

CONSTRUCCIÓN DEL CONOCIMIENTO EDUCATIVO: ESTUDIOS EMPÍRICOS, EXPERIENCIAS Y ANÁLISIS TEÓRICO

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EDITORIAL
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Construcción del conocimiento educativo: estudios empíricos, experiencias y análisis teórico

María Soledad Villarrubia Zúñiga, Paula González García,
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Addressing bullying perpetration among Serbian adolescents: the role of school safety dimensions

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Abstract: Identifying effective strategies for improving school safety is a central priority in bullying prevention. As bullying remains one of the most important threats to school safety, schools employ various strategies to reduce its occurrence and impact. This study examined the association between bullying perpetration, physical safety, and key elements of psychological safety—specifically, feelings of safety, teacher–student relationships, and peer relationships. Data were collected during the 2020/2021 school year from 1526 students (aged 16–18) attending 19 state schools in Belgrade, Serbia, using student surveys and structured school-level observations. Hierarchical multiple regression analysis revealed that two psychological safety variables—students’ feelings of safety and teacher–student relationships—were significantly and negatively associated with bullying perpetration. In contrast, peer relationships and physical safety measures were not significantly associated. These findings highlight the importance of prioritizing psychological safety when addressing bullying perpetration and suggest that physical safety measures alone may have limited effectiveness. It is recommended that schools prioritize the development of supportive and respectful teacher–student relationships and work toward creating environments where students feel safe. Implementing such strategies may enhance students’ social competencies, improve peer interactions, and ultimately contribute to the prevention of bullying perpetration.

Keywords: bullying perpetration, physical safety, feelings of safety, teacher–student relationships, peer relationships.

1. INTRODUCTION

Individual development is shaped by the dynamic interplay between individuals and the environments in which they are embedded (Bronfenbrenner, 1977). Among these, school represents a critical developmental context for children and adolescents – not only as a place of formal learning but also as a social environment that significantly influences cognitive, emotional, and behavioral growth (Roeser et al., 2000). Consequently, efforts to promote educational outcomes must be accompanied by broader consideration of how schools function as ecosystems that either support or hinder student well-being. A growing body of research emphasizes that a safe and supportive school environment is a fundamental prerequisite for student learning and positive youth development. This concern has become especially prominent since the 1990s, a period marked by a rise in highly publicized incidents of school violence – particularly a series of school shootings in the United States – which sparked increased scholarly and policy attention to school safety (Cornell et al., 2021). School safety remains a critical concern, because schools are responsible for protecting students, and unsafe environments are linked to psychosocial

difficulties. Therefore, ensuring a safe and supportive school environment is not merely a protective strategy, but also a cornerstone of educational and developmental success.

One of the most important threats to school safety is bullying as a specific form of student misbehavior involving intentional and repeated attacks carried out by one or more students against a peer (Olweus, 1993). These behaviors are sustained over time and are enabled by a power imbalance, where the victim is less able to defend themselves due to physical, social, or psychological disadvantage. Bullying has a detrimental impact on students' physical and mental health, leading to increased rates of depression, anxiety, poor health, and suicidal thoughts (Moore et al., 2017). The negative effects of bullying go beyond just the victims, affecting the overall school climate and learning environment, as well as the perpetrators themselves. Systematic reviews and meta-analyses of longitudinal studies have shown that bullying perpetration is a strong predictor of later aggression (Ttofi et al., 2012). Therefore, preventing and addressing bullying in schools is essential not only for promoting students' psychosocial development and academic success but also for reducing the risk of future antisocial and criminal behavior at the societal level. Bullying perpetration has been associated with a range of correlates, including both individual and school-level characteristics. Among individual correlates, age and sex have been identified as important factors in understanding patterns of bullying perpetration. When examining school-level characteristics, research highlights the importance of comparing urban and rural settings as well as grammar and vocational schools.

This study is among the first multilevel investigations in Serbia to explore the association between overall school safety and bullying perpetration. Its significance lies in the limited research examining how the broader school safety environment relates to bullying perpetration. Much of the existing literature has focused on the impact of isolated physical safety measures – such as metal detectors or school security personnel – on the prevention of school violence. Moreover, a significant portion of the research in this area has centered on physical threats to school safety, particularly gun-related violence, which has received extensive media coverage and public attention (Jonson, 2017). In contrast, more common forms of aggression, such as bullying are frequently overlooked, despite their long-term psychological consequences. Additionally, studies examining the association between bullying and school climate typically focus on individual aspects of psychological safety, such as teacher–student relationships or students' feelings of safety.

Against this background, a twofold need has been identified in the literature to fill the existing gap. On the one hand, more research is needed to document the association between the overall school safety environment and student problem behavior (Servoss, 2014). On the other hand, additional studies are necessary to assess the effectiveness of both physical and psychological safety strategies in preventing less severe but more prevalent forms of school violence, such as bullying. In response to these gaps, the present study investigates the association between bullying perpetration and both physical safety and the key elements of psychological safety, including students' feelings of safety, teacher–student relationships, and peer relationships.

2. A-TWO DIMENSIONAL CONSTRUCT OF SCHOOL SAFETY

School safety is a multifaceted and complex construct that is often described more than precisely defined. Challenges in conceptualizing school safety include: (1) the lack of a universally accepted definition, as efforts to define the construct often lack consistency and specificity; (2) the absence of clearly defined and distinct elements that constitute the construct; and (3) the tendency to view school safety as an important element of school

climate. Although school safety has been defined in various ways, it is generally understood to consist of two main dimensions: physical safety and psychological safety. According to the National Association of School Psychologists (NASP, 2018), effective school safety depends on maintaining a balance between physical and psychological safety.

Physical school safety refers to two main elements: (1) the condition and management of the school's physical environment and (2) the use of specific safety strategies designed to ensure the security of students and staff while minimizing crime and misbehavior. The first element – the physical environment – includes observable, tangible elements such as the structural condition of school buildings (e.g., facades, windows, lighting, fire protection), maintenance of facilities (e.g., machine operation, lighting systems, and fire safety equipment), and the surrounding area (e.g., roads and underpasses near the school) (Mubita, 2021). The second element – physical safety strategies – encompasses the implementation of security measures like video surveillance systems and metal detectors, procedures such as access control and emergency response plans, and the presence of security personnel including School Resource Officers (SROs), school-based police, or professional security staff (Cornell et al., 2021).

Psychological school safety refers to the social and psychological conditions within the school environment that enable students to feel secure, respected, and emotionally supported. It consists of four key elements: (1) students' personal feelings of safety; (2) student behaviors; (3) the quality of social interactions among school actors – particularly teacher–student relationships (TSRs) and peer relationships (PRs); and (4) the systems and processes that promote well-being (Shean & Mander, 2020; Wang & Degol, 2016).

Feelings of safety are defined as emotional responses to contextual factors that influence an individual's sense of security at school. This is a multidimensional construct encompassing judgments (e.g., cognitive assessments of risk), values (e.g., concern about harm), and emotions (e.g. fear) (Fisher et al., 2016).

In terms of student behaviors, psychological safety involves protection from aggressive actions – such as bullying or harassment – that cause emotional distress rather than physical harm. It also includes the ability of students and staff to express emotions and interact freely without fear of ridicule or antagonism (Cornell et al., 2021).

In terms of relationship quality, positive TSRs are characterized by the presence of caring and supportive adults, along with expressions of acceptance, encouragement, and empathy (Shean & Mander, 2020). On the other hand, positive PRs are associated with to social-emotional variables such as peer attachment, friendship quality, and social status indicators like peer acceptance, perceived popularity, likability, and social preference (Portt et al., 2020).

Finally, systems and processes refer to the structural supports within the school that influence how students perceive their environment and access emotional support. This includes the availability of counseling services, school-based mental health programs, and policies that reinforce emotional well-being (Shean & Mander, 2020).

3. STUDY AIM AND RESEARCH QUESTION

The present study examined the association between bullying perpetration, physical safety and the key elements of psychological safety (feelings of safety, teacher-student relationships, and peer relationships). More specifically, it addresses the following research question: How are physical safety and each element of psychological safety associated with bullying perpetration?

4. METHOD

4.1. Participants

The study sample comprised high school students from 19 public secondary schools located in Belgrade, the capital of Serbia. A two-stage stratified cluster sampling method was employed, incorporating two layers of stratification: one based on geographic location (urban vs. suburban municipalities) and the other on school type (grammar vs. vocational). The selected schools aimed to reflect the broader population of students enrolled in 2nd to 4th grades across 13 out of Belgrade's 17 municipalities. The final selection included 13 schools from urban and six from suburban municipalities, with 12 vocational and seven grammar schools. Within each institution, two classes were randomly chosen from each eligible grade. The total sample included 1526 students (53.3% female), aged 16 to 18 years ($M = 17.06$, $SD = 0.83$). Regarding grade distribution, 31.5% of participants were in the 2nd grade, 30.9% in the 3rd grade, and 37.6% in the 4th grade.

4.2. Procedure

Data collection was conducted during the 2020/2021 academic year. Information at the student level was obtained through self-administered student questionnaires, while school-level data were gathered using a structured observational protocol based on a checklist. The use of such checklists is recommended in best-practice guidelines for assessing the current state of school safety (U.S. DHS, 2013). The student survey required approximately 30 minutes to complete. Observational assessments of the school environment were carried out 30 minutes prior to the beginning of the school day. Assurances of anonymity and confidentiality were provided to all participants, and informed consent was obtained from school administrators before initiating data collection.

4.3. Measures

Bullying perpetration was assessed through eight items drawn from the revised version of the Olweus Bully/Victim Questionnaire (Olweus, 1996). Participants responded using a four-point frequency scale: never (1), once or twice (2), several times (3), and almost daily (4). The scale demonstrated high internal consistency, with a Cronbach's alpha of $\alpha = 0.886$.

The physical safety index was constructed based on a checklist capturing the presence of various safety measures, protocols, and security personnel within participating schools. This index consisted of binary (yes/no) items indicating whether the school had: (a) video surveillance systems; (b) intrusion prevention features such as fenced perimeters or reinforced windows and doors; (c) physical barriers securing the school grounds; (d) an assigned police officer; (e) a security guard; and (f) access control procedures like locked entry or exit points. Scores on the index ranged from 2 to 5, with higher values reflecting schools that had adopted a greater number of physical safety features and personnel.

Feelings of safety were assessed using a single-item measure. Participants responded to the statement "I feel safe at this school" using a four-point scale ranging from 1 (strongly disagree) to 4 (strongly agree).

Teacher-student relationships were assessed using seven items from the Comprehensive School Climate Inventory (CSCI) developed by the National School Climate Center (NSCC, 2007). The items reflected students' perceptions of teacher behaviors, such as supportiveness, collaboration among staff, communication, and the degree to which teachers express interest in and set expectations for students. Participants responded on a five-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). Higher scores

indicated more positive perceptions of teacher–student relationships. The scale demonstrated high internal consistency, with a Cronbach’s alpha of $\alpha = 0.879$.

Peer relationships were assessed using three items from the Comprehensive School Climate Inventory (CSCI), which focused on students’ perceptions of social support and cooperation among peers. The items addressed the availability of trustworthy friends, emotional support, and collaborative peer dynamics within the school environment. Responses were collected on a five-point scale ranging from 1 (strongly disagree) to 5 (strongly agree), with higher scores indicating more positive peer relationships. The scale demonstrated good internal consistency, with a Cronbach’s alpha of $\alpha = 0.814$.

4.4. Data analysis

Statistical analyses were performed using SPSS version 23.0. Descriptive statistics are presented in Table 1. To address missing data, pairwise deletion was applied; notably, no key variable had more than 2% of missing values. Hierarchical multiple regression analysis was employed to examine the associations between physical safety and the components of psychological safety—namely, perceived safety, teacher-student relationships, and peer relationships—and bullying perpetration, while controlling for sex, age, school type, and municipality type. The regression analysis was conducted in two sequential blocks (models). To verify the validity of the results, multicollinearity diagnostics were conducted, including intercorrelations among predictors, tolerance values, and variance inflation factors (VIF). Correlation coefficients ranged from -0.300 to 0.465 , well below the commonly accepted threshold of 0.80 , indicating independence among predictor variables. Tolerance values exceeded the recommended minimum of 0.1 , ranging from 0.714 to 0.995 , while VIF values remained below 10 , ranging from 1.005 to 1.372 . These diagnostics suggest that multicollinearity was not a concern in the current analysis.

Table 1. Descriptive Statistics.

Variable	N	M	SD	Min	Max	Missing	Skewness	Kurtosis
Bullying perpetration	1520	1.12	0.35	1	4	0.40	5.54	37.79
Student characteristics	1475							
Female	814					0.51		
Age	1526	17.06	0.83	16	18	0.00	-.12	-1.54
School characteristics								
Urban school	537					0		
Grammar school	1067					0		
Feelings of safety	1500	3.36	0.82	1	5	1.70	-1.30	1.31
Teacher–student relationships	1502	3.51	1.05	1	5	1.57	-.39	-.70
Peer relationships	1499	3.94	1.13	1	5	1.77	-1.11	.35
Physical safety index	1526	4.20	0.95	2	5	0.00	-.80	-.62

Missing values are reported as a proportion

Moreover, bullying perpetration negatively correlated with psychological safety index, feelings of safety, teacher–student relationships, and peer relationships (see Table 2).

Table 2. Correlations Among the Continuous Variables.

Variable	N	M	SD	1	2	3	4	5	6
1. Age	1526	17.06	0.83	-					
2. Physical safety index	1526	4.20	0.95	.037	-				
3. Feelings of safety	1500	3.36	0.82	-.022	.104**	-			
4. Teacher–student relationships	1502	3.51	1.05	-.073**	.055*	.345**	-		
5. Peer relationships	1499	3.94	1.13	-.046	.150**	.321**	.465**	-	
6. Bullying perpetration	1520	1.12	0.35	-.037	-.060	-.292**	-.229**	-.148**	-

* $p < 0.05$, ** $p < 0.01$.

5. RESULTS

The first model, which included only the covariates, showed statistical significance, accounting for a total of 0.7% of the variance in bullying perpetration, $R^2 = 0.007$, $F(4, 1446) = 2426$, $p = 0.046$ (Table 3, Model 1).

The physical safety index, feelings of safety, teacher–student relationships and peer relationships were included in the second model. The results showed that the second model was statistically significant, indicating that the variables accounted for a total of 10.5% of the variance in bullying perpetration, $R^2 = 0.105$, $F(8, 1442) = 21095$, $p = 0.000$ (see Table 3, Model 2). The physical safety index, feelings of safety, teacher–student relationships and peer relationships explained an additional 9.8% of the variance in bullying perpetration, controlling for the effects of the covariates.

Of all the covariates, sex and age were significant in the final model. Sex was significantly positively associated with bullying perpetration ($\beta = 0.034$, $p < 0.05$). Male sex was found to be positively associated with bullying perpetration. Age was significantly negatively associated with bullying perpetration ($\beta = -0.021$, $p < 0.05$). As age increased, the likelihood of engaging in bullying perpetration tended to decrease.

Only the psychological safety variables showed significance in the final model, while the physical safety index did not; specifically, feelings of safety and teacher–student relationships were found to be significant. Feelings of safety was significantly and negatively associated with bullying perpetration ($\beta = -.084$, $p < 0.001$). Teacher–student relationships was significantly and negatively associated with bullying perpetration ($\beta = -0.047$, $p < 0.001$).

Table 3. Hierarchical Regression Analysis.

Variable		B	95% CI for B		SE B	β	R^2	ΔR^2
			LL	UL				
Step 1	Constant	1.33	.98	1.67	.17		.007	.007
	Sex	.04	.01	.07	.02	.07**		
	Age	-.01	-.03	.01	.01	-.03		
	Type of municipality	-.01	-.04	.03	.02	-.01		

	Type of school	-.00	-.04	.03	.02	-.01		
Step 2	Constant	1.95	1.60	2.29	.17		.105	.098** *
	Sex	.03	.00	.07	.02	.06*		
	Age	-.02	-.04	-.00	.01	-.05*		
	Type of municipality	.01	-.02	.05	.02	.02		
	Type of school	.00	-.04	.04	.02	-.01		
	Physical safety index	-.09	-.02	.02	.01	-.22		
	Feeling of safety	-.08	-.11	-.06	.01	-.22***		
	Teacher–student relationships	-.05	-.06	-.03	.01	-.16***		
	Peer relationship	-.01	-.02	.01	.01	-.02		

Note. CI = confidence interval; LL = lower limit; UL = upper limit;

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

6. DISCUSSION

Although research on school safety is interdisciplinary and complex, there remains a lack of consensus among researchers and policymakers regarding the most effective strategies for fostering safe school environments. In an effort to address the persistent problem of bullying – widely recognized as one of the most serious threats to school safety – schools employ a range of prevention strategies. Schools that prioritize physical safety strategies – such as surveillance systems, formal procedures, and security personnel – typically reflect a punitive or “get tough” philosophy in their approach to behavior management. These strategies are formal, externally enforced, and aimed at deterring student misconduct through visible control mechanisms. This orientation closely aligns with traditional crime prevention models, particularly situational crime prevention (Coon, 2021), which propose that increasing the perceived risk of detection or punishment can reduce the likelihood of rule-breaking behavior. From this perspective, visible security measures are intended to deter students from engaging in misconduct by increasing the effort required and reducing the opportunity to commit offenses. Research has shown that such interventions can play a deterrent role in limiting student misbehavior and offer symbolic reassurance to the school community (Servoss, 2014), functioning similarly to CCTV and police patrols in public settings.

However, the findings of the present study echo previous research indicating that these physical safety strategies are largely ineffective in preventing bullying specifically (Blosnich & Bossarte, 2011). An overreliance on security-based measures can foster an atmosphere of surveillance and fear, which may paradoxically contribute to the very behaviors they are intended to curb (Mayer & Leone, 1999). When safety is framed exclusively through control, rather than connection, students may disengage from the school community, weakening the relational bonds that are essential for long-term prevention.

Schools that utilize strategies focused on fostering positive interpersonal relationships and addressing factors that undermine students' sense of safety take a more holistic approach to preventing bullying. The findings of this study support such an approach, as both students' feelings of safety and the quality of teacher–student relationships were negatively associated with bullying perpetration. This suggests that students who feel safe and supported in their school environment, particularly through positive interactions with teachers, are less likely to perpetrate bullying. These results can be further understood through the lens of Hirschi's (1969) social control theory, which posits that delinquent behavior is more likely to occur when an individual's bond to society is weak or disrupted. Adolescents who maintain strong, supportive relationships with key figures in their environment – such as teachers – are less likely to engage in antisocial behaviors. The theory emphasizes the protective role of social bonds within structured settings like schools, suggesting that emotional connection to adults and the institution itself discourages harmful behavior. Consistent with this framework, previous research has shown that positive teacher–student relationships are a foundational component of school bonding and climate, and are associated with reduced bullying perpetration. Supportive interactions, respectful treatment, and trust between teachers and students have been repeatedly identified as protective factors that reduce the likelihood of students becoming bullies (Casas et al., 2013).

In contrast to the significant role of teacher–student relationships and feelings of safety, the present study found no statistically significant association between the quality of peer relationships and bullying perpetration. This result adds to the complex and sometimes contradictory body of research on the role of peer dynamics in bullying behavior. While some bullies appear to benefit from social integration, others may struggle with peer rejection or conflict. This coexistence of both positive and negative social experiences may help explain the non-significant relationship observed in this study. As suggested by Wang et al. (2012), the presence of these opposing social attributes can statistically offset one another, making it difficult to establish a clear link between peer relationship quality and bullying perpetration. In this context, bullies may simultaneously be central figures in the peer group while maintaining conflictual or superficial relationships, which weakens the predictive value of general peer relationship measures.

Consistent with previous research (Carrera-Fernández et al., 2013), our findings showed that boys were more likely than girls to engage in bullying perpetration. In terms of age, the results also aligned with earlier studies (Williams & Guerra, 2011), which found that bullying perpetration tended to peak in early adolescence and decline thereafter. Since our sample included students aged 16 to 18, this observed decrease in bullying perpetration with age was consistent with developmental patterns reported in the literature.

7. CONCLUSIONS AND LIMITATIONS

Summarizing the findings, two key conclusions can be drawn regarding the development and improvement of school safety strategies for addressing bullying perpetration among students in Serbian schools. On the one hand, the lack of a significant association between physical safety measures and bullying perpetration suggests that these strategies alone may have limited effectiveness in preventing such behavior. On the other hand, psychological safety – particularly students' feelings of safety and the quality of teacher–student relationships – plays a crucial role in reducing bullying perpetration, highlighting the need to foster emotionally supportive school environments. Accordingly, schools in Belgrade are encouraged to prioritize the development of supportive and respectful teacher–student relationships, strengthen students' social and behavioral skills, and

cultivate a school climate that fosters psychological well-being, mutual respect, and a sense of value among students as a core objective of their safety strategies.

In line with this, schools in Belgrade are encouraged to prioritize the development of supportive and respectful teacher–student relationships, enhance students’ social and behavioral skills through school-wide positive behavioral interventions and supports (Osher et al., 2010) and social–emotional learning (Greenberg et al., 2003), and cultivate a school climate that promotes a sense of psychological safety, mutual respect, and a strong sense of belonging as a central goal of their safety strategies.

However, there are some limitations to this study, which need to be acknowledged. First, the cross-sectional design precludes causal inferences; future studies should employ longitudinal or experimental designs to better understand the directionality of the observed associations. Second, the reliance on self-reported data may introduce bias due to social desirability or recall inaccuracy. Incorporating multiple informants (e.g., teachers) and observational methods in future research could strengthen validity. Third, the current operationalization of psychological safety may not fully capture the complexity of students’ perceptions of safety at school. Given the lack of a universally accepted definition of school safety and the absence of a standardized set key elements, the construct may have been treated too broadly. In particular, peer relationships were assessed as a single, unified dimension, which may have masked important distinctions. These findings suggest that future research should adopt a more differentiated approach by distinguishing between various forms of peer influence – such as peer support for aggression, popularity-based status, and friendship quality – rather than conceptualizing peer relationships as a unidimensional construct. Additionally, further exploration of relational aspects of teacher–student relationships, such as emotional closeness and attachment, may offer a more comprehensive understanding of psychological safety in school environment.

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