



Unpacking the Ecology of School Bullying among Thai Opportunity Expansion Students: A Structural Equation Modeling Approach

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Abstract

School bullying remains a persistent concern among adolescents in Thailand. Guided by the Social Ecological Framework, this study examined multi-level risk and protective factors associated with bullying behavior among lower secondary school students. A cross-sectional design using structural equation modeling was applied. A total of 355 students were recruited through multi-stage cluster sampling from six Opportunity Expansion Schools in Thailand's Eastern Economic Corridor. The prevalence of bullying was substantial, with 31.5% reporting victimization and 27.3% reporting perpetration. Nearly half of victims were classified as bully-victims. Boys reported higher levels of perpetration, whereas overweight and obese students reported higher victimization. At the societal level, social norms were associated with lower levels of victimization and perpetration. At the community level, school climate showed no direct associations with bullying outcomes but was indirectly related to perpetration through moral disengagement. At the relationship level, family functioning was positively associated with resilience but was neither directly nor indirectly associated with bullying outcomes. At the individual level, moral disengagement was associated with perpetration, whereas resilience was not associated with either victimization or perpetration. The final structural model explained 18.6% of the variance in victimization and 17.2% of the variance in perpetration. These findings suggest that school bullying is more closely associated with social normative and cognitive moral processes than with broader psychosocial resources. Interventions should prioritize strengthening prosocial peer norms and addressing moral disengagement within school environments. Future longitudinal research is needed to clarify temporal and reciprocal relationships among ecological factors.

Keywords Bullying · Social norms · Moral disengagement · Resilience · School climate · Adolescents

Introduction

School bullying is a persistent public health concern affecting children and adolescents across cultural contexts. Globally, an estimated 246 million children experience school violence and bullying each year (Attawell, 2017). In Thailand, 40% of students (around 600,000 individuals) report

being bullied annually (Hamtanon & Hamtanon, 2024). Despite increasing awareness and prevention efforts, progress in reducing school bullying remains limited (UNESCO, 2024), highlighting the need for a more comprehensive understanding of its underlying mechanisms.

Bullying is traditionally defined as intentional and repeated aggressive behavior characterized by a power imbalance (Olweus, 1994). However, contemporary perspectives conceptualize bullying as a complex social process shaped by interactions across individual, relational, institutional, and societal contexts (UNESCO, 2021, 2024). This broader perspective emphasizes that bullying is not solely an individual behavior but is embedded within wider social systems.

The consequences of bullying are substantial and long-lasting. Evidence shows that involvement in bullying whether as a perpetrator, victim, or both (bully-victim) is associated with adverse physical health outcomes,

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psychological distress, and impaired academic performance (Álvarez-García et al., 2015; Man et al., 2022). These effects are particularly pronounced during adolescence (Rivara & Menestrel, 2016), a critical developmental stage characterized by identity formation, emotional regulation, and social integration (Bishop, 2013).

Importantly, bullying involvement varies across individuals. Factors such as perceived differences in appearance, ethnicity, gender, or disability can increase vulnerability to victimization (Fast, 2016). Peer dynamics also play a crucial role in bullying perpetration; adolescents may engage in bullying to gain social status or approval from peers (Thornberg, 2015). Gender differences further shape these patterns, with boys more likely to engage in physical forms of bullying and girls in relational forms (Wang & Chen, 2023).

Moreover, social-cognitive distortions may enable individuals to disengage from self-regulatory processes, thereby facilitating aggressive and violent behavior (Thornberg & Jungert, 2014). In contrast to risk-oriented perspectives, resilience has been identified as an important protective factor in adolescent development. Beyond individual factors, a growing body of research highlights the importance of contextual influences. Family and school environments, and broader cultural norms all contribute to shaping bullying behaviors. For example, exposure to family conflict may increase the likelihood of aggression, whereas supportive relationships can serve as protective factors (Cui & Li, 2023; Nocentini et al., 2019). Similarly, positive school climates are associated with reduced bullying, while social norms that normalize aggression may perpetuate harmful behaviors (Mandira & Stoltz, 2021). These variations suggest that bullying cannot be fully understood without considering individual characteristics, social dynamics, and contextual factors.

In the Thai context, cultural norms emphasizing social harmony, respect for hierarchy, and, avoidance of confrontation (i.e., saving face) may inadvertently discourage reporting or intervention in bullying situations (Samoh et al., 2019). Expressions such as *sanuk* (fun) or beliefs like “boys will be boys” can trivialize aggressive behaviors (Luanpreda & Verma, 2016; Samoh et al., 2019). At the same time, rapid socio-economic changes driven by urbanization and globalization have introduced tensions between collectivist and individualist values in Thailand (Pradubmook-Sherer & Sherer, 2014). These shifts may associate with increasing mental health concerns among Thai adolescents, including stress, anxiety, and depression (UNICEF, 2022), and may intersect with bullying experiences.

Previous Thai studies on bullying have primarily emphasized exposure to violence within students’ immediate environments. For instance, Lacheem et al. (2009) identified parental violence, strict upbringing, authoritarian classroom

management, and peer violence as key predictors. Similarly, Sherer & Sherer (2011) highlighted environmental violence alongside peer influence and personal traits, while Pradubmook-Sherer & Sherer (2015) demonstrated that exposure to violence across home, school, and community contexts predicted bullying victimization. More recently, Thopae-roh et al. (2022) identified individual and relational factors, including sex, peer relationships, stress, and psychological characteristics, as significant predictors.

Despite these contributions, important gaps remain. Prior research has largely examined predictors in isolation and has paid limited attention to the integrated roles of psychological processes (e.g., moral disengagement, resilience) and school-level factors (e.g., school climate). Methodologically, many studies rely on traditional regression approaches, which do not fully capture the complex interplay among multi-level influences. In addition, most research has focused on Southern Thailand, a region with distinct cultural and religious characteristics, thereby limiting generalizability to other rapidly developing areas. Contexts such as the Eastern Economic Corridor (EEC), characterized by economic transformation, population mobility, and increasing social diversity, remain underexplored.

Furthermore, Opportunity Expansion Schools (OES), which provide lower secondary education for students from low-income and working families (Sittisak & Roekmongkol, 2025), represent a critical yet understudied educational setting. Students in these schools may experience unique social and economic vulnerabilities that shape bullying dynamics, yet empirical evidence in this context remains uncommon. Understanding bullying within OES is therefore essential for developing targeted and equitable interventions in Thailand.

To address these gaps, the present study adopts an integrated ecological perspective by examining the associations among individual, family, school, and societal factors in relation to school bullying among Thai adolescents in OES. Guided by relevant behavioral theories, this study employs Structural Equation Modeling (SEM) to simultaneously assess direct and indirect relationships, with particular attention to psychological mechanisms (e.g., moral disengagement and resilience) and contextual influences (e.g., school climate and social norms). By focusing on an underexplored population and applying a multi-level analytical approach, this study extends prior Thai and international researches and provides a more comprehensive, contextually grounded understanding of bullying. The findings are expected to inform culturally responsive prevention strategies aligned with United Nations Sustainable Development Goal 4, particularly Target 4.a, which emphasizes safe and inclusive learning environments.

Literature Review

Conceptual Framework

Bullying is a complex social behavior shaped by interacting influences across multiple levels of the social environment. The Social Ecological Framework emphasizes that behavior is shaped by dynamic interactions across systems rather than isolated factors (CDC, 2002; Krug et al., 2002). Importantly, this framework serves as an organizing model rather than a predictive theory; therefore, the present study draws on complementary theoretical perspectives, including Social Cognitive Theory, Social Learning Theory, and Transactional Resiliency Theory, to explain potential mechanisms linking ecological factors to bullying behavior.

At the individual level, this study focuses on resilience and moral disengagement as key psychological factors associated with bullying involvement. From a transactional social-ecological perspective, rather than representing a fixed personality trait, resilience is understood as a developmental process, capacity, and outcome that emerges despite exposure to adverse life events or challenging situations across the lifespan (Kuldas & Foody, 2022). This perspective emphasizes the dynamic interaction between individual assets and environmental resources that facilitate positive adaptation in the presence of risk. Resilience is generally considered a protective factor against bullying involvement, as higher resilience is associated with better coping and lower behavioral maladjustment (Fei et al., 2022). However, findings from Thailand have been inconsistent. Some studies reported a negative association between resilience and bullying (Inson & Sangon, 2021), while others found no significant relationship (Bowornkittikun et al., 2021). These mixed findings suggest that the role of resilience may depend on contextual factors and the interactions among its multidimensional components within specific environments.

Moral disengagement, grounded in Social Cognitive Theory by Albert Bandura, refers to a set of cognitive mechanisms that enable individuals to justify harmful behavior without self-condemnation (Thornberg, 2023). These mechanisms weaken moral self-regulation, thereby increasing the likelihood of aggressive and harmful behaviors. Moral disengagement is typically conceptualized across multiple loci: behavioral, agency, outcome, and victim, which reflect different ways individuals rationalize or minimize the consequences of their actions (Bandura et al., 1996). A child's moral development influences their likelihood of engaging in or rejecting harmful behavior, as children who bully others often show higher levels of moral disengagement (Thornberg et al., 2024). Meta-analyses and longitudinal studies consistently show positive associations between moral disengagement and both bullying perpetration and

victimization (de Oliveira et al., 2021; Killer et al., 2019; Thornberg, 2023). Accordingly, the study hypothesizes: H1a: Resilience is negatively associated with bullying involvements (victimization and perpetration). H1b: Moral disengagement is positively associated with school bullying (victimization and perpetration).

At the relational level, family functioning is considered a foundational influence on adolescent behavior. Social Learning Theory by Albert Bandura and his colleagues, posits that children learn behaviors through observation and imitation of significant others, particularly within the family environment (Nabavi & Bijandi, 2012). Family functioning refers to the quality of communication, emotional support, role structure, and problem-solving within the family system (Lewandowski et al., 2010). Positive family functioning has been linked to lower bullying involvement and higher levels of prosocial behavior (Cui & Li, 2023; Nocentini et al., 2019; Xue et al., 2022), whereas dysfunctional family environments are associated with increased bullying behaviors (Nunez-Fadda et al., 2022). Family functioning is also conceptually embedded within broader ecological processes, with evidence suggesting that it may influence behavioral outcomes indirectly through school-related experiences and psychological resources such as resilience (Zhang et al., 2022; Zhang & Wang, 2020). In the Thai context, bullying has been associated with family instability, harsh parenting practices, and exposure to domestic conflict (Anuthato et al., 2021; Sakarinkhul & Wacharasindhu, 2014). Based on these evidences, the hypotheses are: H2a: Family functioning is negatively associated with bullying involvements. H2b: Family functioning has an indirect effect on bullying involvements through resilience.

At the community level, school is a key contextual setting in which bullying behaviors emerge and are shaped. School climate refers to students' and staff perceptions of norms, relationships, safety, and the overall school environment (Cohen et al., 2009). It reflects a multidimensional construct influenced by interpersonal and institutional processes. Empirical evidence indicates that school climate can function as both a protective and risk factor for bullying (Mandira & Stoltz, 2021). Positive school climates characterized by safety, support, and a sense of belonging are consistently associated with lower levels of bullying involvement (Aldridge et al., 2017; Benbenishty et al., 2016), whereas negative climates are associated with higher levels of bullying (Lee, 2011; Wang & Chen, 2023). However, findings are not fully consistent, as some studies suggest that highly competitive or performance-oriented school environments may also be associated with increased bullying behaviors (Han et al., 2017; Yang et al., 2022). School climate may also influence bullying through cognitive and relational mechanisms. Prior studies suggested that negative school environments

can increase moral disengagement (Montero-Carretero et al., 2021), while family functioning may be indirectly influenced by school context and associated with behavioral outcomes (Zhang & Wang, 2020). Based on these evidences, the study proposes: H3a: School climate is associated with bullying involvements negatively. H3b: School climate has indirect effects on bullying involvements through moral disengagement, and family functioning.

At the societal level, norms play a central role in shaping acceptable behaviors within peer groups and school communities. Social norms are informal rules that guide behavior and include both descriptive norms (perceptions of what is commonly done) and injunctive norms (perceptions of what is socially approved) (Cialdini et al., 1990). Normative influence operates through perceived expectations from reference groups and social reinforcement processes. When individuals violate perceived norms, they may experience social sanctions or emotional responses such as shame, which can regulate subsequent behavior (Mackie & Moneti, 2014). In collectivistic cultures, individuals are more likely to prioritize group harmony and be sensitive to social expectations and normative influence (Bohns & Flynn, 2013). Empirical evidence indicates that peer norms that tolerate or normalize aggression are associated with higher levels of bullying involvement, whereas prosocial norms are associated with lower levels of such behaviors (Laninga-Wijnen et al., 2021; Zaneva et al., 2023). In collectivist contexts such as Thailand, social norms related to hierarchy and conformity may further shape how bullying is perceived and addressed. Prior research in Thailand also highlights the broader influence of social norms on adolescent risk behaviors (Yokutphu et al., 2022). Supportive interpersonal relationships and prosocial peer norms have been found to be associated with more positive student behavioral outcomes, suggesting that normative and relational school environments jointly contribute to student adjustment (Hopson et al., 2014). In addition, when aggressive behaviors are normalized, they may contribute to a negative classroom climate characterized by higher conflict, greater isolation, and reduced cooperation and cohesion (Laninga-Wijnen et al., 2021). Accordingly, it was hypothesized that H4a: Social norms are negatively associated with bullying involvements. H4b: Social norms have an indirect effect on bullying involvements through school climate.

The Present Study

Guided by the Social Ecological Framework, this study examined multilevel factors associated with perceived school bullying involvement among adolescents in Thai Opportunity Expansion Schools. The proposed model

incorporates societal (social norms), community (school climate), relationship (family functioning), and individual (resilience and moral disengagement) factors. At the societal level, social norms are expected to influence perceived bullying involvement directly and indirectly through their associations with school climate. At the community level, school climate is expected to influence perceived bullying involvement directly and indirectly through its associations with moral disengagement, and family functioning. At the relationship level, family functioning is expected to contribute to resilience. At the individual level, resilience is expected to be associated with lower bullying involvement, whereas moral disengagement is expected to increase bullying involvement by facilitating cognitive justifications for harmful behavior.

Consistent with the ecological framework, these factors were conceptualized as interrelated influences operating across multiple levels of adolescents' social environments. Structural equation modeling was used to examine direct and indirect pathways to bullying victimization and perpetration. Given inconsistent findings in previous research, particularly regarding resilience and school climate, the present study empirically tested these relationships within the Thai context. Figure 1 presents the hypothesized model.

Methods

Study Design

This study employed a cross-sectional descriptive design using covariance-based structural equation modeling (CB-SEM) to test the hypothesized relationships among latent constructs.

Settings and Sample

This study was conducted in six Opportunity Expansion Schools (OES) across three provinces (two schools per province) in Thailand's Eastern Economic Corridor (EEC), a designated special economic zone. A multi-stage cluster sampling technique was used, proceeding from provinces to schools, grades, and classrooms. Within selected classrooms, all eligible students were invited to participate. The inclusion criteria were male and female students aged 13–15 years who had attended the current school for at least one semester. The study focused on day students from local communities. Sample size adequacy was determined based on recommendations for CB-SEM, particularly the N: q ratio approach (Kline, 2023, p. 16), which suggests an adequate number of cases relative to the number of estimated

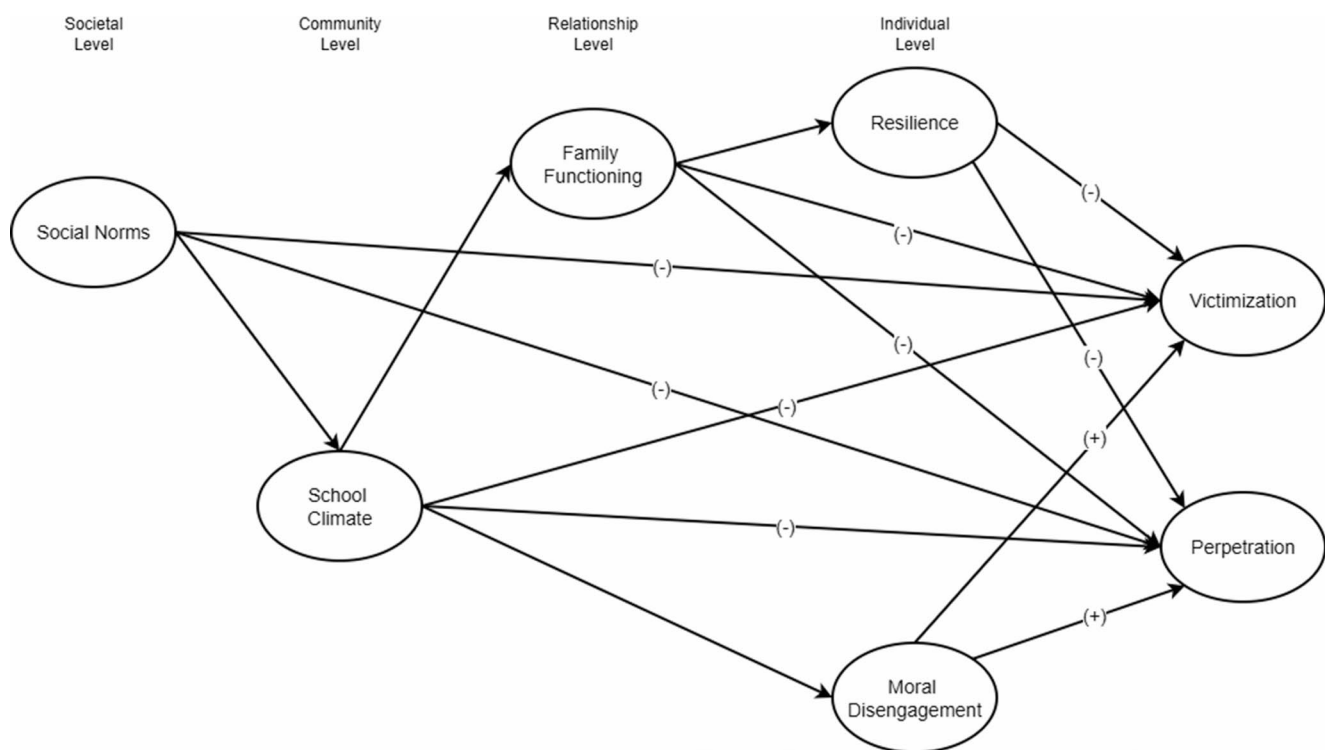


Fig. 1 Hypothesized ecological model of perceived school bullying involvements

parameters. The proposed model included approximately 62 free parameters. Using a conservative 5:1 cases-to-parameters ratio, the minimum required sample size was 310. After accounting for a 10% non-response or attrition rate, the target sample size was 341. The final sample of 355 participants exceeded this threshold, indicating sufficient statistical power for the analysis. However, it is also noted that detecting small to medium indirect effects may require larger samples (e.g., $N \approx 400\text{--}500$) (Fritz & Mackinnon, 2007).

Research Instruments

Resilience was assessed using the Resilience Factors Scale (RFS) (Takviriyannun, 2008), which consists of 25 items measuring three dimensions: *I HAVE* (external support), *I AM* (internal strengths), and *I CAN* (interpersonal and problem-solving skills) (Grotberg, 2003). Items are rated on a 4-point Likert scale (1 = Definitely not true to 4 = Definitely true). Scores were computed by averaging all items, with higher scores indicating greater resilience. The scale has demonstrated good reliability (Cronbach's $\alpha = 0.88$) (Chulakarn & Chaimongkol, 2021). In the present study, McDonald's omega (ω) was 0.864.

Moral Disengagement was measured using the Moral Disengagement Scale (Thummanond & Maneesri, 2020), which consists of 32 items covering four loci: behavioral

locus, agency locus, outcome locus, and victim locus (Bandura et al., 1996). Items are rated on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). A mean score was computed, with higher scores indicating greater moral disengagement. The scale demonstrated strong reliability with Cronbach's α of 0.91 (Thummanond & Maneesri, 2020). In the present study, reliability was also acceptable, with a McDonald's omega (ω) of 0.875.

Family Functioning was evaluated using the Chulalongkorn Family Inventory (CFI) (Trangkasombat, 2006), which includes 36 items based on the McMaster Model of family Functioning (Miller et al., 2000). It measures seven domains: problem-solving, communication, roles, affective responsiveness, affective involvement, behavior control, and general functioning. Items are rated on a 4-point Likert scale (1 = Not accurate at all to 4 = Very accurate). After reverse coding of negatively worded items, a mean score was computed, with higher scores indicating better family functioning. The scale demonstrated good reliability (Cronbach's $\alpha = 0.88$) (Limsawat et al., 2020). In the present study, the scale demonstrated good reliability (McDonald's $\omega = 0.913$).

School Climate was measured using the School Climate Measure (SCM) (Kulophas, 2017), which includes 39 items across eight domains: student-teacher relationships, school connectedness, academic support, order and discipline, physical environment, social environment, perceived

exclusion/privilege, and academic satisfaction (Zullig et al., 2014). Items are rated on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). A mean score was computed, with higher scores indicating a more positive school climate. The SCM has demonstrated acceptable to strong reliability across subscales (Cronbach's $\alpha = 0.61\text{--}0.89$) (Kulophas, 2017). In the present study, McDonald's omega (ω) was 0.940.

Social Norms related to bullying were assessed using an 8-item scale developed for this study based on WHO guidelines (Granat et al., 2022). The instrument measures injunctive norms (perceived social approval) and descriptive norms (perceived prevalence of behavior) across physical, verbal, and relational bullying. Items are rated on a 7-point scale (1 = Definitely no to 7 = Definitely yes). A mean score was computed, with higher scores indicating stronger perceived pro-bullying social norms. Content validity was established through expert review, and the instrument was translated following WHO forward-backward translation procedures. In the present study, the scale demonstrated good reliability (Cronbach's $\alpha = 0.798$, McDonald's $\omega = 0.799$).

School Bullying was measured using the revised Olweus Bully/Victim Questionnaire (Tapanya, 2007), which assesses both victimization and perpetration experiences over the past two to three months. The instrument includes 36 items rated on a 5-point frequency scale (1 = Has not happened to 5 = Several times a week). Students are classified as victims (Q4) or perpetrators (Q24) if they report bullying at least two or three times a month. For SEM analysis, two composite variables were created: victimization (items Q4–13) and perpetration (items Q24–33). The scale has demonstrated acceptable reliability (Cronbach's $\alpha = 0.75$) (Prasartpornsirichoke et al., 2022). In the present study, McDonald's omega (ω) was 0.829.

Data Collection Process

Ethical approval for this study was obtained from the Burapha University Institutional Review Board (G-HS124/2567), and permissions were granted by the Basic Education Commission and participating school administrators. Data were collected from Grade 7–9 students between January and February 2025. Participants were identified through school records based on eligibility criteria. Written informed consent was obtained from parents or guardians one week prior to data collection, and student assent was obtained on the day of participation. Students were informed about the study purpose, voluntary participation, confidentiality, and their right to withdraw at any time without penalty. Data were collected in a single session at each school during non-instructional time in supervised classroom settings arranged to ensure privacy and reduce peer influence. Trained

research assistants ($n=4$), under the supervision of the principal investigator, administered standardized instructions and provided clarification when needed. The questionnaire took approximately 50–60 min to complete. To minimize fatigue, participants were given a 10-minute refreshment break after completing the first half of the questionnaire. A brief visual explanation of bullying was provided to ensure common understanding of key concepts of school bullying. Participant well-being was prioritized through a distress protocol, allowing students to skip questions or discontinue participation at any time. A brief debriefing session was conducted after completion, and information on school-based support services was provided. Although no financial incentives were offered, participants received small tokens of appreciation. All data were securely stored in password-protected digital files and locked cabinets and retained for one-year post-publication before secure deletion in accordance with ethical guidelines.

Data Analysis

Data were analyzed using IBM SPSS Statistics 27 and IBM SPSS AMOS 24. Missing data were handled using Full Information Maximum Likelihood (FIML) to minimize bias and retain statistical power. Descriptive statistics were computed to summarize demographic characteristics and study variables. Because the Social Norms scale was newly developed for this study, its factor structure was first examined using exploratory factor analysis (EFA). The results supported a two-factor solution while one item from descriptive norms demonstrated low communality (0.189) and weak factor loading. Therefore, it was removed from subsequent analyses. Prior to model estimation, key assumptions for structural equation modeling (SEM) were assessed. The data showed no severe violations of normality or multicollinearity. A small number of 7 multivariate outliers (1.97%) were identified but retained, as they represented valid observations and did not substantially affect parameter estimates.

The measurement model was evaluated using confirmatory factor analysis (CFA), with construct reliability and validity assessed through composite reliability (CR), average variance extracted (AVE), and discriminant validity. Structural relationships were then examined using SEM with maximum likelihood estimation. Model fit was evaluated using multiple indices, including chi-square (χ^2), comparative fit index (CFI), and root mean square error of approximation (RMSEA). Indirect effects were tested using bootstrapping with 5,000 resamples, and 95% bias-corrected confidence intervals.

Table 1 Demographic characteristics of sample ($N=355$)

Variables	<i>n</i>	%
Age (Mean = 13.98, SD = 0.84)		
13 years	129	36.3
14 years	104	29.3
15 years	122	34.4
Gender		
Boy	139	39.2
Girl	216	60.8
Grade		
Grade 7	134	37.7
Grade 8	107	30.1
Grade 9	114	32.1
BMI category		
Normal	312	87.9
Overweight	29	8.2
Obese	14	3.9
Family type		
Single parent	44	12.4
Nuclear	161	45.4
Extended	150	42.3
Hometown Region (EEC)		
Yes	266	74.9
No	89	25.1

Results

Descriptive Statistics

The sample had a mean age of 13.98 years ($SD=0.84$), with the majority being female (60.8%). Most participants were originally from the Eastern Economic Corridor region (74.9%) and had normal body weight (87.9%). The average monthly household income was approximately 32,902 THB ($SD=35,413$) (see Table 1).

Among the 355 students, 112 (31.5%) reported being bullied (victimization), and 97 (27.3%) reported engaging in bullying others (perpetration). Notably, 52 victims (46.4%) reported engaging in perpetration (bully-victims), indicating a significant association between victimization and perpetration ($\chi^2(1)=30.07$, $p<.001$). Verbal bullying was the most commonly reported form, experienced by 85.1% of victims and 77.9% of perpetrators, followed by racial bullying (58.4% and 53.2%, respectively). Most

victims identified perpetrators as same-grade peers (73.2%) and small groups of two to three students (38.4%). Bullying episodes typically lasted approximately one month (44.6%) and occurred most frequently in unsupervised classrooms (66.1%), hallways (54.5%), and playgrounds (41.1%). Over one-third of victims (36.3%) reported not disclosing their experiences, whereas those who did most often confided in friends (51.8%) or teachers (25.9%).

Bivariate analyses indicated that boys were more likely than girls to report perpetration ($p<.05$), while overweight or obese students were more likely to report victimization ($p<.05$). The correlation analysis (see Table 2) indicated that social norms were negatively associated with both victimization and bullying perpetration, whereas moral disengagement was positively associated with perpetration. These relationships provided preliminary support for the hypothesized structural model.

Measurement Model Assessment

Instrument Validation

Before testing the structural model, confirmatory factor analyses (CFA) were conducted for each instrument to assess construct validity. Most fit indices were within acceptable ranges, with χ^2/df values ranging from 1.91 to 4.06, GFI from 0.828 to 0.960, CFI from 0.845 to 0.944, and RMSEA from 0.051 to 0.093. McDonald's omega coefficients ranged from 0.799 to 0.940, indicating acceptable to excellent reliability across all instruments. Detailed CFA results and reliability estimates are presented in Table 3.

Initial Measurement Model

The initial higher-order CFA model demonstrated $\chi^2(881)=1735.744$, $\chi^2/df=1.97$, and RMSEA = 0.052. However, the comparative fit index (CFI = 0.869) indicated only marginal model fit. Standardized factor loadings also ranged from 0.364 to 0.904, although several indicators, particularly within the bully perpetration, family functioning, and school climate constructs, showed loadings below the recommended threshold of 0.50. Composite reliability

Table 2 Correlation among the study variables

Variable	1	2	3	4	5	6	7
1. Resilience	—						
2. Moral Disengagement	-0.180**	—					
3. Family Functioning	0.543***	-0.211***	—				
4. School Climate	0.501***	-0.184**	0.361***	—			
5. Social Norms	0.046	-0.385***	0.187*	0.088	—		
6. Victimization	0.026	0.158*	-0.077	-0.013	-0.357***	—	
7. Perpetration	0.000	0.245	-0.142*	-0.106†	-0.314***	0.503***	—

Values represent Pearson correlation coefficients. † $p<.10$, $p<.05^*$, $p<.01^{**}$, $p<.001^{***}$. All tests are two-tailed

Table 3 Confirmatory factor analyses of instruments and their reliabilities

Variables	χ^2	df	χ^2/df	<i>P</i> -value	GFI	CFI	RMSEA	ω
Resilience (RSF)	318.386	167	1.907	0.000	0.918	0.897	0.051	0.864
Moral disengagement (MDS)	456.742	186	2.456	0.000	0.881	0.845	0.064	0.875
Family functioning (CFI)	407.891	184	2.217	0.000	0.902	0.924	0.059	0.913
School climate (SCM)	1232.846	520	2.371	0.000	0.828	0.859	0.062	0.940
Social norms	52.729	13	4.056	0.000	0.960	0.944	0.093	0.799

χ^2 =Chi-square, df=Degree of Freedom, GFI =Goodness-of-fit Index, CFI=Comparative Fit Index, RMSEA=Root Mean Square Error of Approximation, ω =McDonald's Omega

(CR) values were above the acceptable threshold of 0.70 for most constructs, except for social norms (CR = 0.621). Convergent validity was only partially supported, as several constructs had average variance extracted (AVE) values below 0.50. Especially, Olweus Bully/Victim Questionnaire scale lacked convergent validity (AVE= 0.420 for victimization and AVE=0.359 for bully perpetration). Discriminant validity was assessed using the heterotrait–monotrait ratio (HTMT), with all values below 0.85, indicating adequate discriminant validity.

Revised Measurement Model

Based on the initial CFA results, poorly performing indicators were removed to improve model fit and construct validity. In particular, the full Olweus Bully/Victim Questionnaire did not demonstrate adequate convergent validity. Consequently, items 5, 6, 8, 9, 10, 13, 26, 28, 29, 30, 32, and 33 were removed based on standardized factor loadings and validity criteria. The revised scale achieved acceptable convergent validity and was retained for subsequent analyses.

Reliability of the retained constructs was assessed using McDonald's omega (ω), and most constructs showed satisfactory reliability ($\omega \geq 0.70$). However, the behavioral control subdimension of family functioning was removed because of very poor reliability ($\omega = 0.293$), indicating that it was not a reliable indicator of the construct. In addition, some retained subdimensions, including agency locus of moral disengagement and roles in family functioning, showed relatively low reliability ($\omega < 0.60$), which should be considered when interpreting the corresponding structural paths.

The final revised measurement model showed good fit to the data: $\chi^2(356) = 705.931$, $\chi^2/df = 1.98$, CFI = 0.926, and RMSEA = 0.053. All standardized factor loadings exceeded 0.50, ranging from 0.579 to 0.914, indicating satisfactory indicator reliability. Composite reliability values exceeded 0.70 for all constructs except social norms (CR = 0.615). Convergent validity was supported for most constructs; however, the social norms construct remained slightly below the recommended AVE threshold (AVE = 0.444). Despite this limitation, the construct was retained because

of its theoretical relevance. Discriminant validity was confirmed, with all HTMT values below the recommended cut-off of 0.85.

Structural Model Assessment

The structural model demonstrated acceptable fit to the data and adequately represented the observed relationships among ecological predictors of school bullying, $\chi^2(363) = 822.15$, $\chi^2/df = 2.27$, CFI = 0.903, and RMSEA = 0.060. At the societal level, social norms were significantly and negatively associated with both victimization ($\beta = -0.416$, $p < .001$, 95% CI $[-0.833, -0.203]$) and perpetration ($\beta = -0.333$, $p < .001$, 95% CI $[-0.738, -0.104]$), supporting H4a. However, the indirect effects of social norms on perceived bullying involvement through school climate were not significant; therefore, H4b was not supported. At the community level, school climate was not directly associated with either victimization or perpetration, indicating that H3a was not supported. However, school climate was significantly associated with lower moral disengagement ($\beta = -0.192$, $p = .002$) and showed a significant indirect effect on perpetration through moral disengagement ($\beta = -0.057$, 95% CI $[-0.157, -0.006]$, $p = .028$), partially supporting H3b. The proportion mediated for this pathway was moderate (PM = 0.45), indicating that approximately 45% of the total effect was explained through moral disengagement. At the relationship level, family functioning was significantly associated with resilience ($\beta = 0.556$, $p < .001$), but showed no direct or indirect effects on either victimization or perpetration. Therefore, H2a and H2b were not supported. At the individual level, moral disengagement was positively associated with perpetration ($\beta = 0.155$, $p = .010$, 95% CI $[0.003, 0.306]$), but not with victimization, partially supporting H1b. Resilience was not significantly associated with either outcome; therefore, H1a was not supported. Total effects indicated that social norms remained significantly associated with both victimization ($\beta = -0.394$, $p = .002$, 95% CI $[-1.449, -0.144]$) and perpetration ($\beta = -0.309$, $p = .004$, 95% CI $[-1.249, -0.066]$). Overall, the model explained 18.6% of the variance in victimization and 17.2% of the variance in perpetration. Full results are presented in Table 4; Fig. 2.

Table 4 Direct, indirect, and total effects with hypothesis testing

Hypothesis	Path	Effect	β	95% CI	<i>p</i> -value	PM	Supported
H1a	Resilience → Victimization	Direct	0.097	[-0.088, 0.326]	0.221	—	No
H1a	Resilience → Perpetration	Direct	0.151	[-0.068, 0.392]	0.054	—	No
H1b	Moral Disengagement → Victimization	Direct	0.077	[-0.070, 0.239]	0.210	—	No
H1b	Moral Disengagement → Perpetration	Direct	0.155	[0.003, 0.306]	0.010	—	Yes
H2a	Family Functioning → Victimization	Direct	-0.080	[-0.167, 0.197]	0.316	—	No
H2a	Family Functioning → Perpetration	Direct	-0.137	[-0.260, 0.148]	0.083	—	No
H2b	Family Functioning → Resilience → Victimization	Indirect	0.089	[-0.074, 0.342]	0.261	—	No
H2b	Family Functioning → Resilience → Perpetration	Indirect	0.133	[-0.054, 0.400]	0.165	—	No
H3a	School Climate → Victimization	Direct	0.015	[-0.276, 0.074]	0.828	—	No
H3a	School Climate → Perpetration	Direct	-0.070	[-0.357, 0.053]	0.291	—	No
H3b	School Climate → Moral Disengagement → Victimization	Indirect	-0.029	[-0.138, 0.020]	0.225	—	No
H3b	School Climate → Moral Disengagement → Perpetration	Indirect	-0.057	[-0.157, -0.006]	0.028	0.450	Yes
H4a	Social Norms → Victimization	Direct	-0.416	[-0.833, -0.203]	<0.001	—	Yes
H4a	Social Norms → Perpetration	Direct	-0.333	[-0.738, -0.104]	<0.001	—	Yes
H4b	Social Norms → School Climate → Victimization	Indirect	0.001	[-0.015, 0.168]	0.772	-0.003	No
H4b	Social Norms → School Climate → Perpetration	Indirect	-0.005	[-0.066, 0.009]	0.275	0.016	No
—	Social Norms → Victimization	Total	-0.394	[-1.449, -0.144]	0.002	—	—
—	Social Norms → Perpetration	Total	-0.309	[-1.249, -0.066]	0.004	—	—

Standardized coefficients (β) are reported. Indirect effects were estimated using bias-corrected bootstrap confidence intervals (95% BCa) based on 5,000 resamples. Mediation effect size is expressed as proportion mediated (PM). Indirect effects are considered significant when the confidence interval does not include zero

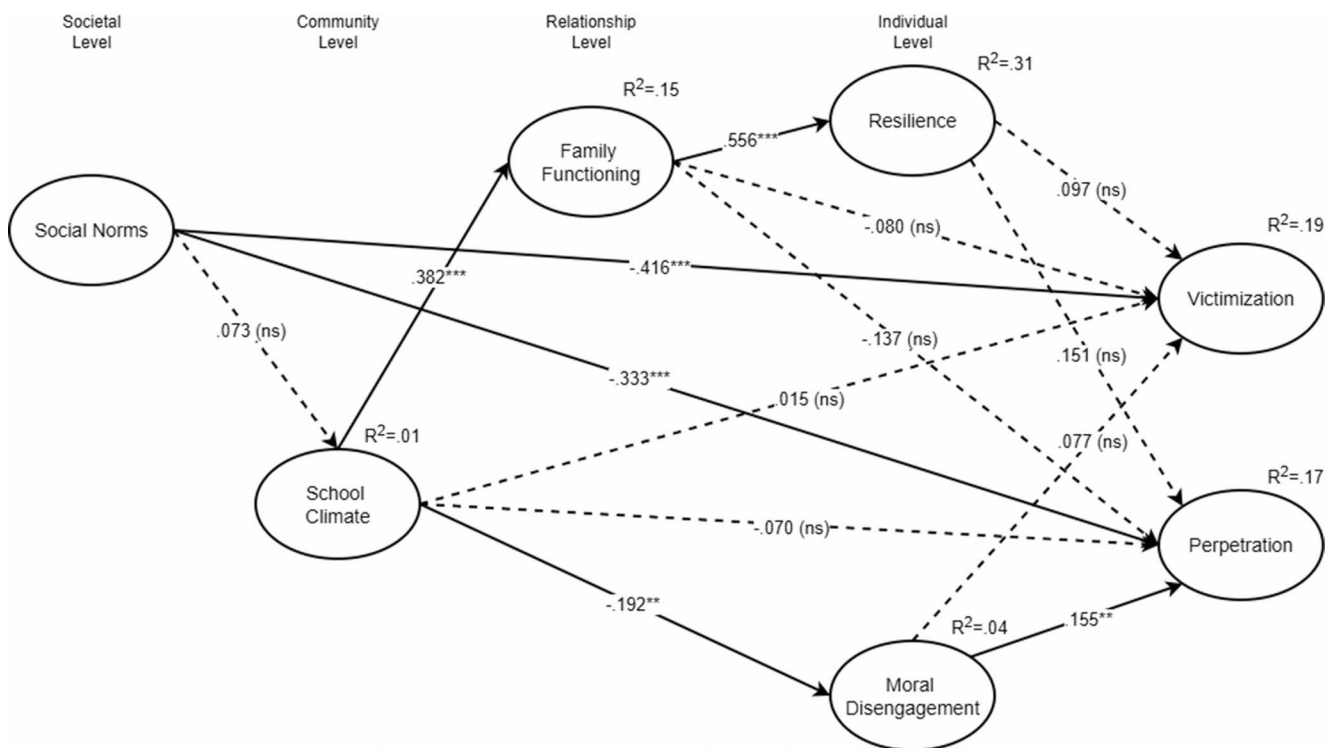


Fig. 2 Final structural ecological model of perceived school bullying involvements. Note: Standardized path coefficients (β) are shown. Solid lines represent significant paths, and dashed lines represent non-significant paths. ** $p < .05$, *** $p < .001$, ns = non-significance

Discussion

The present study found that 31.5% of students reported victimization and 27.3% reported perpetration, indicating that school bullying remains a significant issue in Thai Opportunity Expansion Schools. A substantial proportion of victims (46.4%) also reported perpetration, supporting the bully–victim pattern identified in previous research. This finding is consistent with earlier Thai evidence (Sakarinkhul & Wacharasindhu, 2014), suggesting the coexistence of victimization and perpetration among Thai adolescents.

Gender differences were observed, with boys reporting significantly higher levels of perpetration. This aligns with prior studies suggesting that gender norms and peer affiliations may contribute to higher engagement in aggressive behaviors among boys (Aunampai et al., 2022; Li & Liu, 2024). Additionally, the normalization of male aggression may further reinforce bullying as socially acceptable behavior (Luanpreda & Verma, 2016). Verbal bullying was the most frequently reported form and represents a dominant and pervasive form of bullying across different populations and contexts, particularly in school settings, consistent with previous evidence (Prasartpornsirichoke et al., 2022).

This study also found that overweight and obese students faced significantly higher rates of victimization compared to their healthy-weight peers, consistent with prior studies (Cheng et al., 2022; Rupp & McCoy, 2019), which may be linked to social isolation, discrimination, and body image concerns. In addition, more than one-third of victims did not disclose their experiences, and those who did primarily confided in peers rather than adults, which may limit effective intervention and contribute to persistence of bullying (Blomqvist et al., 2020).

The structural model indicated that social norms were the most consistent negative associated with both victimization and perpetration. In the Thai school context, social norms function as protective factors, where strong prosocial and anti-bullying norms discourage aggressive behaviors by promoting conformity to group harmony, respect for others, and disapproval of violence. These findings align with prior research indicating that prosocial peer norms reduce bullying and promote positive bystander behavior (Nickerson et al., 2022; Zaneva et al., 2023). In contrast, norms that tolerate bullying increased risk. Direct effects on bullying involvements were significant, whereas indirect effects via school climate were not, suggesting that social norms were primarily directly associated with bullying outcomes.

At the community level, school climate did not show direct associations with bullying outcomes but was indirectly associated with perpetration through moral disengagement. This suggests that school climate may be associated with bullying through cognitive moral processes rather than

direct behavioral pathways. The multidimensional nature of the school climate construct may have contributed to variation in students' perceptions, potentially reducing the strength of direct associations with bullying outcomes. Prior research indicating that school climate shapes moral reasoning in bullying among adolescents (Montero-Carretero et al., 2021).

At the relationship level, family functioning was not directly associated with victimization or perpetration, indicating no direct effects in this model, which contrasts with prior findings (Gharaei & Mashhadi, 2023; Zhang et al., 2024). However, family functioning was positively associated with resilience, consistent with evidence that supportive family environments enhance resilience (Chen et al., 2022). Indirect effects via resilience were not significant, suggesting that family influence operates through broader developmental processes rather than directly shaping bullying behavior.

At the individual level, resilience was not significantly associated with either victimization or perpetration, indicating no direct effect on bullying behavior. This finding does not support the hypothesis and is inconsistent with much prior literature (Fei et al., 2022). Although family functioning enhanced resilience, resilience itself was not directly associated with bullying involvement. This finding may reflect the context-dependent and multifactorial nature of resilience, which operates through complex interactions between individual and environmental factors rather than through direct effects alone (Kuldas & Foody, 2022). Moreover, resilience in this study was assessed through external support, internal strengths, and interpersonal/problem-solving skills. These dimensions may not be sufficiently specific to bullying behavior and may operate differently across contexts.

Moral disengagement was positively associated with perpetration but not victimization, partially supporting H1b. This finding is consistent with Social Cognitive Theory, which proposes that moral disengagement facilitates antisocial behavior by weakening self-regulatory processes (Bandura et al., 1996). Its non-significant association with victimization suggests relevance primarily to active perpetration rather than passive experience. Given that moral disengagement comprises multiple cognitive mechanisms (e.g., behavioral locus, agency locus, victim locus), this effect likely reflects a cumulative cognitive rationalization process.

Several hypothesized relationships were not supported in this study, including the direct effects of school climate and family functioning on bullying outcomes, as well as all hypothesized effects involving resilience. These findings indicate that the proposed theoretical pathways were only partially supported and should not be interpreted as

confirmed mechanisms. Due to the cross-sectional design and reliance on observational data, the findings reflect associations rather than definitive causal relationships. Moreover, although SEM study allows testing of directional models, the findings reflect statistical associations rather than causal relationships, and alternative model specifications (including reversed pathways) may also fit the data. Then, given model modifications and estimation constraints, the structural model should be considered a best-fitting approximation rather than a definitive representation of underlying processes.

From a social ecological perspective, the findings highlight the interconnected nature of influences across levels. Although some hypothesized pathways were not fully supported, the results suggest that societal-level factors, such as social norms, operate primarily through direct associations with bullying behavior, while community-level factors, such as school climate, may influence bullying indirectly through individual-level cognitive mechanisms like moral disengagement. This pattern partially aligns with the hypothesized model, in which broader contextual influences shape individual cognition, which in turn relates to behavior. However, the absence of significant indirect effects from social norms through school climate suggests that these levels may function more independently than originally hypothesized. Similarly, the lack of significant pathways involving family functioning and resilience indicates that relational and individual protective processes may not directly translate into reduced bullying behavior within this context.

Overall, the findings highlight the importance of examining both direct and indirect pathways across ecological levels. While also indicating that the strength of these relationships may vary depending on contextual and measurement factors. Within this study, bullying involvement was more consistently associated with normative and cognitive factors than with broader psychosocial resources. However, these findings should be interpreted within the context of the study design, measurement approach, and explained variance of the model.

Strengths and Limitations of the Study

This study makes several important contributions. First, it integrates multilevel ecological factors within a single structural equation modeling (SEM) framework, offering a more comprehensive understanding of bullying beyond isolated predictors. Second, it incorporates both individual psychological mechanisms (e.g., moral disengagement and resilience) and contextual influences (e.g., school climate), advancing prior research that has often examined these factors separately. Third, the study

focuses on Opportunity Expansion Schools in Thailand's Eastern Economic Corridor, an underexplored and policy-relevant context. Finally, the use of bootstrapped confidence intervals enhances the robustness of the mediation analyses.

Several limitations should be considered when interpreting the findings. First, the cross-sectional design precludes causal inferences; therefore, the observed relationships should be interpreted as associations rather than causal effects. Longitudinal research is needed to establish temporal ordering and examine potential reciprocal relationships among variables. Second, reliance on self-reported data may have introduced response biases, including social desirability and recall bias, particularly for sensitive behaviors such as bullying perpetration. Third, the context-specific sample may limit the generalizability of the findings to other educational and cultural settings.

Fourth, several measurement-related limitations should be acknowledged. The social norms construct demonstrated relatively low convergent validity, particularly for the injunctive norms dimension, which may have attenuated some associations. In addition, the initial measurement model showed GFI and CFI values below the recommended threshold of 0.90, suggesting that the original measurement structure did not fully represent the observed data. Although subsequent model refinement improved model fit and construct validity, this limitation should be considered when interpreting the findings. Furthermore, as the social norms scale was newly developed and included both injunctive and descriptive components across multiple forms of bullying, the observed associations provide preliminary support for construct validity; however, further validation is warranted.

Finally, although the sample size was adequate for model estimation, it may have limited statistical power to detect smaller indirect effects within a relatively complex SEM model. Accordingly, the findings should be interpreted as indicative rather than definitive, and future research should seek to replicate and extend these results using larger and more diverse samples.

Implications for Policy and Practice

This study underscores the importance of multi-level, ecology-informed approaches to bullying prevention in Thai Opportunity Expansion Schools. Given the cross-sectional design, findings should be interpreted cautiously, and implications considered evidence-informed rather than causal.

At the practice level, school-based professionals including teachers, counselors, and school health

personnel play a critical role in early identification and intervention, particularly for bully–victims, who represent a vulnerable subgroup due to their dual involvement in victimization and perpetration. Screening and intervention efforts should prioritize students reporting both roles. Interventions should also address individual cognitive processes, particularly moral disengagement, which was consistently associated with bullying perpetration in this study.

Psychoeducational programs that promote moral reasoning, empathy, and accountability may help reduce aggressive behaviors. Although resilience was not a significant factor in this model, assessments should consider context-specific coping and interpersonal strategies rather than assuming uniformly protective effects. Targeted, non-stigmatizing support may also be warranted for boys and overweight or obese students, who showed higher involvement in bullying outcomes.

From an educational and training perspective, professional development should strengthen competencies in adolescent psychosocial development, peer aggression, and school-based mental health promotion. Greater emphasis on complex constructs such as moral disengagement and resilience, alongside case- or scenario-based learning, may enhance preparedness for addressing bullying in diverse school contexts.

At the policy level, findings support whole-school, ecology-based prevention strategies that prioritize peer social norms, which demonstrate consistent associations with bullying behaviors. The findings suggest that efforts to improve school climate may be strengthened when combined with strategies that address peer normative culture and individual cognitive factors. Policies should also move beyond binary classifications of “victim” and “perpetrator” by adopting integrated frameworks that reflect overlapping roles, thereby promoting more inclusive and effective prevention strategies.

Recommendation for Future Research

Future research should adopt longitudinal or multi-wave designs to clarify temporal relationships among social norms, moral disengagement, resilience, and bullying outcomes, and to examine potential reciprocal effects. Such approaches are essential for moving beyond the associative findings of cross-sectional data.

Research examining gender-specific pathways is also warranted, particularly given the higher levels of perpetration observed among boys. Investigating whether ecological influences (e.g., social norms, school climate) and individual processes operate differently across gender groups may inform more targeted interventions. Future

research should further examine weight-related disparities in bullying involvement, particularly the higher likelihood of victimization among overweight or obese students. Studies exploring underlying mechanisms such as weight stigma, peer norms, and body image may help clarify these associations and inform more inclusive prevention strategies.

In addition, the non-significant role of resilience in this study highlights the need for more nuanced investigation of its multidimensional nature. Future studies should examine whether different dimensions of resilience, such as external support, internal strengths, and interpersonal/problem-solving capacities, exert distinct or context-dependent effects on bullying involvement.

Finally, cross-cultural and multi-context research is needed to validate social ecological models of bullying. The strong direct effects of social norms, alongside limited mediation through school climate, suggest that ecological pathways may vary across settings. Replication in diverse educational and cultural contexts would strengthen the generalizability of these findings.

Ethics, Consent to Participate, and Consent to Publish Declarations

This study received ethical approval from the Burapha University Institutional Review Board and permission from educational authorities and participating schools. Written informed consent from parents or guardians and student assents were obtained prior to participation. Students were informed about the study purpose, voluntary participation, confidentiality, and their right to withdraw at any time without penalty. Data collection was conducted in private classroom settings to ensure confidentiality. Trained research assistants provided standardized instructions, and participants were allowed to skip questions or discontinue participation if they experienced discomfort. A brief debriefing was provided after completion, along with information on available school-based support services.

Conclusion

This study found that bullying remains a prevalent issue among adolescents in Thai Opportunity Expansion Schools, with a substantial overlap between victimization and perpetration. Verbal bullying was the most common form, perpetrators are mostly same-grade peers, and incidents frequently occurred in school settings. Within the social-ecological framework, social norms were the most protective factor of both victimization and perpetration, while moral disengagement was associated with perpetration. School climate was indirectly associated with perpetration through moral disengagement, whereas

family functioning was positively associated with resilience but showed no direct association with bullying outcomes. These findings suggest that bullying involvement may be more closely related to normative and cognitive processes than to broader psychosocial resources within this context. Future longitudinal research is needed to clarify the temporal and reciprocal relationships among ecological factors and bullying involvements. Effective bullying prevention should focus on strengthening anti-bullying social norms, reducing moral disengagement, and promoting positive school environments to foster safer and more supporting school communities.

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Data Availability The dataset generated and analyzed during this study is available from the corresponding author upon reasonable request.

Declarations

Competing interests The authors declare no competing interests.

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