected within a friendship. Future researchers may want to consider explicitly examining the role of defending in this relationship.

With respect to developmental patterns, the moderating effect of school safety on the relationship between bullying victimization and psychosomatic symptoms was significant for both youth in grades 6-8 and youth in grades 9-10. Additionally, these results showed a similar exacerbation pattern, such that the relationship between bullying victimization and psychosomatic symptoms was significantly stronger at higher levels of school safety. Although school safety significantly moderated the relationship between bullying victimization and well-being for youth in grades 6-8 and not for youth in grades 9-10, the two groups were not

significantly different from each other. These findings again point to the role of expectancy violation. The consistency of this result across grade groups suggests that school safety plays an important role across developmental stages (e.g., Strindberg & Horton, 2022). Perhaps, regardless of age, experiencing bullying in a school context one perceives as safe violates one's expectations in a way that exacerbates its impact.

Limitations and Future Directions

This study also has several limitations. First, because the data are cross-sectional, I cannot draw causal inferences or infer the directionality of associations between bullying victimization, social safety, and health (Kesmodel, 2018). For example, perceived social safety may predict bullying victimization, or youth with higher levels of psychosomatic symptoms are more primed to anticipate lower social safety. Longitudinal research should be conducted to clarify how these factors influence one another over time. Doing longitudinal research may help us understand how social safety develops and its impact on health outcomes during adolescence. Second, I did not include biological indicators of social safety, such as cortisol or immune functioning (Ravi et al., 2021). Including these factors would allow us to test the underlying mechanisms that may link social safety to changes in health (Slavich, 2020). Future researchers may consider integrating physiological or immunological measures alongside the Social Safety Ecology Scale to better understand both biological and socio-cognitive influences on social safety.

Additionally, school safety was measured through adolescents' *perceptions* of their school context, rather than assessing objective structural-level factors. Incorporating school-level climate measures, such as schools' implementation of anti-bullying policies, could clarify contextual effects and could help formally test the healthy context paradox. The healthy context

paradox states that in schools with low rates of bullying, youth who experience victimization may have worse outcomes than bullied youth who attend schools with high bullying rates (Yun & Juvonen, 2020). Assessing bullying at the school level would enable the examination of the role of perceived school safety in the healthy context paradox and examine how well perceived school safety aligns with average bullying rates in schools.

Next, I did not use school clustering in my analyses, meaning that the standard error may be higher than if I took a multilevel modeling approach. I also did not use provincial weighting in my analyses, which could help correct for the oversampling of certain provinces, such as Manitoba, in my dataset. Future researchers may want to consider alternative approaches that could better account for school-level clustering and provincial/territorial representation, to ensure the results are generalizable to Canada as a whole.

Finally, although the sample included a large number of gender diverse youth relative to other studies, this group remained smaller than cisgender groups, which limited my statistical power, especially when assessing moderation effects. Additionally, I was unable to compare between different groups of gender diverse youth. Gender diverse youth are not a homogenous group; there may be important differences to explore when further granulating into categories (e.g., binary versus nonbinary transgender youth; Wilkinson et al., 2021). Future studies should oversample gender diverse youth to allow for more robust within-group analyses. The unexpected exacerbation effects I found also warrant further exploration through frameworks like expectancy violation and match/mismatch.

Conclusion

The current study combined a social safety theory perspective with a social ecological framework to help advance our understanding of how perceived social safety moderates the

relationship between bullying victimization and adolescent health. Contrary to my original hypothesis, perceived social safety, especially school safety, did not buffer the effects of bullying. Instead, it exacerbated them. Therefore, the context in which harm or safety occurs may change its associations with health and well-being. These amplification effects, observed across gender and grade groups, may reflect expectancy violations or mismatches between expectations of safety and social threat (Santarelli et al., 2014). Additionally, I found that perceptions of social safety were important across diverse groups, with similar moderation effects observed across gender and grade groups – emphasizing that safety is important for everyone. Researchers, educators, and policymakers should pursue approaches that promote safety and account for how youth interpret and respond to social threat in environments they expect to be protective.

Chapter 4 – Examining Trends in Social Safety and Bullying Across Canadian Cohorts

Abstract

Social safety, including perceptions of connection, protection, and inclusion, is a multidimensional construct that is context dependent. Beyond their immediate interpersonal environments, adolescents' perceptions of social safety may be shaped by their broader sociohistorical context. Despite the potential importance of birth cohort in influencing adolescents' social environments, little research has looked at social safety and its relationship to bullying victimization across time. With six cohorts of data (2002-2022) from the Canadian Health Behaviour in School-Aged Children (HBSC) study (n = 118,764), I examined cohort differences in the prevalence of, and relationships between, bullying and different forms of perceived social safety (community and school safety). Using logistic regression, I examined trends in general and sexual bullying victimization over time by gender and grade group. The prevalence of general bullying victimization increased over the cohorts, particularly for girls in grades 9-10. Using a multigroup path analysis, with cohort as my grouping variable, I found an increase in magnitude in the relationship between general bullying victimization and school safety over the cohorts, suggesting that the relationship between bullying victimization and school safety is stronger over time, perhaps related to the increase in anti-bullying programs and pro-diversity initiatives. Findings from this study highlight that over the sociocultural shifts over the last twenty years when it comes to diversity, equity, and inclusion, the association between general bullying victimization and school safety has grown stronger.

Introduction

Over the past two decades, there has been a shift in Canada towards promoting diversity and inclusion (Cukier et al., 2020; Tamtik & Guenter, 2019; Wolbring & Nguyen, 2023). Changing attitudes and policies at a societal and institutional level may reflect increasing social acceptance of racial/ethnic, gender, and sexual diversity at the interpersonal level (Berry & Sam, 2013; Hammack & Manago, 2025). Many schools have adopted anti-racist, gender-affirming policies and LGBTQ inclusive curricula with the goal of creating supportive environments for youth (e.g., Gaffney et al., 2021; James, 2019; People for Education, 2023; Peter et al., 2021; Rawlings & Stoddard, 2019; Taylor et al., 2015). These initiatives may help increase social safety, or the experience of connection, protection, and inclusion for youth (Slavich, 2020),. Despite these systemic improvements, many minoritized youth in Canada continue to report experiences of trauma and exclusion, often based in systemic oppression (Exner-Cortens et al., 2021, 2023; Kaushik et al., 2018; Williams et al., 2022). To date, research has yet to clarify whether Canadian youth who perceive increased social safety experience less identity-based bullying, or whether the link between bullying victimization and perceived social safety has evolved across time. Thus, in the current study, I examined cohort trends in perceived social safety and in both general and identity-based bullying victimization among Canadian adolescents.

Social safety theory (Slavich, 2020) posits that feeling safe, included, and connected is important for both well-being and physical and mental health (Alley et al., 2025). Although much of the theory focuses on more proximal social experiences, Slavich and colleagues (2023) also stress the importance of macro-level influences, such as historical shifts in policy and social norms, on how individuals may perceive social safety in their environments. One such macro-

level factor is birth cohort, which encompasses the social, institutional, and immunologic environments in which youth are raised (Slavich et al., 2023). One's cohort shapes one's exposure to both protective and threatening social forces (Slavich et al., 2023). For example, youth born in the late 1990s may have started school during the initial launch of Canada's inclusive education initiatives, whereas youth born in the mid-2010s may have benefited from more established anti-bullying programs and inclusive curricula (e.g., Peter et al., 2021; Taylor & Peter, 2011).

Moreover, birth cohorts differ in both exposure to safety and threat (Slavich et al., 2023) and also in the cultural meaning they attach to bullying and social safety. Behaviours that were once brushed off as "kids being kids" are more and more being identified as harmful forms of aggression, especially when they involve targeting someone based on a marginalized identity (Arseneault, 2018; Coy, 2018; Galán et al., 2021; Hellström & Lundberg, 2020; Hong et al., 2018). By examining the association between bullying victimization and perceived social safety at different points in time, we can further contextualize how the broader sociohistorical context may shape both the prevalence of, and relationship between, bullying victimization and perceived social safety.

Changes in Bullying over Time

In the past 20 years, the media has propagated widespread concerns about rising rates of school bullying (Clarke, 2017; Gower et al., 2019; Greenslade, 2023). Empirical evidence, however, tells a more complex story. Some international studies examining bullying trends between 1990 and 2009 showed that rates of traditional bullying generally decreased or remained stable in many countries (Rigby & Smith, 2011). More recent findings from the World Health Organization's Health Behaviour in School-Aged Children (HBSC) study also showed that

although the proportion of youth who report bullying others has declined from 2014 to 2022, rates of bullying victimization have remained relatively stable or decreased across Europe, Central Asia, and Canada (Cosma et al., 2020; Molcho et al., 2025; World Health Organization, 2024). Thus, school-based anti-bullying policies and interventions may have had some success in some countries (Smith et al., 2012; Waasdorp et al., 2021). Not all studies, however, show the same trend. Cross-sectional research by Patte and colleagues (2024) using a convenience sample of Canadian high schoolers found that, despite a dip in prevalence of general bullying victimization at the start of the COVID-19 pandemic, general bullying victimization rates in Canada have risen to higher than pre-pandemic levels. In addition, no studies have examined how the prevalence of different forms of identity-based bullying victimization has changed over time despite the clear sociohistorical shifts that have occurred in the last few decades. Thus, in this study, I will explore changes in both general and identity-based bullying victimization in a Canadian context with a specific focus on the relationship between bullying victimization and perceived social safety.

Identity-based bullying targets individuals on the basis of one or more of their social identities (Mulvey et al., 2018). In the current study, I focused on sexual bullying victimization as a pertinent type of identity-based bullying victimization. Sexual bullying includes sexualized jokes, comments, and gestures directed at individuals often based on their gender identity or expression (Turner-Moore et al., 2022). This type of bullying stems from broader systemic power structures, including heteronormativity and sexism. In this study, I emphasized sexual bullying victimization, because it is both harmful to adolescents' mental health and well-being (Galán et al., 2021) and because it may represent broader systems of discrimination that could evolve over time (Cyrus, 2017; Görzig et al., 2025).

Because sexual bullying victimization reflects entrenched systems and hierarchies of gender and sexuality, its association with social safety may be particularly sensitive to changes in social norms (Duncan, 2012; Turner-Moore et al., 2022). For example, greater visibility of transgender and gender diverse individuals in the media and an increase in public discourse about consent may be associated with changes in the association between sexual bullying victimization and perceived social safety (Burton et al., 2023; McInroy & Craig, 2015). With growing visibility and increased resources, youth in the later cohorts may be better able to recognize and name their experiences as sexual bullying (Medina, 2017). They also may be more likely to recognize the harm associated with identity-based bullying (Galán et al., 2021), thus strengthening the negative association between sexual bullying and perceived social safety over time. When youth have a better awareness of what constitutes sexual bullying and a greater understanding of its negative effects, their perceptions of social safety may be more strongly connected with their victimization experiences.

I also focused on the two more distal levels of the social safety ecology: school safety and community safety, because these broader structural levels may be more directly tied to sociocultural changes over time. School safety, encompassing students' perceptions of classroom inclusivity, and supportive relationships with peers and teachers, may be a critical component of reducing identity-based bullying (Gaffney et al., 2021; Mayne & Craig, 2024). Community safety also may serve as a protective factor against bullying (Statistics Canada, 2020). This form of safety includes factors like neighbourhood cohesion and a sense of belonging in one's local environment. These levels are relevant for my research given various national and provincial policy changes in Canada over the past two decades, including increased LGBTQ advocacy in schools and communities (Higgins et al., 2021). For example, initiatives such as Ontario's Equity

and Inclusive Education Strategy have likely shifted perceptions of safety within school environments (Ontario Ministry of Education, 2009). In Canada, education falls under provincial or territorial jurisdiction, meaning that legislation on bullying may differ between provinces (Lithwick, 2015). Still, most provinces have integrated formal definitions of bullying into their legislation. With Canadian schools taking more responsibility for addressing bullying with formal policies and reporting mechanisms, the relationship between bullying and school safety may have magnified over time (Accepting Schools Act, 2012, S.O. 2012, c. 5, 2012; Public Safety Canada, 2018).

More broadly, at the national level, many important political and social changes in equity, diversity, and inclusion may be associated with changes in how youth perceive and respond to bullying and social safety. For example, in 2005, gay marriage was legalized in Canada; in 2017, gender identity and gender expression became protected categories under the Canadian Human Rights Act; and, in 2021, Canada established the National Day for Truth and Reconciliation (Canadian Heritage, 2017, 2021; Government of Canada, 2005). Additionally, in 2022, the Trudeau government launched Canada's first Federal 2SLGBTQI+ Action Plan (Government of Canada, 2022). This plan committed $100 million towards advancing 2SLGBTQI+ rights and equality through supporting research, addressing discrimination, building inclusive communities, highlighting Indigiqueer strength and survivance, and forefronting Canada as a leader in inclusivity (Government of Canada, 2022), and is still active and ongoing. These types of policy changes, even at a more distal level, may influence individual behaviour, informing how youth understand and interpret experiences of social safety and social harm (Bronfenbrenner, 1979; Diamond & Alley, 2022). By examining school and community safety over cohorts, in the current study, I emphasized the importance of examining how changes in equity and inclusion at

structural levels may filter down to influence adolescents' experiences and perceptions of bullying and social safety.

The Moderating Roles of Gender and Grade

In addition to cohort-level shifts, gender and grade may shape how youth experience bullying and perceived social safety. First, grade level serves as a proxy for developmental changes. As youth transition from early to middle adolescence, they experience changes in peer dynamics, social hierarchies, and autonomy from adults, which may influence both bullying exposure and the availability of protective social resources (Espelage & Holt, 2001; Stahel et al., 2025). Hormonal, social, and cognitive changes throughout adolescence all may magnify youth's reactivity to threat and perceptions of social safety (Slavich, 2020; Slavich et al., 2023). Through these mechanisms, the relationship between bullying victimization and perceived social safety may be stronger for adolescents in grades 9-10, compared with their younger peers.

Since 2002, the developmental context surrounding adolescence may have shifted in important ways. For example, youth are navigating an increasingly digital world, meaning that developmental transitions, such as entering high school, may coincide with online identity formation (Anwar, 2024; Sebre & Miltuze, 2021). On one hand, this ever more central digital context may be harmful by creating a constant state of peer surveillance (Pescott, 2024; Trottier, 2012), but on the other hand, it may afford youth community they may not encounter in the real world (Alix, 2020; Berger et al., 2022). These changes in adolescents' social contexts may influence both the prevalence of bullying victimization as well as how youth interpret it. The online environment may provide another, even more visible context wherein youth may experience bullying victimization, which could increase how threatening bullying experiences feel to one's social safety (Kowalski et al., 2019). At the same time, with greater access to

affirming online communities, youth may be more aware of what constitutes harmful behaviour, which could strengthen the relationship between bullying victimization and perceived social safety (Craig & McInroy, 2014; McInroy, 2020). Thus, it is important to examine whether grade moderates the relationship between bullying victimization and perceived social safety and how this relationship may differ between cohorts.

Gender is consistently linked to differences in both exposure to and perception of bullying and safety. For example, in a meta-analysis, Casper and Card (2017) found that boys experienced more direct, overt victimization than girls. These differences in bullying victimization experiences may reflect broader patterns of gender norms and socialization, whereby boys are socialized to use direct physical aggression compared to girls, who may be more likely to aggress indirectly by strategically excluding other girls to achieve close friendships and reduce the likelihood of their own exclusion (Espelage & Swearer, 2004). Sexual bullying is an even more gendered phenomenon, with many girls reporting frequent experiences of sexual bullying by their male peers (Spears et al., 2011). These gender differences could also shape how girls and boys interpret and respond to bullying victimization, which may lead to differences in how bullying experiences are associated with perceptions of social safety (Duncan, 1998; Page et al., 2015). In this way, gendered norms and experiences may amplify the extent to which bullying victimization undermines girls' sense of social safety, compared to boys.

Gender differences also may shift across the study's cohorts, mirroring larger structural changes in Canada that occurred between 2002 and 2022. Key events such as the Trudeau government naming itself a "feminist government", Bill C-16 adding gender identity and expression as protected categories, and a federal apology to individuals harmed by discrimination against 2SLGBTQI+ people all helped to signal increased recognition and

celebration of girls, women, and gender diverse individuals in Canada (Canadian Heritage, 2017; Gerrits, 2024; Government of Canada, 2017). These changes in policy and public discourse may affect how gender may moderate the relationship between general bullying victimization and perceived social safety across cohorts. Beyond general bullying victimization, sexual bullying victimization disproportionately targets girls and gender diverse youth, meaning that these societal shifts could have even more differential effects across gender groups (Mennicke et al., 2021). Gender is, therefore, an important moderator to look at to further understand how social identities may be related to differences in the relationship between bullying victimization and perceived social safety.

Current Study

In this study, I examined trends in general and sexual bullying victimization and perceived social safety (at the school and community levels) across multiple waves of data from Canadian cross-sectional cohorts of youth in grades 6 to 10. I hypothesized that bullying victimization rates would decrease over time, whereas school and community social safety would increase. Additionally, I analyzed the relationship between perceived social safety and bullying victimization across cohorts, hypothesizing that the relationship between both general and sexual bullying victimization and both school and community safety, would increase in magnitude over time. I also examined gender and grade group as moderators, hypothesizing that the relationship between general and sexual bullying victimization and school and community safety would be stronger for girls and youth in grades 9-10 compared to boys and youth in grades 6-8.

Method

Participants

I included data collected from six cohorts (2002, 2006, 2010, 2014, 2018, and 2022) of participants in grades 6-10. Of the 118,764 participants, the percentage of boys (49.4%) and girls (50.6%) was similar. In the sample, 60.1% was in grades 6-8 and 39.9% was in grades 9-10. Please see Table 4.1 for more details.

Table 4.1

Demographic Information for 2002-2022 HBSC Surveys

HBSC Year	Demographic	Category	Percentage
2002	Gender	Girls	53.6% (N = 3878)
		Boys	46.4% (N = 3357)
	Grade	Grades 6-8	67% (N = 4851)
		Grades 9-10	33% (N = 2384)
Total Participants			7235
2006	Gender	Girls	52.6% (N = 5086)
		Boys	47.4% (N = 4584)
	Grade	Grades 6-8	55.6% (N = 5377)
		Grades 9-10	44.4% (N = 4293)
Total Participants			9670
2010	Gender	Girls	50.6% (N = 13169)
		Boys	49.4% (N = 12878)
	Grade	Grades 6-8	59.9% (N = 15610)
		Grades 9-10	40.1% (N = 10437)
Total Participants			26047
	Gender	Girls	50.7% (N = 15048)

2014		Boys	50.7% (*N* = 14649)
	Grade	Grades 6-8	54.6% (*N* = 16221)
		Grades 9-10	45.4% (*N* = 13476)
Total Participants			29697
2018	Gender	Girls	48.8% (*N* = 10256)
		Boys	51.2% (*N* = 10767)
	Grade	Grades 6-8	60.8% (*N* = 12785)
		Grades 9-10	39.2% (*N* = 8238)
Total Participants			21043
2022	Gender	Girls	48.4% (*N* = 12140)
		Boys	51.6% (*N* = 12933)
	Grade	Grades 6-8	65.4% (*N* = 16393)
		Grades 9-10	34.6% (*N* = 8679)
Total Participants			25072

Procedure

I used archival data from the Health Behaviour in School-Aged Children (HBSC) study, a cross-national survey that is conducted every four years on youth in grades 6 to 10. This study collects a diverse, nationally representative sample of youth from across Canada. For all cohorts, after obtaining consent, students completed questionnaires about a variety of different health-related topics during school classes in a 45-70-minute session. The Research Ethics boards of both Queen's University and the Public Health Agency/Health Canada granted ethical clearance.

Measures

Demographics

Students reported their grade, ethnicity, and gender identity/sex. In line with shifts in societal recognition of various minoritized identities, some of the questions in the survey have changed over time. For example, from 2002 to 2014, participants had to choose between two gender/sex options. In 2002, 2010, and 2018, participants could select male or female, and in 2006, 2014, and 2022, participants could select boy or girl. Starting in 2018, the survey introduced a third option: “neither of these terms describes me.” Finally, in 2022, students were able to identify their gender as boy, girl, neither boy nor girl, or other (an open text box in which they could further specify their gender). Participants also indicated what sex they were registered at birth with the options of male or female. From these two questions, I computed a variable to identify youth who were transgender or gender diverse. Because of the changes in the measurement of gender across cohorts, I was limited to looking at youth who identify as boys or girls, and excluded participants who identified as neither option in 2018 and 2022.

Social Safety

School Safety. Students answered several questions about school climate and school support. Respondents rated five items on a 5-point scale (1 = *strongly agree*, to 5 = *strongly disagree*) asking about their experiences in the school environment. Sample items included: “Our school is a nice place to be” and “The rules in this school are fair”. The internal consistency for this scale ranged from good to excellent between cohorts (α = .86-.92; see Table 4.2 for more details).

Community Safety. To measure community safety, I included six questions on a five-point scale (1 = *strongly agree*, to 5 = *strongly disagree*) to assess how participants feel about the area where they live. Sample items included: “It is safe for younger children to play outside during

the day" and "You can trust people around here". The internal consistency for this scale was good (α = .74-.79; see Table 4.2 for more details).

Table 4.2

Cronbach's Alpha in for School and Community Safety Subscales for each Year

Year	School Safety	Community Safety
2002	.88	.78
2006	.86	.74
2010	.90	.75
2014	.91	.78
2018	.91	.78
2022	.92	.79

Bullying Victimization

To assess bullying victimization, I used an adapted version of the revised Olweus Bully/Victim Questionnaire (1996). Participants read a definition of bullying before answering the questions. Students then answered questions about how many times they had been victimized at school in the past two months. Participants responded using a five-point scale that ranged from 0 (*I have not been bullied this way in the past couple of months*) to 4 (*I have been bullied this way several times a week in the past few months*). Higher scores indicated higher bullying involvement.

For both theoretical and methodological reasons, I chose to look at bullying as a dichotomous variable. Although many past studies using the HBSC data have divided bullying into experienced 2-3 times or more and experienced 1-2 times or less (Chester et al., 2015; Cosma et al., 2017, 2020), I was specifically interested in how experiencing *any* amount of bullying may be negatively associated with one's perceptions of social safety because any

victimization experience may affect how safe a youth feels (Diamond & Alley, 2022). To examine general bullying, I computed a dichotomous variable, where youth who had experienced bullying at least once were coded as 1, whereas youth who had not were coded as 0. The sexual bullying question asked participants whether other students had made sexual jokes, comments, or gestures to them. Again, I computed a dichotomous variable, where any sexual bullying was coded as 1, and no sexual bullying was coded as 0.

Data Analysis

To investigate whether general and sexual bullying victimization varied across different cohorts, I conducted logistic regression analyses in R i386 4.4.2 (R Core Team, 2025). I estimated separate models for general and sexual bullying victimization, treating both as binary outcomes. Additionally, to examine whether the relationship between cohort and bullying victimization differed by gender and grade group (both dummy coded; boys = 0, girls = 1; grades 6-8 = 0, grades 9-10 = 1), I included these variables and their interaction terms in the model. I coded cohort in equal increments, so that 2002 = 0, 2006 = 1, 2010 = 2, 2014 = 3, 2018 = 4, and 2022 = 5. To further probe the simple slopes of significant interactions, I used the emmeans package in R i386 4.4.2 (Lenth, 2024; R Core Team, 2025). To test whether perceived social safety varied across cohorts, I used moderated regression analyses. In these models, I also included gender and grade group as moderators, and my outcome variables were school and community safety.

Next, I used multiple group analysis with structural equation modeling and multiple regressions in R i386 4.4.2 (2025), using the lavaan package (Rosseel, 2012), to determine whether the relationship between various forms of bullying victimization (general and sexual) and perceived social safety (school safety and community safety) remained stable across cohorts.

I also looked at gender and grade as moderators in this relationship. Because of the addition of the two-step gender/sex question in the 2022 cohort, I ran different models with either the youth's reported gender identity (boy or girl) or with the gender variable used in Study 2, which allowed us to know whether the youth was cisgender, meaning their gender aligned with their sex assigned at birth. Since the results were relatively consistent between these two gender measures, I reported the results using the youth's reported gender identity and included the other model in Appendix C.

For each of these SEM models, I assessed a model that constrained all regression paths to equality across groups, and one that left the paths free to vary. Next, I conducted a chi-square difference test to compare these two models to determine whether constraining the regressions significantly worsened model fit. Given my very large sample sizes, I emphasized effect size differences over statistical significance when evaluating parameter equality across cohorts, such that differences of $|\beta| < .05$ typically correspond to trivial effects (Cohen, 2013; Funder & Ozer, 2019). As Cheung and Rensvold (2002) and Little (2013) argue, trivial differences should not necessarily be interpreted as meaningful developmental or cohort effects. As a result, I followed up only those between-cohort differences where the change in effect size was greater than .10.

To test for cohort differences, I constrained the relevant paths to equality across groups and compared these constrained models to the fully unconstrained model using scaled chi-square difference tests (Satorra & Bentler, 2001). After determining the path did differ by cohort, I then ran follow up models to systematically, one-by-one, set all 15 potential cohort combinations to equality for that path. Through this approach, I could determine which cohorts differed significantly from each other. All analyses used the robust maximum-likelihood estimator (MLR)

with full information maximum likelihood (FIML) to account for non-normality and missing data.

Results

Regression Analyses

General Bullying Victimization

First, I ran a logistic regression to analyze whether general and sexual bullying victimization varied by cohort, gender, grade group, and their interactions. The three-way interaction between cohort, gender, and grade was statistically significant, indicating that the effect of cohort on the odds of general bullying victimization differed depending on both gender and grade. The two-way interactions between cohort and gender and between cohort and grade also were significant. See Table 4.3 for more details.

Table 4.3

Logistic Regression Analysis to Examine Cohort, Gender, and Grade Group Predicting General Bullying Victimization

Variable	*b*	*SE*	z	*p*	Exp(*B*)
General Bullying Victimization					
Cohort	0.124	0.00733	287.50	< .001	1.13
Gender	-0.002	0.04434	0.002	.965	0.998
Grade group	-0.478	0.05147	86.45	< .001	0.62
Cohort x Gender	0.063	0.01042	37.14	< .001	1.07
Cohort x Grade group	0.050	0.01202	17.42	< .001	1.05
Gender x Grade group	-0.069	0.07232	0.91	.339	0.93
Cohort x Gender x Grade group	0.049	0.01724	8.08	.004	1.05
Constant	-0.138	0.03151	19.16	< .001	0.87

Note. Gender was coded so that boys = 0 and girls = 1. Grade group was coded so that youth in grades 6-8 = 0 and youth in grades 9-10 = 1.

To interpret the three-way interaction, I calculated the simple slopes. The effect of cohort on the log-odds of bullying victimization was significant and positive for all groups, but the magnitude differed. For students in grades 6-8 (grade = 0), the slope of cohort was 0.12 for boys and 0.19 for girls. Among youth in grades 9-10 (grade = 1), the slope was 0.17 for boys and 0.29 for girls. Thus, increases across cohorts were associated with the steepest increases in bullying victimization for girls in grades 9-10, followed by girls in grades 6-8, boys in grades 9-10, and boys in grades 6-8. Pairwise comparisons confirmed that these slopes differed significantly across most groups. Girls in grades 6-8 had a significantly steeper cohort slope than boys in the same grade, and students in grades 9-10 had steeper slopes than students in grades 6-8 within gender. See Table 4.4 and Figure 4.1 for details.

Table 4.4

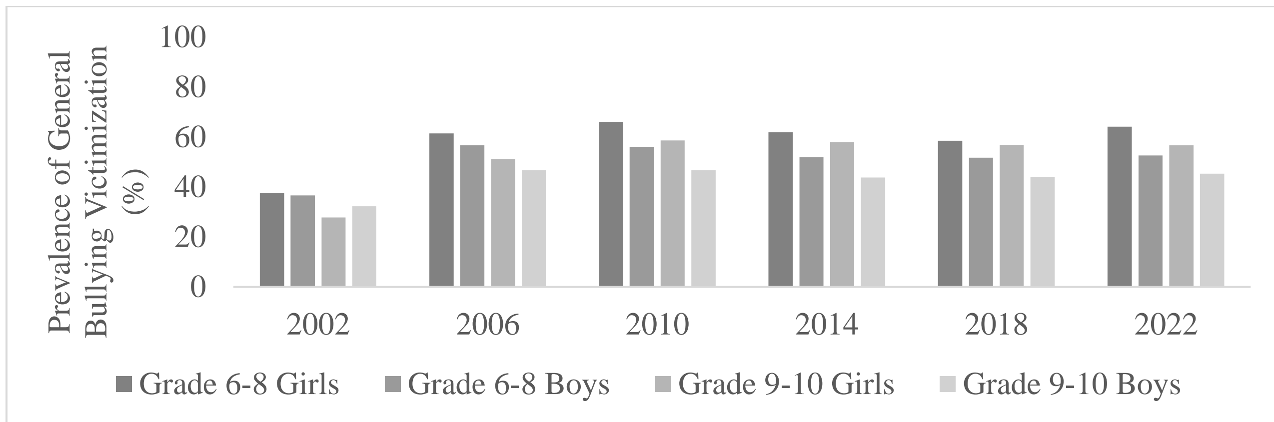
Simple Slopes of Cohort Predicting General Bullying Victimization by Gender and Grade Group

Gender	**Grade Group**	***b***	**SE**	**95% CI Lower**	**95% CI Upper**
General Bullying Vic					
Boys	Grades 6-8	0.12_a	0.01	0.11	0.14
Girls	Grades 6-8	0.19_b	0.01	0.17	0.20
Boys	Grades 9-10	0.17_b	0.01	0.16	0.19
Girls	Grades 9-10	0.29_c	0.01	0.27	0.31

Note. Sharing a subscript means pairwise comparisons showed the groups do not differ significantly at $p < .005$.

Figure 4.1

Prevalence of General Bullying Victimization by Cohort, Gender, and Grade Group



Sexual Bullying Victimization

Next, I conducted a logistic regression to examine whether sexual bullying varied by cohort, gender, grade group, and their interactions. The three-way interaction between cohort, gender, and grade group was statistically significant, indicating that the effect of cohort on the odds of sexual bullying victimization differed depending on both gender and grade group. See Table 4.5 for details.

Table 4.5

Logistic Regression Analysis to Examine Cohort, Gender, and Grade Group Predicting Sexual Bullying Victimization

Variable	*b*	*SE*	z	*p*	Exp(*B*)
Sexual Bullying Victimization					
Cohort	0.03	0.01	3.50	< .001	1.03
Gender	-0.22	0.05	-4.21	< .001	0.80
Grade group	-0.47	0.06	-7.38	< .001	0.63
Cohort x Gender	0.06	0.01	5.21	< .001	1.06
Cohort x Grade group	0.06	0.01	4.41	< .001	1.07
Gender x Grade group	0.77	0.09	9.08	< .001	2.17
Cohort x Gender x Grade group	-0.10	0.02	-5.19	< .001	0.90
Constant	-1.27	0.04	-34.38	< .001	0.28

To interpret the three-way interaction, I calculated simple slopes for the effect of cohort within each gender by grade group combination. The effect of cohort on the log-odds of sexual bullying victimization was significant and positive for all groups except girls in grades 9-10, but the magnitude and direction varied across groups. Among students in grades 6-8 (grade = 0), the slope of cohort was 0.03 for boys and 0.09 for girls. Among students in grades 9-10 (grade = 1), the slope was 0.09 for boys and 0.05 for girls. I then conducted pairwise comparisons to determine whether the simple slopes differed significantly across groups. To account for multiple tests, I set significance at $p < .005$. Girls in grades 6-8 had a significantly steeper cohort slope than boys in grades 6-8. Boys in grades 9-10 had a significantly steeper cohort slope than boys in grades 6-8. There were no significant differences between girls in grades 6-8 and boys in grades 9-10, between girls in grades 6-8 and girls in grades 9-10, and between boys in grades 9-10 and girls in grades 9-10. See Table 4.6 and Figure 4.2 for details.

Table 4.6

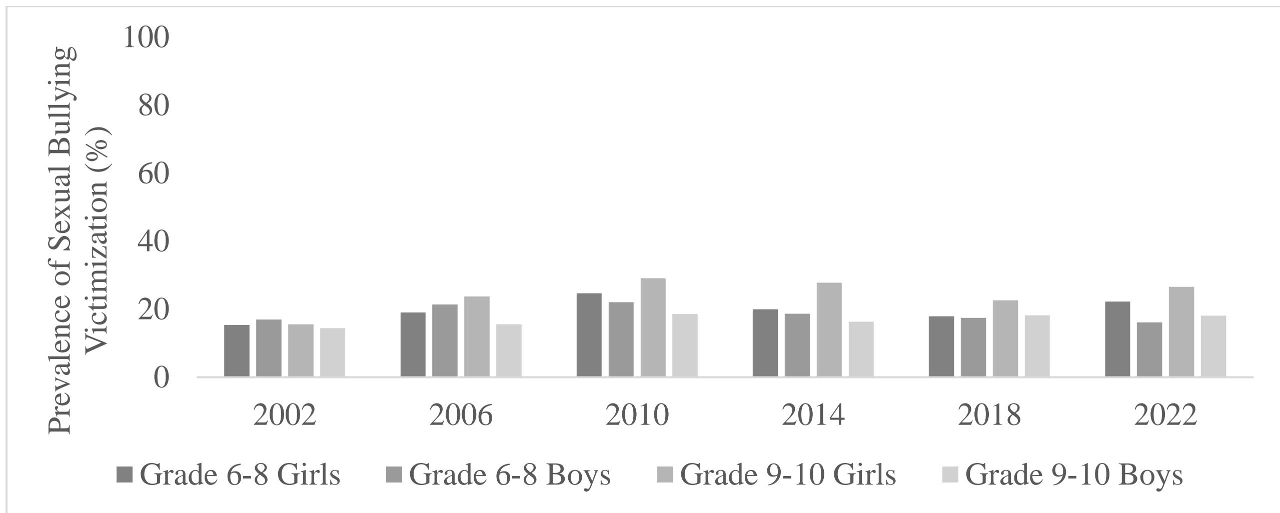
Simple Slopes of Cohort Predicting Sexual Bullying Victimization by Gender and Grade Group

Gender	**Grade Group**	***b***	**SE**	**95% CI Lower**	**95% CI Upper**
Sexual Bullying Vic					
Boys	Grades 6-8	0.03_a	0.01	0.01	0.05
Girls	Grades 6-8	0.09_b	0.01	0.07	0.11
Boys	Grades 9-10	0.09_b	0.01	0.07	0.12
Girls	Grades 9-10	0.05_b	0.01	0.03	0.07

Note. Sharing a subscript means that the groups do not differ significantly at $p < .005$.

Figure 4.2

Prevalence of Sexual Bullying Victimization by Cohort, Gender, and Grade Group



Social Safety

I conducted a moderated regression to examine whether school safety varied as a function of cohort, gender, and grade, and their interactions. The overall model was statistically significant, $F(7, 117395) = 262.40$, $p < .001$. The simple two-way interactions must be evaluated in the light of the inclusion of a three-way interaction, meaning that the gender by cohort interaction would only be for youth in grades 6-8, while the grade by cohort interaction would only be for boys. The interaction between cohort and gender was significant for youth in grades 6-8. Simple slopes indicated that school safety increased significantly across waves for boys in grades 6-8, $b = 0.02$, $SE = 0.002$, 95% CI [0.01, 0.02], $p < .001$, whereas it decreased significantly for girls in grades 6-8, $b = -0.03$, $SE = 0.002$, 95% CI [-0.04, -0.03], $p < .001$. The slopes for boys and girls in grades 6-8 differed significantly, $t(117390) = 17.80$, $p < .001$. The interaction between cohort and grade group was also significant for boys. School safety decreased significantly across waves for boys in grades 6-8, $b = -0.02$, $SE = 0.002$, 95% CI [-0.02, -0.01], $p < .001$, whereas the slope for boys in grades 9-10 did not differ significantly from

zero, $b = 0.003$, $SE = 0.002$, 95% CI [-0.002, 0.007], $p = .20$. The difference between each grade group's slopes was significant, $t(117390) = -6.88$, $p < .001$. See Table 4.7 and Figure 4.3 for more details.

Table 4.7

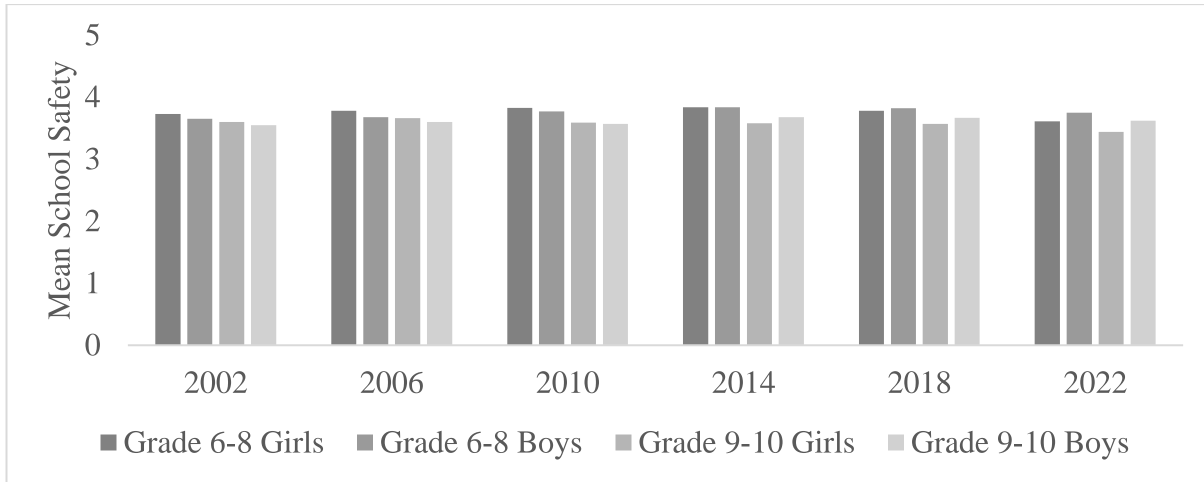
Moderated Regression Analysis to Examine Cohort, Gender, and Grade Group Predicting Social Safety

Variable	*b*	SE	*t*	*p*
School Safety				
Cohort	0.01	0.002	4.25	< .001
Gender	0.20	0.02	13.41	< .001
Grade group	-0.19	0.02	-10.93	< .001
Cohort x Gender	-0.06	0.003	-15.81	< .001
Cohort x Grade group	0.02	0.004	3.88	< .001
Cohort x Gender x Grade group	0.01	0.01	1.35	.18
Constant	3.73	0.01	341.15	< .001
Community Safety				
Cohort	-0.05	0.002	-16.24	< .001
Gender	-0.003	0.02	-0.19	.85
Grade group	-0.18	0.02	-8.93	< .001
Cohort x Gender	-0.01	0.004	-2.13	.03
Cohort x Grade group	0.02	0.005	5.11	< .001
Cohort x Gender x Grade group	-0.01	0.01	-0.87	.39
Constant	4.01	0.01	323.51	< .001

Note. Gender was coded so that boys = 0 and girls = 1. Grade group was coded so that youth in grades 6-8 = 0 and youth in grades 9-10 = 1.

Figure 4.3

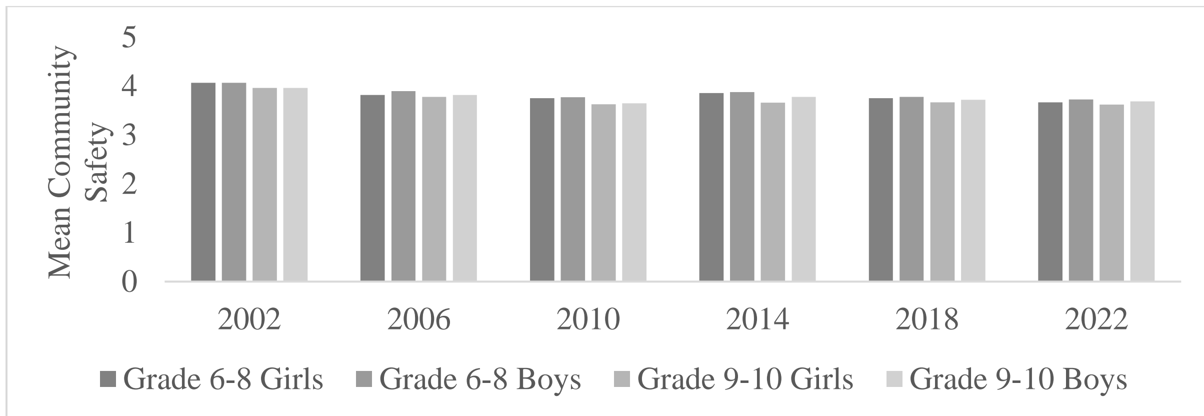
Mean Level of School Safety by Cohort, Gender, and Grade Group



I then conducted a moderated regression to examine whether community safety differed by cohort, gender, and grade. The overall model was statistically significant, $F(7, 108843) = 182.50$, $p < .001$, as were the two-way interactions, which again, must be evaluated in consideration of the three-way interaction. The interaction between cohort and gender was significant for youth in grades 6-8. Simple slopes indicated that community safety decreased significantly across waves for both boys in grades 6-8, $b = -0.03$, $SE = 0.002$, 95% CI [-0.04, -0.03], $p < .001$, and girls in grades 6-8, $b = -0.05$, $SE = 0.002$, 95% CI [-0.05, -0.04], $p < .001$. The decline was significantly larger for girls in grades 6-8 than boys in grades 6-8, $t(108837) = 3.46$, $p = .0005$. The interaction between cohort and grade group was also significant for boys. Community safety decreased significantly across waves for boys in grades 6-8, $b = -0.05$, $SE = 0.002$, 95% CI [-0.06, -0.05], $p < .001$, and for boys in grades 9-10, $b = -0.03$, $SE = 0.003$, 95% CI [-0.04, -0.02], $p < .001$. The decline was significantly steeper for boys in grades 6-8 than for boys in grades 9-10, $t(108837) = -6.47$, $p < .001$. See Table 4.7 and Figure 4.4 for details.

Figure 4.4

Mean Level of Community Safety by Cohort, Gender, and Grade Group



Multigroup Path Analysis by Cohort

I used a series of multigroup path models to test whether the relationship between bullying victimization and perceived safety were invariant across survey cohorts (2002-2022). The unconstrained model, which allowed all regression paths to vary across cohorts, was a fully saturated model and so has perfect fit. Although χ^2 difference tests suggested minor improvements when allowing parameters to vary, the fully constrained model, in which all regression paths were set to equality across cohorts, demonstrated excellent fit to the data, $\chi^2(80) = 1032.96$, $p < .001$, CFI = .96, TLI = .95, RMSEA = .026 [.024, .027], SRMR = .018 (Hu & Bentler, 1999).

Across all cohorts, higher general and sexual bullying victimization were associated with lower school safety and lower community safety. The lower order terms represent simple main effects (i.e., when the IVs = 0), which includes average general and sexual bullying, boys only, and grades 6-8 only. Since most interactions were non-significant, these simple effects do not differ from the simple effects at the other level (i.e., for grades 9-10 or for girls), but that does not necessarily mean that the interaction would be significant at those other levels and/or that the estimates would be similar. Although the constrained model demonstrated excellent fit, I

conducted some exploratory analyses to test for significant differences between cohorts for my paths of interest; standardized effect size changes of .1 or greater were deemed meaningful. See Table 4.8 for more details.

Table 4.8

Unstandardized Path Coefficients (b) Predicting School and Community Safety Across HBSC Cohorts (2002-2022)

Predictor	2002	2006	2010	2014	2018	2022
Outcome: School Safety						
General bullying victimization	**-0.11**	**-0.14**	**-0.14**	**-0.22**	**-0.20**	**-0.27**
Sexual bullying victimization	**-0.21**	**-0.24**	**-0.17**	**-0.21**	**-0.24**	**-0.23**
Gender	**0.08**	**0.09**	**0.09**	**0.06**	0.02	**-0.06**
Grade	**-0.13**	**-0.13**	**-0.23**	**-0.24**	**-0.17**	**-0.06**
General bullying x Gender	-0.06	-0.03	-0.02	-0.08	-0.08	**-0.07**
Sexual bullying x Gender	0.09	-0.02	**-0.07**	-0.11	-0.08	-0.08
General bullying x Grade	0.03	-0.02	0.00	0.01	-0.04	0.05
Sexual bullying x Grade	-0.04	**0.09**	0.04	0.08	0.05	-0.02
Outcome: Community Safety						
General bullying victimization	**-0.08**	**-0.07**	**-0.15**	**-0.13**	**-0.15**	**-0.11**
Sexual bullying victimization	**-0.16**	**-0.13**	**-0.07**	**-0.10**	**-0.06**	**-0.15**
Gender	0.00	**-0.06**	-0.02	**-0.03**	-0.03	-0.02
Grade	**-0.14**	**-0.07**	**-0.18**	**-0.16**	**-0.07**	-0.03
General bullying x Gender	-0.04	-0.02	0.04	-0.02	0.03	-0.05
Sexual bullying x Gender	0.08	0.02	-0.02	-0.02	**-0.08**	0.03
General bullying x Grade	0.06	-0.03	**0.09**	0.02	-0.02	0.02
Sexual bullying x Grade	-0.06	0.06	-0.01	0.02	-0.02	0.00

Note. Values are unstandardized coefficients (*b*). Bolded results are significant $p < .001$. Boys and grade 6-8 youth are the comparison group throughout.

Post-hoc Comparisons between Cohorts

The association between general bullying victimization and school safety differed significantly across nearly all cohort comparisons. This set of analyses did not include interaction terms so I could better interpret lower-order terms. All chi-square difference tests were statistically significant, except for the 2006 versus 2022 and 2010 versus 2014 comparisons. Cohort differences also were significant for the sexual bullying victimization to school safety

path. For the grade to school safety association, every chi-square test was significant. The grade to community safety association had all positive chi-square tests, except the 2010 versus 2014 comparison. Cohort differences in the association between sexual bullying victimization and community safety were less pronounced, with none achieving statistical significance. See Table 4.9 for more details.

Table 4.9

Robust Chi-Square Difference Tests Comparing Equality Constraints on Paths of Interest Across Cohorts

	General Bullying → School Safety		**Sexual Bullying → School Safety**		**Grade → School Safety**		**Sexual Bullying → Community Safety**		**Grade → Community Safety**	
Cohort Comparison	**$\Delta\chi^2$**	**df**	**$\Delta\chi^2$**	**df**	**$\Delta\chi^2$**	**df**	**$\Delta\chi^2$**	**df**	**$\Delta\chi^2$**	**df**
2002 vs 2006	**48.81**	4	**15.22**	4	**13.13**	4	4.64	4	**43.69**	4
2002 vs 2010	**32.37**	4	3.73	4	**53.15**	4	5.56	4	**30.19**	4
2002 vs 2014	**64.70**	4	**14.76**	4	**49.91**	4	6.05	4	**33.84**	4
2002 vs 2018	**64.32**	4	**14.19**	4	**38.48**	4	6.14	4	**37.75**	4
2002 vs 2022	**48.80**	4	**10.79**	4	**49.72**	4	2.31	4	**36.15**	4
2006 vs 2010	**26.65**	4	8.77	4	**52.24**	4	5.48	4	**38.51**	4
2006 vs 2014	**66.02**	4	**14.92**	4	**52.27**	4	6.14	4	**40.51**	4
2006 vs 2018	**62.20**	4	**12.89**	4	**31.40**	4	6.11	4	**28.97**	4
2006 vs 2022	56.45	4	8.20	4	**45.58**	4	3.04	4	**26.74**	4
2010 vs 2014	62.74	4	5.96	4	**19.32**	4	4.47	4	7.44	4
2010 vs 2018	**48.79**	4	**10.72**	4	**52.61**	4	1.72	4	**44.43**	4
2010 vs 2022	**63.92**	4	**14.07**	4	**46.37**	4	6.28	4	**44.69**	4
2014 vs 2018	**60.62**	4	**14.40**	4	**46.75**	4	5.52	4	**44.67**	4
2014 vs 2022	**17.07**	4	**11.68**	4	**34.95**	4	4.93	4	**44.74**	4
2018 vs 2022	**40.55**	4	6.37	4	**52.78**	4	6.09	4	**11.60**	4

Note. Tests are Satorra-Bentler scaled Chi-square difference tests based on MLR estimation. Bolded $\Delta\chi^2$ indicates $p < .005$.

Discussion

In the current study, I examined trends in adolescents' perceived social safety (school, community) and bullying victimization (general, sexual) across six cohorts of Canadian youth in

grades 6 to 10. Across two decades of HBSC data, I found cohort, gender, and developmental patterns in both bullying victimization and perceived social safety. General and sexual bullying victimization both showed significant interactions between cohort, gender, and grade group, demonstrating that changes in bullying victimization over time differed between these groups. Both school and community safety showed significant two-way interactions between gender, grade group, and cohort, such that the relationship between cohort and school safety was significant and negative for girls in grades 6 to 8 and significant and positive for boys in grades 6 to 8. The relationship between cohort and school safety was significantly negative for boys in grades 6 to 8 and non-significant for boys in grades 9 and 10. By comparison, the decrease in community safety was slightly stronger for girls in grades 6 to 8 than boys in grades 6 to 8 and boys in grades 6 to 8 compared to boys in grades 9 and 10. Results from the multigroup path models showed a gradual increase in the magnitude of the negative relationship between general bullying victimization and school safety across cohorts. This finding illustrates that although bullying victimization may be consistently negatively associated with perceptions of school safety over time, the strength of that correlation may be related to broader, sociohistorical factors, such as increased recognition of diversity and the adoption of inclusive school policies that highlight the harm of bullying.

Contrary to my hypotheses, general bullying victimization rates increased over time, with prevalence rates lowest in 2002 and peaking in 2010. Several factors may underlie this trend. With the mounting ubiquity of digital technologies and rising academic and social pressures (Qi & Yang, 2024; Wang et al., 2025), adolescents may be navigating increasingly complex social landscapes compared to previous cohorts. This added digital context, paired with increased pressure, may create additional contexts in which youth may experience bullying and other

interpersonal challenges. With increased public and scientific attention paid to bullying and its harms (Arseneault, 2018), youth may be better equipped to recognize and label their experiences as bullying victimization. More recently, during the COVID-19 pandemic, some research showed increases in the prevalence of both traditional and digital bullying (Forsberg & Thorvaldsen, 2022), which could be due to decreased focus on anti-bullying measures in favour of other more pressing public health concerns, more opportunities for cyberbullying, and teacher burnout (Armitage, 2021; Forsberg & Thorvaldsen, 2022).

Significant interaction effects highlighted the important role that gender and grade may play on these trends over time. For both bullying types, the three-way interaction between cohort, gender, and grade group was statistically significant, indicating that changes in bullying victimization over time differed by demographic groups. Girls in grades 9-10 showed the steepest increases in general bullying victimization across cohorts, followed by girls in grades 6-8, boys in grades 9-10, and boys in grades 6-8. Several potential explanations may underlie this significant three-way interaction. First, girls may be more likely than boys to experience more subtle, indirect forms of bullying (Espelage & Swearer, 2004). Similarly, as they continue to develop their socioemotional skills, youth in grades 9-10 may be more likely to experience bullying victimization that could fly below the radar, being less clearly detectable (Pichel et al., 2021). In combination with the increased understanding of bullying as a psychosocially harmful experience (Arseneault, 2018), youth may be more able to correctly identify even subtle forms of bullying victimization.

Sexual bullying victimization showed a similar to general bullying. For most groups, sexual bullying generally increased over time. The steepest increases were observed among girls in grades 6-8 and boys in grades 9-10. Bullying does not occur in a gender-neutral way: it is both

a gendered practice and a gendering process (Miller, 2016). In this way, bullying reflects existing gender norms while simultaneously reproducing and enforcing them in adolescents' everyday interactions (Miller, 2016; Rosen & Nofziger, 2019). There are multiple reasons why boys in grades 9-10 may be experiencing a steeper increase in sexual bullying victimization over time than boys in grades 6-8. First, older boys may actually now be encountering more sexualized forms of aggression than their younger counterparts, compared with earlier cohorts (Espelage & Holt, 2007; Sahin-Ilkorkor & Brubaker, 2025). However, this change also could reflect differences in norms regarding masculinity, resulting in older boys recognizing their experiences as sexual bullying (Rosen & Nofziger, 2019).

For girls in grades 6-8, the stronger relationship between sexual bullying victimization and cohort may reflect the earlier emergence of sexualized peer cultures in more recent cohorts (Lunde et al., 2025; Ringrose, 2011). With the rise in digital environments that put pressure on young girls to meet gendered expectations of sexuality, younger girls may be increasingly exposed to sexualized forms of aggression, such as sexual bullying (Ringrose et al., 2013; Ringrose & Barajas, 2011; Tolman et al., 2015). Young girls in more recent cohorts may be better able to recognize and label sexual bullying victimization, as they are growing up in a society with heightened awareness of consent and gendered harm (Mitchell et al., 2016; Powell & Henry, 2017). This intersection of developmental and sociohistorical changes may underpin the steeper rise in sexual bullying victimization in girls in grades 6-8 compared to girls in grades 9-10.

I found that mean levels of school safety were the lowest in 2022 compared to all other cohorts from 2006-2018. Several factors could explain this finding. First, during the pandemic, institutional priorities shifted. Schools prioritized public health (e.g., infection control, remote

learning), which may have diverted resources from anti-bullying programming and other school climate fostering initiatives (Stewart et al., 2024). As a result of the pandemic, many students experienced prolonged periods of social isolation, which may have impeded their prosocial and emotional regulation abilities upon reintegration into the classroom (Alradhi et al., 2022; Maynard et al., 2023). These youth also may have experienced elevated anxiety and emotional dysregulation during the pandemic (Geoffroy et al., 2024), which could have further eroded perceived school safety.

Across all cohorts, higher general and sexual bullying victimization were consistently linked to lower perceived school and community safety. However, follow-up tests showed some more complex differences between cohorts. Specifically, general bullying victimization and school safety became more strongly negatively associated for boys in grades 6-8 in later cohorts. A confluence of factors may contribute to this magnified relationship over time. First, over time, youth may have become more attuned to bullying as a harmful experience (Arseneault, 2018; Kolstrein & Jofré, 2013), magnifying its links to how safe youth feel at school. Additionally, as schools adopt more inclusive policies, youth may begin to perceive bullying as a more serious violation of community values and norms, which could negatively impact their sense of belonging and safety at school (La Salle-Finley et al., 2024; Siperstein et al., 2022). Finally, increased public attention and the rise in acceptance for minoritized identities may have heightened the salience of bullying victimization on how safe school feels.

The developmental collision hypothesis may provide a complementary perspective on why the relationship between general bullying victimization and school safety has magnified over time. This theory posits that the increased sociocultural visibility of sexual diversity has accelerated the timing of sexual identity development (Bishop et al., 2025). This advanced

timing may cause it to "collide" with early adolescence, a developmental period marked by heightened vulnerability to stress and the emergence of mental health issues (Kiekens et al., 2024). As a result, more recent cohorts of youth may face a paradoxical decrease in their sense of school safety, and an increase in the extent to which experiences of social threat may impact it. The developmental collision hypothesis may also apply to other types of identity development, and with increased visibility and acceptance of a variety of minoritized identities, may come a stronger relationship between experiences of bullying victimization at school and one's sense of school safety (Bishop et al., 2025; Lloyd et al., 2024).

Limitations and Future Directions

Despite the important contributions and strengths of the current study, several limitations warrant discussion. Gender was not measured consistently over time, and the survey conflated gender and sex, oscillating between cohorts by asking whether youth were "male" or "female" versus "boy" or "girl." Before the 2018 cohort, there was no way for a youth who did not identify in the gender binary to share their gender. Moreover, it was only in the 2022 cohort that the HBSC integrated a gender/sex two-step measure. As a result of these changes, I could not meaningfully examine gender diversity in my sample, despite these youth being an important population due to their increased likelihood of being bullied and their decreased likelihood of encountering social safety in their environment.

Although I was able to examine changes between cohorts, because the data were not prospective, I was unable to look at longitudinal changes in our variables over time. Consequently, I was unable to parse the directionality of these relationships or ascertain causality. It is probable that a bi-directional relationship could exist between bullying victimization and perceived social safety, such that youth who experience social threat, may in

turn develop negative social safety schemas, which could create a cycle of low self-esteem and expectations of victimization and further social threat. Future studies could employ a longitudinal methodology to better assess directionality.

Furthermore, I would have preferred to examine more diverse forms of identity-based bullying victimization beyond sexual bullying victimization. In understanding how broader sociocultural trends may reflect in the prevalence of bullying and perceived social safety over time, it is important to look at a range of different social identities. Unfortunately, there measurement inclusion over the cohorts of the survey has not been consistent. For example, racial/ethnic bullying was included in most cohorts but excluded in 2014 and 2018. Additionally, only in the latest cohort of data collection has the HBSC study included measures for gender identity-based bullying and sexuality-based bullying. These changes over time may reflect important cohort differences. Additionally, the inclusion or omission of an inclusive measure is in itself reflective of societal attitudes towards that identity, which could potentially affect the experiences of youth who hold that social identity.

In addition to examining more forms of identity-based bullying victimization, future studies may want to take a more intersectional approach to understand how interlocking systems of oppression may influence the relationship between bullying victimization and perceived social safety over time. Although I was able to examine gender effects, many social groups may experience bullying differently due to structural power systems that influence interpersonal power dynamics. Future studies could integrate more complex measures and analyses to address the complex identity-related factors that produce and maintain bullying dynamics.

Conclusion

In the current study, I examined cohort differences in the prevalence of and relationships between general and sexual bullying victimization community and school safety over the last two decades. Bullying victimization was consistently negatively associated with both types of perceived social safety across cohorts, but the relationship between general bullying victimization and school safety increased in magnitude over time. This finding may reflect broader sociocultural changes in how bullying victimization, identity, and belonging are perceived and understood. Girls were generally more likely to report both types of bullying victimization than boys, with this difference especially noticeable for sexual bullying victimization. Additionally, youth in grades 9-10 were less likely to report both social safety and bullying victimization than their younger counterparts, highlighting the important developmental changes that occur across cohorts. As schools and communities navigate changing political and social climates, these findings highlight the importance of considering broader sociohistorical shifts when building safer, more inclusive schools and communities for youth.

Chapter 5 – General Discussion

The three studies in this dissertation were guided by both a social safety perspective and the social ecological framework and were aimed at advancing our understanding of bullying and adolescent health in Canada. To this end, I first developed a multidimensional measure of perceived social safety. I then used this measure to examine how family, friend, school, and community social safety moderate the relationship between bullying victimization and health problems, and how different forms of bullying victimization may be related to perceived social safety over time. The findings from these three studies provide support for the multidimensional, complex nature of social safety. Despite a negative relationship between all social safety types (family, friend, school, and community) and bullying victimization, I found an unexpected moderation pattern, such that at higher levels of school safety, the relationships between bullying victimization and psychosomatic symptoms were stronger than at low levels. This finding stresses the importance of context. Experiencing bullying in an environment one expects to be safe may be more destabilizing because it violates a youth's expectations of protection, connection, and inclusion. Finally, the relationship between general bullying victimization and school safety strengthened over time, suggesting the importance of sociocultural changes on how youth perceive and interpret bullying victimization and social safety. The results of this dissertation have implications for research, policy, and education.

Social Safety is Multidimensional

In this dissertation, I showed that perceived social safety is multidimensional and can be experienced in multiple interconnected contexts in youths' lives. In Study 1, my factor structure established four distinct but related levels of the social safety ecology: family safety, friend safety, school safety, and community safety. This structure aligns with Slavich's original work

(2020), which posits that individuals are located within nested social safety circles, all of which may interact to produce everyday experiences of social safety and threat. Although all four forms of social safety were negatively associated with bullying victimization and psychosomatic symptoms and positively associated with well-being, the strength of the associations differed. This difference suggests that these factors are related yet distinct dimensions of perceivedsocial safety.

Study 2 further illustrated this multidimensionality. Findings of this study showed that not all of these social safety contexts have the same relationship with bullying victimization and health. For example, I found that school safety showed unexpected amplification effects. Counter to my expectations that all types of perceived social safety would serve a protective role, buffering bullied youth against negative health problems, my results, in fact, showed that at high levels of school safety, the relationship between bullying victimization and both psychosomatic symptoms and well-being was stronger than at low levels of school safety. This finding aligns with expectancy violation theory (Burgoon, 2015), which suggests that when someone violates our expectations of how they will behave in a social setting, we are more likely to notice the behaviour and experience negative outcomes (Burgoon, 2015) compared to when someone acts in alignment with our expectations. Thus, different dimensions of social safety may shape adolescents' responses to social threat in unique ways.

Additionally, Study 3 provided further evidence for the multidimensionality of perceived social safety. For example, school and community safety both showed different patterns across cohorts, whereby the relationship between general bullying and school safety increased in magnitude over time, whereas the relationship between general bullying and community safety stayed consistent. School seems to be particularly relevant, perhaps due to it being the context in

which youth are the most likely to experience bullying (Menesini & Salmivalli, 2017; Moody & Stahel, 2025). Understanding how the context in which one experiences bullying interacts with the different levels of social safety would be an interesting future direction for this work.

Consistencies and Differences across Grades, Genders, and Cohorts

Throughout my dissertation, I found both consistencies and differences across grades, genders, and cohorts. These consistencies and differences emphasize the importance of context and power in understanding perceived social safety, bullying victimization, and health. As expected, youth in grades 6-8 were more likely to experience bullying victimization and well-being and less likely to experience psychosomatic symptoms compared to their peers in grades 9-10. This finding aligns with developmental literature, which shows that bullying peaks in middle school (Bellmore et al., 2017; Kretschmer et al., 2017), whereas mental health problems often rise in prevalence during high school (Blakemore, 2019). With respect to the interaction effects I examined in Study 2, the patterns remained relatively consistent between youth in grades 6-8 and youth in grades 9-10, with the same exacerbation effect of school safety emerging on the relationship between bullying victimization and psychosomatic symptoms. The developmental consistency in this pattern suggests that the expectancy violation of experiencing bullying in a context one expects to be safe may stay stable over grade group. Moreover, in Study 3, I found a consistent negative association between grade and both school and community safety across waves, such that boys in grades 9-10 reported significantly lower perceived social safety than their peers in grades 6-8. Again, this finding coincides with extant research suggesting that as youth encounter more challenging social experiences, their social safety schemas may develop to anticipate more threat (Slavich, 2020; Slavich et al., 2023). Thus, although there is developmental variability in the levels of bullying victimization and social safety, perceiving a

safe school climate may create expectations of protection that experiencing bullying then violates, regardless of developmental stage.

Gender diverse youth are less likely to be afforded everyday instances of social safety than their cisgender counterparts (Diamond & Alley, 2022). However, although gender diverse youth were more likely to experience bullying victimization and less likely to experience all types of social safety in my sample, they showed very similar relationships between these variables compared to their cisgender peers. This finding suggests that social safety may be behaving similarly among gender groups. Future research should further examine potential gender and developmental differences. In doing so, researchers should strive to implement an intersectional approach whenever possible (Santos & Toomey, 2018). Context and power are important components of both bullying and social safety. By understanding how multiple social identities may intersect to produce varying levels of power, privilege, and oppression, we may be better able to elucidate the social ecological systems at play.

Finally, the relationship between general bullying victimization and school safety increased in magnitude across the cohorts. Thus, broader sociocultural forces, such as changes in social norms or policies, may change the way youth interpret and experience bullying victimization, and how experiences of social threat become linked with perceptions of social safety. As public awareness and school policies surrounding bullying have changed over time, adolescents' understanding of the harms of bullying victimization may have intensified, along with their expectations of a safe school environment. When an adolescent experiences bullying at school when they are expecting a safe environment, the relationship between general bullying victimization and school safety may be stronger. Thus, social safety is not static, but can evolve in line with broader sociocultural shifts. Theoretically, it is important to conceptualize perceived

social safety as situated in and sensitive to sociohistorical context. From a methodological perspective, it is important to examine cohort effects explicitly to help us further understand how sociocultural changes over time may shape how youth experience social safety and threat.

Shift from Deficit-Based to Strength-Based Approach

My results support the theoretical shift from a deficit-based to a strength-based approach, because they show the role of positive social environments and relationships in shaping adolescent health and well-being. Although a majority of the research examining minoritized populations has taken a pathologizing lens, focusing on negative experiences, stress, and oppression (e.g., (Dürrbaum & Sattler, 2020; Goldbach, Schrager, et al., 2021; Hoy-Ellis, 2023; Hunter et al., 2021; Meyer, 2003), my findings demonstrate that this deficit-focused perspective captures only one part of the picture. Diamond and Alley (2022) posit that this missing puzzle piece is social safety. The current dissertation supports that perspective, as I found that above and beyond the effects of social threat, perceived social safety may predict higher well-being and fewer psychosomatic symptoms, across gender and grade.

Moreover, a deficit-based approach cannot fully explain the complex sociocognitive processes underlying some of my findings. For example, youth who experience higher perceptions of social safety had a stronger relationship between bullying victimization and psychosomatic symptoms than those who experience low safety, suggesting that protective social environments may influence how youth interpret social threat. In other words, the *presence* of social safety may play a different role then the *absence* of harm. By incorporating both social safety and social threat into our approaches, we will be better able to account for the complex social, cognitive, and contextual factors associated with adolescent relationships and health.

Contributions, Implications, and Future Directions

The current dissertation has many different implications for research methodology, education, and future research. Researchers should take a multidimensional approach to understanding perceived social safety, instead of simply focusing on one dimension. These findings demonstrate that the interpersonal and school and community contexts in which a youth encounters social safety have difference with respect to their relevance and importance. Additionally, it is important that our measures and theory underscore that social safety is more than just social support. Although often conflated, social safety and social support are distinct constructs with important theoretical and practical differences. A large body of research demonstrates the protective effects of social support in the context of bullying victimization (e.g., Holt & Espelage, 2007; Malecki & Demaray, 2003). Having supportive relationships with parents, peers, and teachers consistently is linked to lower rates of internalizing symptoms, greater resilience, and improved academic outcomes for youth experiencing bullying victimization (e.g., Budge et al., 2014; Dessel et al., 2017; Raudino et al., 2013; Rueger et al., 2010). That said, an adolescent might report receiving instrumental or emotional support from others yet still feel socially unsafe if they anticipate rejection or stigmatization due to their past experiences (Valente & Crescenzi-Lanna, 2022).

The items on the Social Safety Ecology Scale, therefore, aimed to assess a broader construct, of whether youth *perceive* their environments and relationships as being reliably safe and accepting (Slavich, 2022). Rather than assessing behaviours, such as whether they received social support from caregivers or peers in the last few weeks, this measure focuses more on social safety *schemas* (e.g., *You can trust people around here*). In centering social safety schemas rather than counting the frequency of social support, we are better able to understand how youth's perceptions and expectations of their relationships and environments being safe,

may be associated with their experiences of social threat and health. This distinction helps us create a more complete theoretical understanding of how adolescents understand and navigate their social worlds.

My dissertation also has implications for education. First, school interventions should focus on targeting specific social safety realms. Although they may have limited control over an adolescent's sense of social safety at home or in their community, schools can develop partnerships with families and community agencies to help foster social safety. For example, schools could collaborate with community agencies to make referrals for at-risk youth, enhancing both school and community safety. Schools could also partner with caregivers to ensure that youth have access to consistent support across contexts. Within the school environment itself, promoting school safety is not as simple as reducing bullying: schools should themselves strive to create inclusive environments by encouraging equity, belonging, and respect in students, teachers, and staff. To do so, schools may want to integrate more inclusive curricula, integrate policies that promote equity, diversity, and inclusion, and augment their training for educators to equip them to build strong classroom climates (Greytak et al., 2013; Pennell, 2017; Swanson & Gettinger, 2016). In taking these steps, it is important to consider gender diverse students, but their needs may not be as unique as we may think. A whole-school approach may help us build a positive climate for all youth (Gaffney et al., 2021; Menesini & Salmivalli, 2017). When gender diverse youth feel socially safe, their cisgender counterparts likely will as well (Greytak et al., 2013; Ioverno et al., 2013).

My dissertation also provides important insights for educators and policy-makers who want to support the youth most at risk for bullying and its consequences. The amplification effect I found in Study 2 suggests that when bullying victimization occurs in an environment a youth

expects to be safe, this violation may exacerbate the association between bullying victimization and health. This finding aligns with the healthy context paradox, which suggests that youth who are bullied in schools where victimization is less common may experience worse outcomes than youth who are bullied in schools where bullying is more normative (Garandeau & Salmivalli, 2019). When implementing interventions, it is important to develop protocols to support the youth who will continue to experience bullying even in safer school climates. These supports could include ensuring the students have predictable adults to turn to and access to mental health supports that can help them understand the expectancy violation that they experienced. At the same time, I must also highlight that although not all safe environments buffer bullying victimization, youth who experience higher levels of school safety still have better outcomes overall than youth who experience low school safety. This finding suggests that improving school safety remains essential, despite the amplification effect, but these improvements should be paired with targeted supports for youth who continue to be bullied.

Conclusion

Social safety is a fundamental human need, which is particularly relevant during adolescence, a developmental stage characterized by increasingly complex interpersonal relationships and a strong motivation to belong. One salient social threat during adolescence is bullying victimization, which is associated with a variety of negative outcomes. By combining social safety theory with a social ecological framework, the current dissertation offered a multidimensional understanding of the relationships and contexts that youth experience and perceive social safety. I also found that although gender diverse youth are at increased risk of bullying victimization and are less likely to experience social safety, these youth experienced the same exacerbation of the relationship between bullying victimization and psychosomatic

symptoms at high levels of school safety as their cisgender counterparts. Across cohorts, the relationship between general bullying victimization and school safety increased in magnitude, demonstrating the importance of sociocultural shifts on youths' bullying and social safety experiences. Taken together, this dissertation offers a multidimensional, developmentally-grounded perspective on social safety, bullying victimization, and health that may inform interventions designed to promote adolescent thriving at school and beyond.

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Appendix A

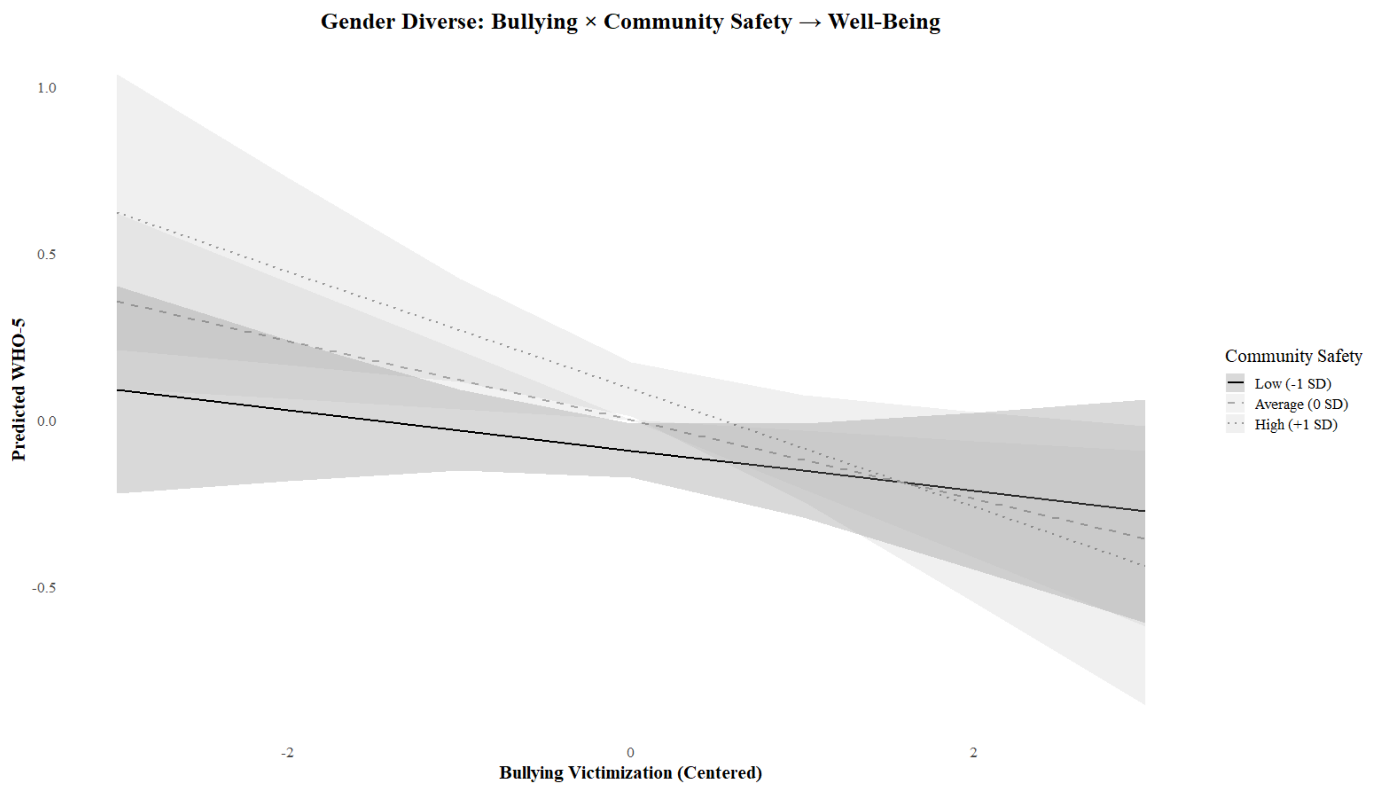
Figure 3.4

Simple Slopes Plot of the Interaction Between Bullying Victimization and Community Safety on Well-being Among Cisgender Girls

Appendix B

Figure 3.5

Simple Slopes Plot of the Interaction Between Bullying Victimization and Community Safety on Well-being Among Gender Diverse Youth



Appendix C

Table 4.10

Standardized Path Coefficients (β) Predicting School and Community Safety Across HBSC Cohorts (2002-2022) with 2022 Gender Specifying Cisgender Boys and Girls

Predictor	2002	2006	2010	2014	2018	2022
Outcome: School Safety						
General bullying	**-.16*** **	**-.13*** **	**-.18*** **	**-.25*** **	**-.24*** **	**-.27*** **
Sexual bullying	**-.07** **	**-.19*** **	-.01	**-.06*** **	**-.08*** **	**-.09*** **
Gender	**.04** **	**.05*** **	**.04*** **	-.01	**-.03*** **	**-.09*** **
Grade	**-.09*** **	**-.11*** **	**-.17*** **	**-.17*** **	**-.13*** **	**-.11*** **
Gen bullying x Gender	-.01	-.02	-.02	**-.04*** **	**-.05** **	**-.04*** **
Sex bullying x Gender	.01	.01	**-.09** **	**-.04** **	**-.03* **	-.02
Gen bullying x Grade	.02	-.03	**-.03* **	-.01	-.01	**.02* **
Sex bullying x Grade	-.04	.03	**.03** **	**.04** **	**.03* **	.02
Outcome: Community Safety						
General bullying	**-.10*** **	-.04	**-.18*** **	**-.13*** **	**-.12*** **	**-.11*** **
Sexual bullying	-.04	-.08**	.03	-.03	-.00	-.03
Gender	.00	**-.05*** **	-.01	**-.03*** **	**-.02* **	**-.04*** **
Grade	**-.09*** **	**-.06*** **	**-.09*** **	**-.11*** **	**-.05*** **	**-.03*** **
Gen bullying x Gender	.02	-.01	**.06* **	**-.02* **	.02	-.02
Sex bullying x Gender	-.01	.01	**-.06* **	.00	**-.04* **	.00
Gen bullying x Grade	-.02	-.03	.01	.01	-.01	.02
Sex bullying x Grade	-.01	.02	.01	.01	-.00	-.01

Note. Values are standardized coefficients (Std.all). p <.05*, p <.01**, p <.001***. Boys are the comparison group throughout.