
Relationship between academic achievement and personal protective factors against school violence

Catalina Rodriguez-Pichardo¹, Mario Gonzalez Medina²

¹ Tecnológico de Monterrey, N.L., Mexico

² Universidad de Monterrey, N.L., Mexico

cmrodrig@tec.mx

✦ **ABSTRACT.** L'obiettivo di questa indagine era quello di determinare la relazione tra i risultati accademici in Matematica e Lingua e comunicazione e i fattori protettivi personali contro la violenza nella scuola secondaria di secondo grado. La metodologia utilizzata è stata non sperimentale, quantitativa e correlazionale, con un campione di 4822 studenti messicani. Una tecnica di modellazione di equazioni strutturali è stata applicata per validare empiricamente un modello teorico che associa le variabili studiate (la violenza scolastica, il tipo di violenza scolastica, i fattori protettivi personali e il rendimento scolastico). Questa analisi è stata condotta utilizzando il database Achievement Evaluation del National Educational System (ELSEN) corrispondente al Piano Nazionale di Valutazione della Conoscenza (PLANEA) 2017. È stata applicata una tecnica di modellazione con equazioni strutturali per verificare empiricamente il modello proposto. I risultati hanno mostrato che il rendimento scolastico è direttamente e negativamente correlato alla violenza a scuola. Inoltre, il fattore protettivo personale è correlato alla violenza: quando il primo aumenta, la violenza diminuisce. Questi risultati hanno permesso di costruire e suggerire strategie di prevenzione e intervento che promuovono l'empatia, l'autoregolazione, oltre a un sistema di decisioni che aiuterà a ridurre il fenomeno della violenza negli studenti della scuola secondaria di secondo grado.

✦ **SUMMARY.** *The objective of this investigation was to determine the relationship between academic achievement in Mathematics, and Language & Communication and the personal protective factors against violence at the high school level. The methodology used was non-experimental, quantitative, and correlational, with a sample of 4822 Mexican high school students. A structural equation modeling technique was applied to empirically validate a theoretical model that associates the studied variables (school violence, the type of school violence, personal protective factors, and academic achievement). To make this analysis, the database used was Achievement Evaluation from the National Educational System (ELSEN) corresponding to the National Plan for Evaluating Knowledge (PLANEA) 2017. Statistical analyses were conducted using SPSS 25 and AMOS 25 software. A modeling technique with structural equations was applied to verify the proposed model empirically. The results showed that academic achievement is directly and negatively related to violence at school. Also, the personal protective factor is related to violence: when the former increases, violence decreases. These results allowed to build and suggest strategies for prevention and intervention that promotes empathy, self-regulation, in addition to a system of decisions that will help reduce this violence phenomenon in high-school students.*

Keywords: *Violence, Academic achievement, Protective factors*

INTRODUCTION

School violence reaches many young people, especially in Mexico. According to OECD (2019), 23% of Mexican students have suffered some type of violence at school. Violence is understood as the situation that threatens the physical, moral, psychological, or social integrity of members of the school community, causing a certain level of physical or psychological pain, to the person who experiences it. Usually taking place within a social relationship developed in school or within the physical limits of the institution (Cárdenas, 2009; Varela, Ávila & Martínez, 2013).

When comparing the index of school violence between Mexico and OECD countries, the average school violence in Mexico is higher than in the rest of the OECD countries. Students are suffering different types of violence, such as: verbal (insults and nicknames); physical (hitting and pushing); psychological (threats, rumors, exclusion and isolation); institutional (insecurity perceived by the students in their school and the reflection of the teachers' attitudes and/or authorities' laziness); and digital (threatening the person's integrity using electronic tools) (Del Tronco, Ramírez, Sota, Baggini & Cervantes, 2013; Garaigordobil, 2015; García-Fernández & Giménez-Mas, 2010; Muñoz, 2008).

School violence is a phenomenon that generates many negative consequences in students such as psychological damage, low academic achievement and school dropout. Psychological damage is one of the effects of school violence. Cava, Buelga, Musitu and Murgui (2010) found that adolescents who are victims of violence, experience a poorer psychosocial adjustment.

Violence also has a negative impact on the academic achievement. It has been found that there is a negative and significant relationship between suffering violence and success in the areas of Language and Mathematics (González & Treviño, 2018). School dropout has been related to school violence too. It has been proven that when violence is manifested, there is a more significant impact on the students' decision regarding dropping out of school (Del Tronco et al., 2013).

The negative consequences of school violence have been a concern for many administrators, parents and teachers, which makes school violence an issue that needs to be investigated since there are still very few studies that reveal the magnitude of the problem (Roman & Murillo, 2011). Most studies entail how to protect students from school violence,

specifically taking into consideration the individual factors that could act as a buffer for bullied adolescents (Quintana-Orts & Rey, 2018). Some studies indicate that there are personal protective factors that help improve a person's response to school violence, generating an adaptive result and positively impacting their school performance (Ttofi, Bowes, Farrington & Lösel, 2014; Uriarte, 2006). However there are still many gaps in knowledge regarding protective factors and possible interventions (Larson et al., 2020; Patel, Kieling, Maulik & Divan, 2013; Zych, Farrington & Ttofi, 2018).

Theoretical background

It should be noted that school violence is a complex and multidimensional phenomenon in multiple levels; thus, there is a need to investigate more about school violence and its relationship between educational achievement and personal protective factors (Cicchetti, 2013; Sabina & Banyard, 2015). This study focuses on deepening on these variables by considering the Santrock's theory about academic performance in adolescence (Santrock, 2019) and the humanistic theory on the importance of the person discovering their unique human potential and how to relate to their environment in a harmonious way (Scholl, McGowan & Hansen, 2012; Soutter, O'Steen & Gilmore, 2014; Stanley, Small, Owen & Burke, 2013).

Santrock's theory on academic performance in adolescence explains the importance of educational achievement during adolescence, since this is the age when students have to assume more responsibilities that make them feel the game of life they have to play is real. Academic success and failure during teenage years serve as predictors of how their life will go as adults (Santrock, 2019). Focusing on the interest of teenagers reaching their academic goals has a more serious commitment. This research considers the academic achievement in various areas of knowledge, such as Mathematics, and Language & Communication.

Although academic success is a main issue during adolescence according to Santrock's theory, the probability of low academic achievements increases in students who have been victims of school violence (Glew, Fan, Katon, Rivara & Kernic, 2005; Roman & Murillo, 2011). An international study estimated school violence's effect, and it was negatively associated with low Math achievement scores (Rutkowski, Rutkowski & Engel, 2013); meanwhile, other authors found

that a positive school environment and students with personal protective factors were positively associated with high grades in different areas (Laurent, Barnard, Janse, Reddy, Frempong & Winnaar, 2015; Wang et al., 2018).

From the humanistic theory on addressing school violence, the school should offer students opportunities to learn proactively in a safe environment. This is possible throughout creating and maintaining an environment that meets individual needs and enables them to develop personal protective factors (Causton, Tracy-Bronson & MacLeod, 2015; Sabina & Banyard, 2015; Stanley et al., 2013; Zych et al., 2018). The personal protective factors are those personal, institutional and social resources that buffer the risk factors and promote personal and academic development (Jessor, 1993).

The humanistic approach related to academic achievement focuses on managing personal protective factors for avoiding being a bully-victim. This approach leads students to become self-regulated, empathic and good decision-makers to assume prosocial behavior and to face adverse situations (Arastaman & Balci, 2013; Gutiérrez, Sánchez, Alberola & Montañés, 2009; Lapponi, 2013; Petrucci, Borsa, Damasio & Koller, 2016; Stanley et al., 2013; Sun, Xie & Anderman, 2018; Torrano, Fuentes & Soria, 2017).

In this research, a personal protective factor is self-regulation which is understood as the ability to identify cognitive and emotional processes, regulate them and transform them into positive experiences. This helps the students supervise their own learning and makes them responsible for their own active participation in their life decisions (García-Fernández & Giménez-Mas, 2010; Santrock, 2019). Another personal protective factor is empathy, which is the ability to put oneself in another person's shoes. It generates prosocial and moral behavior (Sánchez-Queija, Oliva & Parra, 2006; Sánchez, Ortega & Meneghini, 2012; Schoon, 2021). Finally, the exercise of decision-making is considered as a protective factor because it helps people analyze the consequences of their actions (Gibbons & Rossi, 2015).

AIM

In the light of previous theory, this research aims to determine the relationship between school violence, personal protective factors, and educational achievement

in Mathematics, and Language & Communication at the high school level. Based on the stated objective, the research question is the following: What is the relationship between school violence, personal protective factors, and the educational achievement in Mathematics, and Language & Communication in high school? The information obtained from this research will serve as a reference to other regions and countries interested in understanding and intervening in this phenomenon. It will also help build up intervention and prevention strategies derived from a scientific study. Additionally, this study's empirical information will allow national and international researchers to deepen more on school violence and how to prevent it.

METHOD

The present study is non-experimental, quantitative and correlational. The database used was the ELSÉN, corresponding to PLANEA. This database is available to the general public on the website of the National Institute for the Evaluation of Education (Spanish acronym: INEE).

Instrument

The Mexican Department of Public Education (Spanish acronym: SEP), the INEE and the educational authorities of the different states of the Mexican Republic, within the framework of the PLANEA, agreed to apply an instrument that would allow identify the mastery of the required learning in high school in the areas of Mathematics, and Language & Communication. The instrument PLANEA is characterized by an objective and standardized test aligned to the common curricular framework (SEP, 2017).

Participants

The database used was obtained from the test PLANEA 2017 applied to a sample of 4822 senior high school students belonging to public and private schools granted by the SEP of Nuevo León, Mexico, on April 4 and 5, 2017. This study followed the ethical principles that protect the participants, as suggested by Aguilar, Darroman, Perera and Benitez (2008).

Procedure

After making an exhaustive review of the corresponding literature, a theoretical model of three components was proposed: 1) school violence, 2) personal protective factors, and 3) educational achievement. The latter was measured with the student's result in the areas of Mathematics (MAT), and Language & Communication (LYC).

The reliability of each construct is shown, by the means of Cronbach's alpha (α) coefficient. In addition, to determine the construct validity of the factors school violence and personal protection factors, an exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were performed. The results of the rotated matrix of the EFA are shown in Table 1, in addition, the Kaiser-Meyer-Olkin = .855, and the p -value of the Bartlett sphericity test is less than .001 and the percentage of variation explained is 82.1%. Regarding Figure 1, it shows the results of the CFA. Based on the results of the alpha coefficient, the EFA and the AFC, it can be said that the questions to measure School violence and Personal protection factors are reliable and valid. Together with their respective variables and questions, the two remaining components are presented in Table 2 and in Table 3. Also, Figure 2 shows the theoretical model in which the relationships proposed between the three components are reflected.

Both violence variables (Institutional, Physical, Economic, Digital and Psychological) and the personal protective factors (Empathy, Self-regulation and Decision-making) were constructed by applying the principal component analysis technique and the components that had an eigenvalue more significant than one (Kaiser, 1974).

The multivariate modeling technique with structural equations was applied to analyze the relationships proposed in the theoretical model and answer the research question. It was determined that the statistics of the goodness of fit and parsimony met the minimum values established for the findings to be statistically valid (Acock, 2013). Plus, the results were significant for a $p < .05$. The corresponding statistical analyzes were carried out in the SPSS 25 software and AMOS 25 (see Figure 1).

RESULTS

The sample size was composed of 4822 students in the last year of high school in the state of Nuevo León, Mexico, of

which 2435 (50.5%) were women with an average age of 17.82 and 2386 (49.5%) men whose average age was 18.01 years. Regarding school funding, 4165 students (86.4%) were from public schools and 657 (13.6%) from private schools.

The empirical model was built with three dimensions, eight indicators, and three measurable variables. The criteria for selecting each principal component (indicator) were to take all those that had a characteristic value greater than one unit (Kaiser, 1974). Once the main components were determined, the modeling technique with structural equations was applied to determine the relationships between personal protective factors and educational achievement with school violence. Some goodness of fit and parsimony statistics were verified. The results shown in Figure 2, prove that educational achievement is directly and negatively related to school violence. In other words, when educational attainment increases by one standard deviation, school violence decreases by .25 deviations. That is, as violence grows, achievement reduces significantly.

Meanwhile, personal protection factors are also related to school violence, which, in other words, means that when personal protection factors increase by one standard deviation, violence decreases by .45 deviations. The results show that the increase in school violence is associated with a decreased personal protection factor. The analysis determined a positive and significant correlation of .38 between educational achievement and the personal protection factor, meaning an increase in the personal protection factor indicators is related to better results in Mathematics, and Language & Communication. On the other hand, for each standardized unit that increases in psychological violence, school violence increases by .81. In other words, it has been observed that as long as students have a behavior of exclusion, ignorance, rejection, force, insult, offense or ridicule to their peers, school violence increases significantly. Likewise, for each standardized unit that the physical variable increases, violence increases by .75 (see Figure 2).

To summarize, Figure 2 shows that when students hit, kick, slap, or physically mistreat each other, violence increases significantly. The results obtained from this research, represented in the empirical model, show how personal protection factors (Empathy, Self-regulation, and Decision-making system) are positively related to educational achievement. This research offers evidence that some characteristics of students who achieve higher educational

Table 1 – Results of the exploratory factor analysis

Question	Component/factor	
	<i>School violence</i>	<i>Personal protective factors</i>
Indicate how often students at your school offend you with insults, curses, or hurtful nicknames.	.865	.111
Do you consider your school a safe place?	.801	.210
Indicate how often students in your school destroy furniture or damage facilities.	.791	.250
When problems exist (arguments, fights, etc.) between your classmates, how often do teachers intervene to solve them?	.780	.260
Indicate how often students at your school hit, kick, slap, or physically abuse you.	.762	.200
Indicate how often students in your school do the following:		
– Hit or push other students.	.760	.340
– Hurt or injure other students.	.754	.333
Indicate how often students at your school steal other students' belongings	.701	.336
Indicate the frequency with which your classmates bother you through social media (Instagram, Facebook, Twitter), email, or text messages on the cell phone.	.623	.350
Indicate how often the students at your school:		
– Exclude, ignore, or reject you.	.611	.356
– Force you to do things you don't want to.	.600	.369
– Insult, offend or ridicule their peers.	.578	.371
Indicate your degree of agreement with the following statements:		
– I can easily pick up if another person wants to participate in a conversation.	.210	.824
– I can easily identify if a person says one thing when they really mean another.	.201	.820
– I can easily predict how someone else will feel.	.198	.818
– I can tell when I'm being nosy, even if the other person doesn't tell me.	.190	.815
– I can tell if another person is hiding her/his true emotions.	.188	.801
– I find it easy to put myself in someone else's shoes.	.180	.798
– My friends often tell me about their problems because they say I really understand them	.179	.781
Indicate how much the following describes you:		
– I finish everything I start.	.177	.772
– I am a hard-working person.	.176	.768
When you have to make a decision, how often do you apply the following?		
– I consider all my options when making decisions.	.170	.750
– In a decision, I try to find what are the disadvantages of each option.	.166	.745
– Before making the decision, I try to collect a lot of information.	.160	.738
– I try to be clear about my objectives before deciding.	.158	.730

Note. Source: own elaboration with information from PLANEA 2017.

Figure 1 – Confirmatory factor analysis

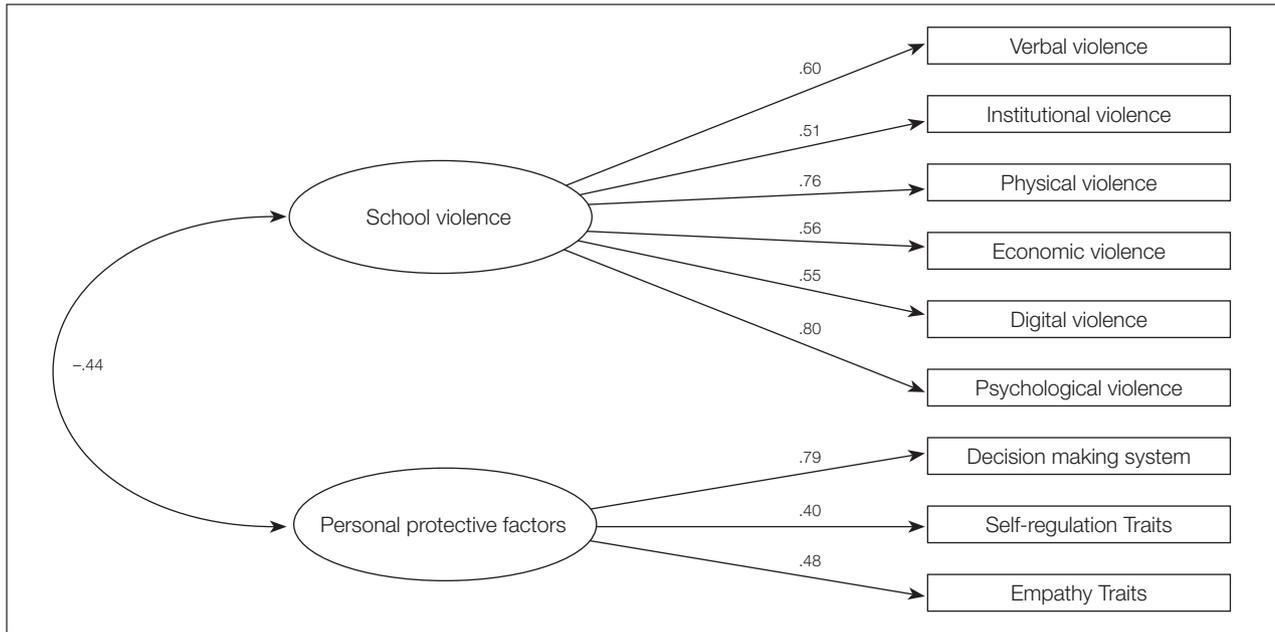


Table 2 – Components, variables, and questions of the theoretical model

Component	Variable	Question
School violence ($\alpha = .891$)	Verbal violence	Indicate how often students at your school offend you with insults, curses, or hurtful nicknames.
	Institutional violence	Do you consider your school a safe place?
		Indicate how often students in your school destroy furniture or damage facilities. When problems exist (arguments, fights, etc.) between your classmates, how often do teachers intervene to solve them?
	Physical violence	Indicate how often students at your school hit, kick, slap, or physically abuse you.
		Indicate how often students in your school do the following: Hit or push other students. Hurt or injure other students.
	Economic violence	Indicate how often students at your school steal other students' belongings
	Digital violence	Indicate the frequency with which your school classmates bother you through social media (Instagram, Facebook, Twitter), email, or text messages on the cell phone.
Psychological violence	Indicate how often the students at your school: Exclude, ignore, or reject you. Force you to do things you don't want to. Insult, offend or ridicule their peers.	

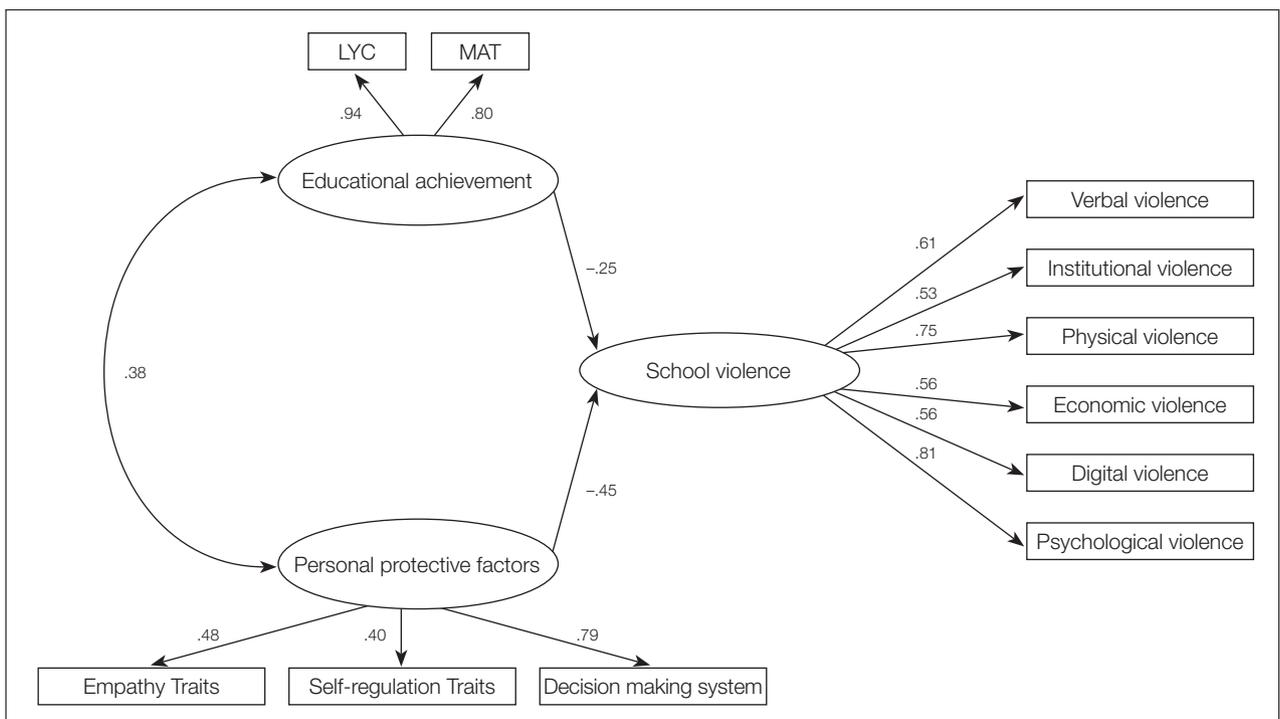
Note. Source: own elaboration with information from PLANEA 2017.

Table 3 – Personal protective factors

Factor	Variable	Question
Personal protective factors ($\alpha = .886$)	Empathy traits	Indicate your degree of agreement with the following statements: I can easily pick up if another person wants to participate in a conversation. I can easily identify if a person says one thing when they really mean another. I can easily predict how someone else will feel. I can tell when I'm being nosy, even if the other person doesn't tell me. I can tell if another person is hiding her/his true emotions. I find it easy to put myself in someone else's shoes. My friends often tell me about their problems because they say I really understand them.
	Self-regulation traits	Indicate how much the following describes you: I finish everything I start. I am a hard-working person.
	Decision-making system	When you have to make a decision, how often do you apply the following? I consider all my options when making decisions. In a decision, I try to find what are the disadvantages of each option. Before making the decision, I try to collect a lot of information. I try to be clear about my objectives before deciding.

Note. Source: own elaboration with information from PLANEA 2017.

Figure 2 – Statistical analyzes and associations



achievement are those who can put themselves in other person's shoes, acknowledge the feelings of others, complete what they start, fulfill school responsibilities, use a system to make decisions, consider all options before deciding, analyze the consequences of decisions and seek to be clear about their objectives before making any decisions.

Limitation

Although the present study represents an advance in the field of introducing the relationship between academic performance and personal protection factors against school violence, it is important to point out a limitation. Although the validation was done by construct and it was verified that the reliability for each factor, it was not possible to carry out the validation by experts to the instrument used. Therefore, for future research, it is proposed to carry out this type of validation.

DISCUSSION

This study shows relevant results proving the relationship between school violence and educational achievement in Mexico.

Relationship between school violence and educational achievement

The results presented show that those who are insulted, offended, are victims of robberies, and live in an unsafe school environment, beaten, hurt, harassed through social media, excluded, and even forced to do things against their will, are the most affected in terms of educational achievement. Previous authors (González & Treviño, 2018; Pérez-Fuentes, Álvarez-Bermejo, del Mar Molero, Gázquez & Vicente, 2015) have concluded that the actions corresponding to school violence affects school performance, decreasing in this way, educational achievement and students' grades.

These findings denote the importance of intervening promptly in the face of the phenomenon of school violence since the school climate is positively associated with students' performance and grades. With an emphasis on the relationship between low academic achievement and

school violence, the probability of obtaining low academic achievements increases in students who have been victims of school violence increases (Glew et al., 2005; Murtin et al., 2015; Roman & Murillo, 2011). Instead, Wang et al. (2018) found that a positive school environment was positively associated with grades.

From a humanistic approach, the students should be involved in a safe environment in order to meet individual student needs. This means that safe schools need to minimize risks, but they also need to maximize the student's skills to survive and thrive (Jessor, 1993), in order for them to be able to focus on their academic performance (Osuna & Díaz, 2020).

These findings denote the importance of intervening promptly in the face of the phenomenon of school violence.

Relationship between personal protective factors and educational achievement

Regarding personal protective factors, the findings of this research reflect the importance of students having empathy, self-regulation, and a decision-making system to obtain better academic achievements. These factors are considered personal protection because they contribute to violence prevention, and as their levels get higher, educational achievement increases. Moreover, these skills are included as fundamental for transversal formation (Osuna & Díaz, 2020).

The results of this research reveal the significant relationship between personal protective factors and educational achievement. Similar results were presented by Zych et al., (2018), who pointed out the existence of a positive relationship between personal protective factors, such as self-regulation and empathic social skills, with academic achievement. Some of the research reviewed (Garaigordóbil, 2015; Mitrović et al., 2020; Sánchez et al., 2012) shows coincidence with the results obtained in this research, particularly regarding the importance of recognition and management of their emotions in order to assume prosocial behaviors.

Considering this study's findings, the need to take action against school violence is clear, relying on personal protection factors to obtain better educational achievement. Some actions could be aimed at the inclusion of coexistence

guarantors (Del Tronco et al., 2013; Ortega-Ruiz, Del Rey & Casas, 2013; Ruiz & Alcaide, 2017).

Shaking hands workshop: An intervention proposal

Considering the positive relationship between personal protective factors and educational achievement, a proposal for an intervention and prevention workshop aimed at high school students is presented focusing on personal protective factors such as empathy, self-regulation, and a system of decision-making facilitated by a tutor. This workshop looks forward to going beyond crossing our arms or being a passive witness of school violence and make a difference by taking actions. This proposal also intends to become a hint to school administrators engaged in school violence in Mexico and other countries.

The intervention and prevention proposal called “Shaking Hands Workshop” aims to develop high school students personal protective skills. The workshop is designed to work in formative synergy with the academic community, under the humanistic approach and positive psychology, since it has been found that it favors academic performance and optimizes development of students (Alford & White, 2015).

Tutors play an essential role in the proposed workshop because it has been found they can improve the school climate by establishing rules for a healthy coexistence as well as by teaching of the adequate expression of emotions and coexistence (Belonogova & Sviridova, 2020; Duggins, Kuperminc, Henrich, Smalls-Glover & Perilla, 2016; Peñalva-Vélez, López-Goñi, Vega-Osés & Satrústegui-Azpíroz, 2015; Tomas, Rodriguez-Pichardo, Ariso & Fernández, 2020).

The proposal for intervention and prevention, “Shaking Hands Workshop”, is described as follows: the workshop has a duration of 16 weeks, grouped by topics corresponding to personal protective factors, with a weekly periodic frequency of five hours. Modules are organized for four weeks; 3 weeks are addressed to the students, while one week is allocated to their trainers, like parents and teachers.

It is suggested for the selection of tutors of “Shaking Hands Workshop” to consider candidates who are trained in positive psychology. More specifically, (Julio-Maturana, 2017; Seligman & Csikszentmihalyi, 2000) it is suggested to consider tutors who can explain the benefits in student development when using the model of positive psychology

called PERMA for its acronym in English (Positive emotion, Engagement, Relationships, Meaning, Achievement) which brings about benefits such as: improving students’ academic and personal performance, respect for autonomy, and the production of joy, respect, and hope.

The composition of the groups will be based on the database ELSEN, corresponding to PLANEA in order to identify those from the participant school who have been victims of violence.

Module 1. Emotional management. This module seeks to develop emotional competencies through active and experiential learning. The theoretical-conceptual foundations are related to emotional intelligence and the RULER methodology: Recognizing, Understanding, Labeling, Expressing, and Regulating emotions (Bisquerra, Pérez-González & García Navarro 2015; Brackett et al., 2011). Also, some theoretical foundation from Limber & Olweus (2017) was considered for Module 1.

Module 1 addresses topics that could help emotional management, such as:

- Emotional awareness
- Emotional regulation
- Emotional autonomy
- Emotional management and educational achievement.

In Module 1, the students should work under the leadership of a tutor or mentor who encourages them to share their feelings and concerns, and to develop the habit of finding alternative solutions or improvements.

Module 2. Empathy. The objective is to develop the skill of empathy and peaceful coexistence, and to generate a support network among equals. Based on other authors’ positive experiences (Cowie & Fernández, 2006; Sánchez et al., 2012; Stanley et al., 2013; Zych et al., 2018), the module will help students to develop networks among their peers, so that they value coexistence in their school as positive, as well as under a system of relationships between peers and an emotional and moral connection.

The module 2 addresses topics such as:

- The ABCs of interpersonal relationships
- Builders of peaceful coexistence
- Peace culture
- Empathy and educational achievement.

In Module 2, the student will work with a shared leadership between a tutor and volunteering peers, trained in interpersonal skills to offer support.

Module 3. Self-regulation. The module seeks to develop

self-regulation aimed at educational achievement. The module follows the guidelines established by some authors (Nacimiento & Mora-Merchán, 2014; Rodríguez & Merchán, 2014; Velasco, 2013) who provide guidance on achieving self-regulation through a process of analysis of what they do, how they do it, and what they do it for in order to focus on self-improvement. The module 3 addresses topics such as:

- Psycho-affective thermometer
- Coping techniques
- Positive reassessment
- Self-regulation and educational achievement.

Module 3 is developed under the leadership of a mentor who facilitates emotional confrontation, positive reframing processes, and motivates self-regulation skills.

Module 4. Decision-making system. This module seeks to develop decision-making skills through active and experiential learning. The theoretical-conceptual foundations are related to emotional education and Rational Emotive Therapy (Bisquerra et al., 2015; Laponi, 2013). This module addresses topics such as:

- From the irrational to the rational
- Decision-making system
- Empowerment
- Decision-making system and educational achievement.

In Module 4, the students might work under the leadership of a tutor or mentor who encourages them to identify irrational thoughts and proposes responsible alternatives that contribute to an environment of respect and coexistence.

Due to the results obtained regarding digital abuse that is negatively affecting educational achievement, it would be appropriate to include technology in these modules in order to prevent digital abuse and create a peaceful digital culture. The generation of online games could promote healthy coexistence and enable students to cope emotionally and socially.

CONCLUSION

The relationship between school violence, personal protection factors, and academic achievement in Mathematics, and Language & Communication in high

school was determined. Educational achievement was directly and negatively related to school violence. In contrast, personal protective factors were negatively correlated with school violence, but they were positively and significantly correlated with personal protective factors.

Based on the results obtained in this research, the following recommendations are made:

1. Review school policies so that they function as establishments for safe environments
2. Generate training synergy in which the school, society, and families collaborate in forming healthy environments
3. Invite educational and social leaders to take an active role in supporting prevention and regulation initiatives against school violence and strengthening values of inclusive societies, such as solidarity and tolerance
4. Carry out more research focused on the prevention and intervention of school violence, including contextual, family, and personal variables
5. Promulgate campaigns focused on motivating students to feel responsible for a healthy coexistence. For example, campaigns on the exercise of human rights, empowerment or interpersonal skills training
6. Use technology to create safe environments. Open educational resources can be generated to help prevent digital bullying and digital escape rooms may be used as emotional training
7. Contribute to the training of social skills in cyberspace
8. Create a culture of coexistence where rights are highlighted, as well as the importance of creating healthy, tolerant, safe learning environments free of discrimination, harassment, and violence
9. Reinforce the areas of Mathematics, and Language & Communication with tutors and volunteer peers' academic support.

Overall, this research may serve as a reference for those interested in further understanding the phenomenon of school violence, and as an invitation for more people to take responsibility to create safe and peaceful school environments.

Acknowledgment. The authors would like to acknowledge the proofreading support of Antonio Alcala and Alina Avila, Tecnológico de Monterrey, Mexico, in this work.

References

- ACOCK, A. (2013). *Discovering structural equation modeling using stata*. Texas: College Station.
- AGUILAR, I., DARROMAN, I., PERERA, L.S. & BENÍTEZ, B. (2008). Conocimientos de la ética de la investigación científica. *Revista Cubana de Medicina General Integral*, 24 (3),1-7.
- ALFORD, Z. & WHITE, M.A. (2015). Positive school psychology. In M. White & S. Murray (Eds.), *Evidence-based approaches in positive education*. Dordrecht: Springer.
- ARASTAMAN, G. & BALCI, A. (2013). Investigation of high school students' resiliency perception in terms of some variables. *Educational Sciences: Theory and Practice*, 13 (2), 922-928.
- BELONOGOVA, E.V. & SVIRIDOVA, I.A. (2020). A regional model to train mediators for the educational system of Kuzbass. *Journal of Siberian Federal University. Humanities & Social Sciences*, 13 (9), 1449-1465. doi 10.17516/1997-1370- 0655
- BISQUERRA, R., PÉREZ-GONZÁLEZ, J.C. & GARCÍA NAVARRO, E. (2015). *Inteligencia emocional en educación*. Madrid, E: Síntesis.
- BRACKETT, M.A., KREMENITZER, J.P., MAURER, M., CARPENTER, M., RIVERS, S.E. & ELBERTSON, N. (2011). *Creating emotionally literate classrooms: An introduction to the RULER approach to social and emotional learning*. Port Chester, NY: National Professional Resources.
- CAUSTON, J., TRACY-BRONSON, C.P. & MacLEOD, K. (2015). Beyond treats and timeouts: humanistic behavioral supports in inclusive classrooms. *International Journal of Whole Schooling*, 11 (1), 68-84.
- CAVA, M.J., BUELGA, S., MUSITU, G. & MURGUI, S. (2010). Violencia escolar entre adolescentes y sus implicaciones en el ajuste psicosocial: un estudio longitudinal. *Revista de Psicodidáctica*, 15 (1), 21-34.
- CICCHETTI, D. (2013). Annual research review: Resilient functioning in maltreated children: Past, present, and future perspectives. *Journal of Child Psychology and Psychiatry*, 54, 402-422. 10.1111/j.1469-7610.2012.02608.x
- COWIE, H. & FERNÁNDEZ, F.J. (2006). Ayuda entre iguales en las escuelas: Desarrollo y retos. *Electronic Journal of Research in Education Psychology*, 4 (9), 291-310.
- DEL TRONCO, J., RAMÍREZ, A.M., SOTA, C.S., BAGGINI, I. & CERVANTES, R.M. (2013). La violencia en las escuelas secundarias de México. *Una exploración de sus dimensiones, México: FLACSO*.
- DUGGINS, S.D., KUPERMINE, G.P., HENRICH, C.C., SMALLS-GLOVER, C. & PERILLA, J.L. (2016). Aggression among adolescent victims of school bullying: Protective roles of family and school connectedness. *Psychology of Violence*, 6 (2), 205-215.
- GARAIGORDOBIL, M. (2015). Ciberbullying en adolescentes y jóvenes del País Vasco: Cambios con la edad. *Anales de psicología*, 31 (3), 1069-1076.
- GARCÍA-FERNÁNDEZ, M. & GIMÉNEZ-MAS, S.I. (2010). La inteligencia emocional y sus principales modelos: Propuesta de un modelo integrador. *Espiral. Cuadernos del profesorado*, 3 (6), 43-52.
- GIBBONS, M.A. & ROSSI, M.A. (2015). Evaluación de impacto de un programa de inclusión social y prevención de violencia estudiantil. *IDB Working Paper Series, No. IDB-WP-624*.
- GLEW, G.M., FAN, M.Y., KATON, W., RIVARA, F.P. & KERNIC, M.A. (2005). Bullying, psychosocial adjustment, and academic performance in elementary school. *Archives of Pediatrics & Adolescent Medicine*, 159 (11), 1026-1031.
- GONZÁLEZ, M.A. & TREVIÑO, D.C. (2018). Logro educativo y factores asociados en estudiantes de sexto grado de educación primaria en el estado de Nuevo León, México. *Perfiles Educativos*, 40 (159), 107-125.
- GUTIÉRREZ, R.B., SÁNCHEZ, M.M., ALBEROLA, M.C.R. & MONTAÑÉS, J. (2009). Los factores de protección frente a la conducta antisocial: ¿Explican las diferencias en violencia entre chicas y chicos? *Revista Española de Investigación Criminológica: REIC*, 7, 1-15.
- JESSOR, R. (1993). Successful adolescent development among youth in high-risk settings. *American Psychologist*, 48, 117-127.
- JULIO-MATURANA, C. (2017). Configurando identidad de aprendiz en la escuela: Obstáculos en la relación pedagógica y su incidencia en procesos de deserción escolar temprana. *Revista Latinoamericana de Educación Inclusiva*, 11 (1), 109-129.
- KAISER, H.F. (1974). An index of factorial simplicity. *Psychometrika*, 39, 31-36. doi.org/10.1007/BF02291575
- LAPPONI, S.F. (2013). Resolución de conflictos en la escuela: Una herramienta para la cultura de paz y la convivencia. *Contextos Educativos. Revista de Educación*, 3, 91-106.
- LARSON, K.E., NGUYEN, A.J., SOLIS, M.G.O., HUMPHREYS, A., BRADSHAW, C.P. & JOHNSON, S.L. (2020). A systematic literature review of school climate in low and middle-income countries. *International Journal of Educational Research*, 102, 101606, 1-20.
- LIMBER, S.P. & OLWEUS, D. (2017). Lessons learned from scaling-up the Olweus Bullying Prevention Program. In C. Bradshaw (Ed.), *Handbook on bullying prevention: A life course perspective*.

- Washington, DC: National Association of Social Workers Press.
- MITROVIĆ, S., NEŠIĆ, A., DUDIĆ, B., GREGUS, M., DELIĆ, M. & MEŠKO, M. (2020). Emotional intelligence of engineering students as basis for more successful learning process for industry 4.0. *Mathematics*, 8 (8), 1321. doi.org/10.3390/math8081321
- MUÑOZ, G. (2008). Violencia escolar en México y en otros países: Comparaciones a partir de los resultados del Instituto Nacional para la Evaluación de la Educación. *Revista Mexicana de Investigación Educativa*, 13 (39), 1195-1228.
- MURTIN, F., LAURENT, T., BARNARD, G., JANSE VAN RENSBURG, D., REDDY, V., FREMPONG, G. & WINNAAR, L. (2015). Policy determinants of school outcomes under model uncertainty: Evidence from South Africa. *South African Journal of Economics*, 83 (3), 317-334.
- NACIMIENTO, L. & MORA-MERCHÁN, J.A. (2014). The use of coping strategies and metacognitive skills in situations of bullying and cyberbullying. *European Journal of Education and Psychology*, 7 (2), 121-129.
- OECD (2019). *PISA 2018 results (Volume I): What students know and can do*. Paris: OECD Publishing. doi.org/10.1787/5f07c754-en
- ORTEGA-RUIZ, R., DEL REY, R. & CASAS, J.A. (2013). La convivencia escolar: Clave en la predicción del bullying. *Revista Iberoamericana de Evaluación Educativa*, 6 (2), 91-102.
- OSUNA, C. & DÍAZ, K.M. (2020). The achievement of mathematics learning in PISA, ENLACE and PLANEA in Mexican adolescents. A retrospective analysis. *Education Policy Analysis Archives*, 28 (28), 1-24.
- PATEL, V., KIELING, C., MAULIK, P.K. & DIVAN, G. (2013). Improving access to care for children with mental disorders: A global perspective. *Archives of Disease in Childhood*, 98 (5), 323-327.
- PEÑALVA-VÉLEZ, A., LÓPEZ-GOÑI, J.J., VEGA-OSÉS, A. & SATRÚSTEGUI-AZPÍROZ, C. (2015). Clima escolar y percepciones del profesorado tras la implementación de un programa de convivencia escolar. *Estudios sobre Educación*, 28, 9-28.
- PÉREZ-FUENTES, M., ÁLVAREZ-BERMEJO, J.A., DEL MAR MOLERO, M., GÁZQUEZ, J.J. & VICENTE, M.A.L. (2015). Scholar Violence and Academic Achievement (VERA): Augmented reality application. *European Journal of Investigation in Health, Psychology and Education*, 1 (2), 71-84.
- PETRUCCI, G.W., BORSA, J.C., DAMÁSIO, B.F. & KOLLER, S.H. (2016). Adaptation and preliminary validation evidences of the School Climate Questionnaire, Elementary and Middle School Version (SCS-MS). *Psicologia: Reflexão e Crítica*, 29 (1), 1-8. doi.org/10.1186/s41155-016-0037-5
- QUINTANA-ORTS, C. & REY, L. (2018). Traditional bullying, cyberbullying and mental health in early adolescents: Forgiveness as a protective factor of peer victimisation. *International Journal of Environmental Research and Public Health*, 15 (11), 2-14.
- RODRÍGUEZ, L.N. & MERCHÁN, J.A.M. (2014). The use of coping strategies and metacognitive skills in situations of bullying and cyberbullying. *European Journal of Education and Psychology*, 7 (2), 121-129.
- ROMAN, M. & MURILLO, F.J. (2011). América Latina: Violencia entre estudiantes y desempeño escolar. *Revista Cepal*, 104, 37-54.
- RUIZ, R.O. & ALCAIDE, F.C. (2017). El modelo construir la convivencia para prevenir el acoso y el ciberacoso escolar. *Innovación Educativa*, 27, 19-32.
- RUTKOWSKI, L., RUTKOWSKI, D. & ENGEL, L. (2013). Sharp contrasts at the boundaries: School violence and educational outcomes internationally. *Comparative Education Review*, 57 (2), 232-259.
- SABINA, C. & BANYARD, V. (2015). Moving toward well-being: The role of protective factors in violence research. *Psychology of Violence*, 5 (4), 337-342.
- SÁNCHEZ, V., ORTEGA, R. & MENESINI, E. (2012). La competencia emocional de agresores y víctimas de bullying. *Anales de Psicología*, 28 (1), 71-82.
- SÁNCHEZ-QUEIJA, I., OLIVA, A. & PARRA, Á. (2006). Empatía y conducta prosocial durante la adolescencia. *Revista de Psicología Social*, 21 (3), 259-271.
- SANTROCK, J.W. (2019). *Adolescence (17th ed)*. New York, NY: McGraw-Hill.
- SCHOLL, M.B., MCGOWAN, A.S. & HANSEN, J.T. (2012). Introduction to humanistic perspectives on contemporary counseling issues. In M.B. Scholl, A.S. McGowan & J.T. Hansen (Eds.), *Humanistic perspectives on contemporary counseling issues*. New York, NY: Routledge.
- SCHOON, I. (2021). Towards an integrative taxonomy of social-emotional competences. *Frontiers in Psychology*, 12, 1-8.
- SELIGMAN, M.E.P. & CSIKSZENTMIHALYI, M. (2000). Positive psychology: An introduction. *American Psychologist*, 55 (1), 5-14. doi.org/10.1037/0003-066X.55.1.5
- SEP (2017). *PLANEA Educación Media Superior*. Retrieved from <http://planea.sep.gob.mx/ms/>
- SOUTTER, A.K., O'STEEN, B. & GILMORE, A. (2014). The student well-being model: A conceptual framework for the development of student well-being indicators. *International Journal of Adolescence and Youth*, 19, 496-520. doi:10.1080/02673843.2012.754362
- STANLEY, P.H., SMALL, R., OWEN, S.S. & BURKE, T.W. (2013).

- Humanistic perspectives on addressing school violence. In *Humanistic perspectives on contemporary counseling issues*. New York, NY: Routledge.
- SUN, Z., XIE, K. & ANDERMAN, L.H. (2018). The role of self-regulated learning in students' success in flipped undergraduate math courses. *The Internet and Higher Education*, 36, 41-53.
- TOMAS, C., RODRÍGUEZ-PICHARDO, C., ARISO, A. & FERNÁNDEZ, J.L. (2020). Propuesta de un modelo de mentoreo académico: Colaboración entre el Tecnológico de Monterrey y EAE Business School. In E.C. Dittmar (Ed.), *La empresa en el siglo XXI: Un estudio multidisciplinar de carácter jurídico empresarial*. Barcelona, E: Editorial Thomson Reuters Aranzadi.
- TORRANO, F., FUENTES, J.L. & SORIA, M. (2017). Aprendizaje autorregulado: Estado de la cuestión y retos psicopedagógicos. *Perfiles educativos*, 39 (156), 160-173.
- TTOFI, M.M., BOWES, L., FARRINGTON, D.P. & LÖSEL, F. (2014). Protective factors interrupting the continuity from school bullying to later internalizing and externalizing problems: A systematic review of prospective longitudinal studies. *Journal of School Violence*, 13 (1), 5-38.
- URIARTE, J. (2006). Construir la resiliencia en la escuela. *Revista de Psicodidáctica*, 11 (1), 7-23.
- VARELA, R.M., ÁVILA, E.M. & MARTÍNEZ, B. (2013). School violence: An analysis from different interaction contexts. *Psychosocial Intervention*, 22 (1), 25-32.
- VELASCO, M.J. (2013). Violencia reactiva e instrumental. La impulsividad como aspecto diferenciador. *Revista de Educación*, 361, 665-685.
- WANG, C., BOYANTON, D., ROSS, A.-S.M., LIU, J.L., SULLIVAN, K. & ANH DO, K. (2018). School climate, victimization, and mental health outcomes among elementary school students in China. *School Psychology International*, 39 (6), 587-605. doi.org/10.1177/0143034318805517
- ZYCH, I., FARRINGTON, D.P. & TTOFI, M.M. (2018). Protective factors against bullying and cyberbullying: A systematic review of meta-analyses. *Aggression and Violent Behavior*, 48, 1-16.