

Community Violence, Peer Victimization, and Protective Weapon Purchase in Nicaraguan Adolescents: The Role of Attitudes Toward Weapons

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Abstract

This study examines if Nicaraguan adolescents' violence exposures (i.e., community violence, bullying and cyberbullying victimization) are related to purchasing weapons for protection and investigates the mediating role of attitudes toward weapons. Cross-sectional survey data were collected from 2,357 adolescents (53.9% female) in Nicaraguan middle schools. Most participants were in 7th (43.0%) or 8th (38.6%) grades with a mean age of 12.9 years (SD = 1.14). Nicaraguan adolescents who had frequent exposure to community violence or cyberbullying victimization were more likely to purchase a weapon for self-protection. Significant mediation effects of attitudes toward weapons were identified. This study extends previous research by showing that exposure to violence leads to weapons being purchased for defense in Nicaragua where adolescents are exposed to frequent violence. It also demonstrates the role of attitudes toward weapons in this process. These findings have implications for prevention interventions in this and similar cultures.

Keywords: protective weapon purchase, community violence, bullying victimization, cyberbullying victimization, attitudes toward weapons

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Introduction

Adolescent weapon-related behaviors are a significant public health concern. In the U.S., where most of the research has been conducted, the 2023 High School Youth Risk Behavior Survey (CDC, 2023) reports that 4.2% of adolescents carry a weapon such as a gun, knife, or club on school property at least one day in the past 30 days, and 9.0% had been threatened or injured with a weapon on school property during the past 12 months. About 22% of all U.S. weapon-related arrests involved youth 21 years or younger (FBI, 2019). In Nicaragua, where study focuses, data are limited. However, reports indicate that countries across Latin America face high

fatalities due to armed violence and homicide is the leading cause of mortality among adolescents aged 10 to 19 years (Unicef, 2022). The Institute for Health Metrics and Evaluation (2019) reports that injuries accounted for 28% of total deaths in 2019, and 11% of these injuries were caused by self-harm or interpersonal violence. Nicaragua has the second highest rate of firearms per person in Central America (7 per 100) and the highest rate of guns per active soldier (SSG Advisors, 2016). Although firearms are not commonly used in violence in Nicaragua, adolescents have access to other weapons (called an "arma blanca"), such as knives, stones, and machetes. Nicaraguan police report that "nearly every

at-risk youth has a knife or some other *arma blanca*” (SSG Advisors, 2016, p. 36).

Exposure to violence from weapon-related behaviors during adolescence can cause mental health problems such as post-traumatic stress (Jaycox et al., 2002; Turner et al., 2019) and depressive symptoms (Jaycox et al., 2002), and can lead to cardiovascular problems (Ford & Browning, 2014). In addition to these adverse health outcomes, a substantial financial cost associated with hospitalization for weapon-related injuries among adolescents is estimated to be nearly \$100 million per year (Taylor et al., 2021). Adolescent exposure to weapon-related behaviors is also known to lead to weapon violence perpetration in adulthood (Teplin et al., 2021). Given the considerable health and financial costs, it is important to identify factors that influence weapon-related behaviors among adolescents.

Greater accessibility to weapons in the home, primarily through parental ownership, is a commonly examined factor linked to weapon-related behaviors among adolescents (Hemenway, 2011; Kivisto et al., 2021; Price & Khubchandani, 2021). However, there may be some instances where an adolescent obtains a weapon through other means. For instance, a study (Carter et al., 2013) surveyed 689 assault-injured youth aged 14-24 years in the emergency department of a hospital following an assault and found that 23% of the youth were in possession of a firearm. The youth used various methods to acquire a firearm outside the home, including purchases from street dealers, drug dealers, sporting goods stores, and pawn shops, purchases from illegal sources, or underage purchases from legal sources (Carter et al., 2013). Adolescents most commonly purchase weapons for self-protection (Lizotte et al., 1994, 2000; May, 1999; Sheley & Wright, 1993). Nevertheless, weapon ownership is associated with an increased risk for serious,

repeated hospitalized medical injuries among adolescents (Pickett et al., 2005), which calls into question the effectiveness of protective weapon ownership (Hemenway, 2011). Moreover, research has found that adolescents who reported owning a firearm for protection were more likely to report carrying a firearm six months later (Lizotte et al., 1994), and those who purposefully acquire a firearm tend to carry a firearm more frequently and constantly than those who acquire it passively (Ash et al., 1996). Given the risks of firearm ownership, it is vital to examine the factors that contribute to it.

Community Violence, Peer Victimization, and Protective Weapon Purchase

There is a complex interplay between individual, social, and community factors that contribute to the risk of violent behaviors among adolescents (Bozzini et al., 2021), including weapon-related behaviors such as carrying a weapon (Haegerich et al., 2014) and using a weapon in fights (Peres et al., 2018). Community violence is defined as excessive exposure to the use of guns, knives, drugs, and random acts of violence in one’s community (Osofsky, 1995). Community violence exposure consists of both witnessing or knowing of others being victims and becoming a victim oneself (Overstreet, 2000). Childhood exposure to community violence, such as seeing or being around others shooting a gun, or seeing someone assaulted (e.g., stabbed or shot by another person), is associated with carrying a weapon, threatening others with a weapon, getting arrested for weapon use, and involving in criminal violent acts in adulthood (Huesmann et al., 2021). Adolescents who perceive a greater level of community violence (Sokol et al., 2022) and live in lower-income and urban areas where community violence often occurs (Kravitz-Wirtz et al., 2022) are more likely to carry a weapon. Overall, it is evident that exposure

to community violence is linked to an elevated risk of weapon-related behaviors; however, to date, most research assumes ready weapon ownership or access, without examining how adolescents gain access to a weapon, such as purchasing a weapon for self-protection.

Peer victimization, such as peer bullying and cyberbullying, may be another potential risk factor for protective weapon purchasing among adolescents. Peer bullying is repeated, aggressive acts intended to cause harm and distress (Olweus, 2013). Cyberbullying is bullying through electronic resources such as email, instant messenger, chat rooms, online gaming, and social networking sites (Kowalski & Limber, 2013). According to the 2023 Youth Risk Behavior Survey, 19.2% of U.S. adolescents experienced bullying victimization on school property in the past 12 months, and 16.3% experienced cyberbullying in the past 12 months (CDC, 2023). Both bullying and cyberbullying victimization have been consistently associated with weapon-related behaviors. Adolescents who are victims of bullying are more likely to carry a weapon to their school environment compared to peers who were not victims of bullying (Lu et al., 2018; Valdebenito et al., 2017; van Geel et al., 2014). Cyberbullied adolescents also report higher rates of weapon carrying than those who were not (Lu, Avellaneda, et al., 2019), and adolescents who possessed a firearm were likely to be cyberbullied (Sigel et al., 2019). However, similar to research on community violence, a limitation is the neglect of weapon access and ownership, such as purchase, among victims of (cyber)bullying, yet a link is anticipated, given the high correlation between weapon carrying and weapon ownership (Ash et al., 1996; Lizotte et al., 1994).

The Role of Attitudes Toward Weapons

A second factor in adolescent weapon decisions are their attitudes toward weapons. Positive attitudes may be an important antecedent to protective weapon purchasing among adolescents. As suggested in social cognitive perspectives of aggression and violence development (Anderson & Bushman, 2002; Huesmann, 2018), exposure to violence in multiple domains (e.g., community, media, family, peers), either witnessing or being a victim, can lead to observational learning of social cognitions supporting violence, which in turn result in violent behaviors. Indeed, it has been well documented that attitudes toward violence may serve as a mediator to explain the intergenerational transmission of violence, such that youth exposed to hostile communication or interparental violence are more likely to hold accepting attitudes toward violence and subsequently more likely to engage in externalizing behaviors, such as physical and relational aggression, verbal bullying, and defiance (Foshee et al., 1999; Lu et al., 2021; Temple et al., 2013).

The potential mediating role of attitudes toward weapons has not been examined between violence exposure and subsequent weapon-related behaviors. However, this link is plausible as indicated in prior research. A study found that childhood bullying victimization may be associated with greater weapon enthusiasm in adulthood (Ray et al., 2021), suggesting victimization experiences can result in a positive attitude toward weapons. Another study found that nearly one-third of 7th-grade students reported they “feel safer” and were “less likely get hurt” by having a weapon in a fight (Malek et al., 1998), implying a favorable attitude toward weapons in adolescents and a possible intention to seek weapons for self-protection. Based on the previous findings, it is probable that attitudes toward weapons may mediate the association between violence exposure

(e.g., perceived community violence and peer victimization) and protective weapon purchasing.

The Present Study

Central America, including Nicaragua, is one of the “silent zones” of research (Dutta & Martin, 2017). It is imperative to diversify scholarship in a global context. To date, other than descriptive statistics about weapon-related behaviors in Nicaragua, and mainly in adult population, very little is known. Based on literature in other countries, it is well understood that community violence (Huesmann et al., 2021; Sokol et al., 2022) and peer victimization (e.g., bullying and cyberbullying; Lu et al., 2019; Valdebenito et al., 2017; van Geel et al., 2014) are associated with weapon-related behaviors, such as weapon carrying in adolescents, but little is known about how they relate to protective weapon purchase, which precedes both weapon carrying and use. Research suggests that attitudes toward violence play an important role in explaining why adolescents who have witnessed violence between their parents are more likely to be violent themselves (Foshee et al., 1999; Lu et al., 2021; Temple et al., 2013), but it remains unknown if attitudes toward weapons play a similar role when adolescents witness or experience other types of violence, such as community violence or peer victimization. To address these gaps in the literature and to extend to the Nicaraguan context, this study aims to examine 1) whether violence exposure (i.e., community violence exposure and experiences of peer victimization) would be associated with protective weapon purchasing in adolescents and 2) if attitudes toward weapons mediate the relationship between violence exposure and protective weapon purchasing.

Methods

Participants

The study used cross-sectional data from a larger intervention study examining a school-based drug and violence prevention program in Nicaragua, called *Dale se REAL* (DsR). Details of DsR can be found in Pettigrew et al. (2023). For this study, we used Wave 3 data collected in 2019, one year after a civil crisis in Nicaragua, which resulted in a surge of violence. Violence-related questions first appeared in this wave of data. The participants consisted of 2,357 adolescents with an average age of 13 years ($SD = 1.14$), with the majority (92.6%) of them being 14 years or younger. Participants self-reported to be 1,148 females (53.9%), and 983 males (46.1%), with 91.0% having lived in Nicaragua all their lives. The majority of participants were students in 7th (43.0%), 8th (38.6%), and 9th (18.1%) grades and reported low socioeconomic status (80.2%).

Procedure

Schools from Western and Central geographic regions in Nicaragua were invited to administer surveys with 7th, 8th, 9th, and 10th grades. A passive consent procedure was used where participating schools sent home informed consent letters to parents of adolescents. Adolescents whose parents did not opt them out of the study were eligible to participate and provided informed assent before completing a paper-pencil survey at their schools. Response rates ranged from 95% - 100% across participating schools. Surveys were administered in Spanish, their native language. After surveys were completed, study team members entered the data into a secure online database. A random set of surveys was checked for data entry accuracy. The study procedure was approved by a university institutional review board.

Measures

Protective Weapon Purchase. Protective weapon purchase was measured with one question: “Has a fear of being attacked or robbed caused you to purchase a weapon for self-protection?” Participants answered yes/no to the question.

Community Violence Exposure. Community violence exposure was measured with nine items about weapon-related violence from the Children’s Exposure to Community Violence scale (Richters & Martinez, 1990). Participants were asked to report “in your neighborhood, how often have you...” experienced different types of weapon-related violence, such as “heard a gun being shot” and “seen someone stabbed.” Response options ranged from “never (= 1) to “many times” (= 4). The scale had a Cronbach’s alpha of .84. A scale mean was created for analysis with higher scores representing more frequent exposure to community violence.

Bullying Victimization. Following the approach used in a previous study (Lu et al., 2020), to measure bullying victimization, participants first reviewed the definition and an example of bullying and then answered the question, “how often have you been bullied in the past 12 months?” Response options ranged from 1 (never) to 4 (many times).

Cyberbullying Victimization. Cyberbullying victimization was measured with one question adapted from Lu, Avellaneda et al. (2019). Participants responded on a scale of 1 (never) through 4 (many times) to the question, “in the past year, has anyone used the internet, email, text messaging, Snapchat, or anything similar to threaten, harass, or embarrass you by posting information or sending messages about you?” to report their cyberbullying victimization experience.

Attitudes Toward Weapons. The attitude toward violence scale was used to measure beliefs about the acceptability of weapons (Funk et al., 1999). The initial scale had 14 items, three of which were weapon-related and were used to measure participants’ attitudes toward weapons in the current study. The items were “carrying a gun or knife would help me feel safer,” “It’s okay to carry a gun or knife if you live in a rough neighborhood,” and “it’s good to have a gun.” Participants were asked to respond on a scale of 1 (strongly disagree) to 5 (strongly agree) to these items. The scale had a Cronbach’s alpha of .78. The scale mean was created for analysis with higher scores indicating stronger pro-weapon attitudes.

Demographic Characteristics. Adolescent age, sex, and parental education information were collected. Additionally, socioeconomic status (SES) information was gathered by the question, “how often does your family pay someone to help clean the house?” This question was used for SES because 1) young adolescents often do not know their household income; 2) employing household servants is common in Nicaragua and thus having frequent household help could be a proxy for having disposable income. Those who responded “never” or “rarely” were coded as low SES whereas “sometimes,” “often,” and “always” were coded as not in low SES.

Data Analysis

Analyses were conducted first in SPSS for Windows, version 28.0 (IBM Corp., 2021) to examine variable frequencies, percentages, means, standard deviations, and correlations. Next, path analysis was performed in Mplus 8.7 (Muthen & Muthen, 1998-2017) by specifying community violence, bullying victimization, and cyberbullying victimization as independent variables, attitudes toward weapons as the mediating

variable, and protective weapon purchase as the dependent variable, controlling for age, sex, parental education, SES, and intervention effects. Weighted Least Squares Mean and Variance-adjusted (WLSMV) estimation method was used because protective weapon purchase was a dichotomous variable (Flora & Curran, 2004). Indirect effects were assessed using bias-corrected bootstrapping confidence intervals based on bootstrapping of 10,000 resamples (MacKinnon, 2008). Data missingness ranged from 2.1% to 9.9%. Data were assumed to be missing at random and were handled by multiple imputation (MI) with 40 datasets imputed (Graham et al., 2007). The results were pooled findings from the 40 analyses using the imputed datasets. To assess model fit, the following criteria were used: root mean square error of approximation (RMSEA) $< .08$ indicates adequate fit and $< .06$ indicates good fit (Browne & Cudeck, 1993), comparative fit index (CFI) $\geq .95$ indicates good fit and $\geq .90$ indicates adequate fit (Hu & Bentler, 1999), and standardized root mean square residual (SRMR) $< .08$ indicates good fit (Hu & Bentler, 1999).

Results

As shown in Table 1, a total of 7.7% of participants were cyberbullied at least once, and 1.4% were victims of cyberbullying “many times.” A greater percentage of participants (29.2%) were bullied at least once, and 3.0% were bullied “many times.” Approximately 1 out of 4 adolescents (22.6%) engaged in protective weapon purchase. Table 2 presents variable means, standard deviations, ranges, and bivariate correlations among variables. Most participants experienced none or infrequent community violence ($M = 1.46$, $SD = .57$) and they generally did not hold favorable attitudes toward weapons ($M = 2.20$, $SD =$

1.05). Protective weapon purchase was significantly correlated with exposure to community violence ($r = .20$, $p < .001$), cyberbullying victimization ($r = .17$, $p < .001$), and accepting attitudes toward weapons ($r = .33$, $p < .001$), but not with bullying victimization ($r = .02$, $p = .35$). The final mediation model is presented in Figure 1. The model had acceptable fit, $\chi^2(16) = 108.17$, $p < .001$, RMSEA = .06, CFI = .91, SRMR = .06.

Total Effects

The total effects of violence exposure on protective weapon purchase in Nicaraguan adolescents are presented in Table 3. Controlling for age, sex, SES, parental education, and intervention effect, community violence exposure ($\beta = .191$, 95% CI: .135, .247, $p < .001$), and cyberbullying victimization ($\beta = .147$, 95% CI: .064, .108, $p < .001$) significantly associated with protective weapon purchase. No significant association was found between bullying victimization and protective weapon purchase ($\beta = -.032$, 95% CI: -.091, .024, $p = .54$).

Indirect Effects

The mediation model is presented in Figure 1. As shown in Table 3, significant indirect effects were identified for both community violence exposure ($\beta = .085$, 95% CI: .064, .108, $p < .001$) and cyberbullying victimization ($\beta = .025$, 95% CI: .005, .045, $p < .05$) on protective weapon purchase, via attitudes toward weapons. That is, exposure to community violence and experiences of cyberbullying victimization contributed to more accepting attitudes toward weapons, which further contributed to protective weapon purchase. Bullying victimization, however, did not show a significant indirect effect on protective weapon purchase ($\beta = .001$, 95% CI: -.016, .018, $p = .84$).

Table 1.*Descriptive Statistics (n=2,357)*

Variables	N (Mean)	Valid % (SD)
Age	(12.9)	(1.14)
10	6	0.3
11	161	7.3
12	725	32.7
13	689	31.0
14	475	21.4
15	118	5.3
16	28	1.3
17	18	0.8
Sex		
Male	983	46.1
Female	1148	53.9
Length of Residence in Nicaragua		
All their lives, born in Nicaragua	2024	91.0
More than 10 years	109	4.9
10 years or less	90	4.1
Grade		
6 th	6	0.3
7 th	908	43.0
8 th	815	38.6
9 th	383	18.1
Socio-economic Status		
Low	1852	80.2
High	456	19.8
Highest Parental Education		
Did not graduate high school	262	12.1
Graduated high school	412	19.1
Took some university courses	235	10.9
Completed a technical career	226	10.5
Completed a university degree	639	29.6
Completed a post-graduate degree	387	17.9
Cyberbullying Victimization		
Never	2032	92.3
Once or twice	93	4.2
A few times	46	2.1
Many times	30	1.4
Bullying Victimization		
Never	1593	70.8
Once or twice	425	18.9
A few times	165	7.3
Many times	68	3.0
Protective Weapon Purchase		
No	1645	77.4
Yes	479	22.6

Table 2.*Means, Standard Deviations, and Bivariate Correlations among Variables (n=2,357)*

	Frequency (%) / M (SD)	Variable Range	1	2	3	4
1. Protective Weapon Purchase	479 (22.6%)	yes/no	-			
2. Community Violence Exposure	1.46 (.57)	1-4	.20***	-		
3. Bullying Victimization	1.43 (.76)	1-4	.02	.12***	-	
4. Cyberbullying Victimization	1.12 (.48)	1-4	.17***	.26***	.10***	-
5. Pro-weapon Attitudes	2.20 (1.05)	1-5	.33***	.24***	.04	.12***

Notes. *** $p < .001$.

Table 3.*Total Effects and Indirect Effects of Violence Exposure on Protective Weapon Purchase*

<i>Total Effects</i>	B	S.E.	β	95% CI for β	<i>p</i> value
Community Violence Exposure	.340	.057	.191	.135, .247	<.001
Bullying Victimization	-.028	.046	-.032	-.091, .024	.543
Cyberbullying Victimization	.313	.064	.159	.100, .217	<.001
<i>Indirect Effects</i>					
Community Violence Exposure	.147	.022	.085	.064, .108	<.001
Bullying Victimization	.002	.012	.001	-.016, .018	.842
Cyberbullying Victimization	.054	.022	.025	.005, .045	.013

Notes. B = unstandardized coefficients, S.E. = standard error, β = standardized coefficients, CI = confidence interval.

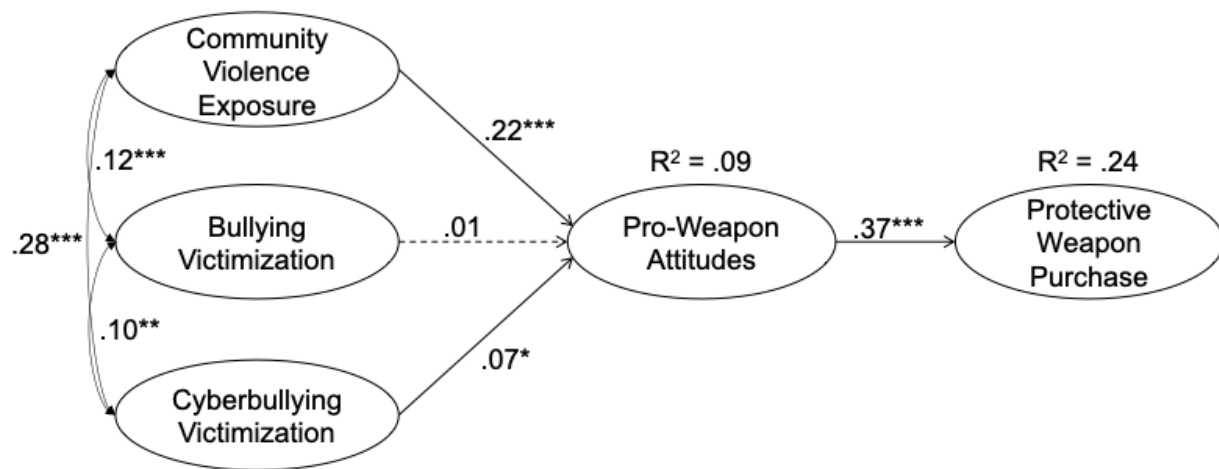


Figure 1. Final Mediation Model

Notes. Age, sex, SES, parental education, and intervention effects were controlled for. Numbers are standardized coefficients. Dashed line indicates non-significant path. * $p < .05$, ** $p < .01$, *** $p < .001$.

Discussions

This study extended research on victimization and weapons to adolescents in Nicaragua, a country experiencing high levels of violence during the study period. A cross-sectional survey of a large sample of early adolescents in Nicaragua was used to examine protective weapon purchase behavior and related factors. Weapon ownership is often a precursor to weapon-related behaviors, which could result in a range of physical and psychological problems, injuries, and even death of adolescents (Ford & Browning, 2014; Jaycox et al., 2002; Taylor et al., 2021; Turner et al., 2019). Thus, identifying the sources of weapon ownership not only helps us explain how and why this occurs, but also is an important first step in prevention.

In the context of high levels of violence and victimization, 23% of the Nicaraguan adolescents reported purchasing a weapon for self-protection. It should be noted that adolescents may acquire weapons by purchasing one themselves (Carter et al., 2013) or getting them from their parents/household (Hemenway, 2011) or friends (Carter et al., 2013). Our study only gathered information on protective weapon purchase, the actual rate of weapon possession in Nicaraguan adolescents may be even higher than this. This number is concerning given that adolescents who purposefully acquire or obtain weapons for self-protective purposes are more likely to engage in weapon-related behaviors, such as carrying weapons (Ash et al., 1996; Lizotte et al., 1994). Owning a weapon is known to increase the risk of violence perpetration and victimization (Lu & Temple, 2019; Pickett et al., 2005).

However, the findings should be interpreted within the country and historic context. Data were collected in 2019, one year following a civil crisis in Nicaragua. The

crisis unfolded as citizens protested increased taxes and decreased social security benefits. In response to protests, the Nicaraguan government sent the national police into the streets and violence ensued. Citizens continued to protest, holding rallies, barricading streets, and defending themselves. The death toll across a four-month period included 23 police and 332 citizens, among whom 27 were children and adolescents (Organization of American States, 2021). Without existing information on adolescent weapon purchase or ownership rates in Nicaragua in other years, it was unknown whether the high reports of weapon purchase in our Nicaraguan adolescent sample was a special case due to this historic event and adolescents' increased exposure to violence at the time of the study. It was also unknown if during this crisis, weapons were more accessible than usual for adolescent purchase. Future research is warranted.

Exposure to community violence has been linked to increased individual violence and weapon-related behaviors such as weapon carrying (Huesmann et al., 2021; Kravitz-Wirtz et al., 2022; Sokol et al., 2022). Contributing to existing literature, our study adds protective weapon purchase behavior to the list by finding adolescents exposed to community violence were more likely to purchase a weapon for self-protection and extends to the Nicaraguan context. Similarly, more frequent cyberbullying victimization was significantly associated with a higher likelihood of protective weapon purchase, even after controlling for community violence exposure, bullying victimization, and demographic characteristics. Prior research has found that adolescents who were cyberbullied were more likely to carry a weapon (Lu, Avellaneda, et al., 2019). These studies, however, did not dive into where and how adolescents got access to the weapons they carried. One study reported that adolescent cyberbullying victims were more

likely to report access to a loaded gun, measured as “could have gotten a loaded gun” (Simckes et al., 2017). However, the actual weapon access or weapon ownership was not examined. Our study addresses this literature gap and examines protective weapon purchase.

In explaining why violence victims are more likely to own or carry a weapon, the self-protection perspective (Kleck et al., 2011; Pierre, 2019) suggests that individuals may engage in weapon-related behaviors to protect themselves. The present study findings lend support to the self-protection perspective and suggest that victims of violence are more likely to seek protection by purchasing weapons. However, as prior research has suggested (Hemenway, 2011), such self-protective behavior may put them at an even greater risk of violence victimization and perpetration.

Another important contribution of the study is the identification of the mediating role of attitudes toward weapons. While the links between violence victimization and subsequent perpetration have been documented (Lu, Shorey, et al., 2019), the current study demonstrates that this effect is mediated by attitudes towards weapons such that those who are victimized are likely to have a more accepting attitude toward weapons (e.g., think weapons will help protect themselves), which increases their likelihood of purchasing a weapon. Together with prior research indicating the link between weapon ownership and violence perpetration and victimization (Lu & Temple, 2019; Pickett et al., 2005), the findings highlight the importance of violence prevention for adolescents to prevent further violence as well as interventions to guide adolescents on appropriate attitudes toward weapons. School-based violence prevention programs are a promising approach. Yet in Nicaragua specifically and Central American generally, evidence-based violence

prevention programs are rare, other than DsR (Pettigrew et al., 2023) and Miles de Manos [Thousands of Hands] which targets Honduras, El Salvador, and Guatemala (McClure et al., 2022). Prevention programs could utilize skill-based education, social norms approaches, and bystander trainings to influence adolescents’ attitudes toward weapons and violence.

Contrary to expectations from previous literature (Valdebenito et al., 2017), bullying victimization was not significantly associated with protective weapon purchase nor attitudes toward weapons. It is possible that with in-person bullying victimization, if an adolescent does not perceive the situation as dangerous or does not feel that a weapon may be helpful (e.g., if their weapon had been taken away by a bully), they may not purchase a weapon. On the other hand, a significant association was identified for cyberbullying victimization. Cyberbullying victims may purchase a weapon to protect themselves from in-person threats, since cyberbullies commonly use images depicting a weapon (e.g., gun, knife) or gun point gestures to threaten or intimidate a victim (Vishwamitra et al., 2021). Furthermore, unlike in-person bullying, cyberbullying often is anonymous and can have long-lasting effects (e.g., a destroyed reputation), thus making it more likely to prompt self-protection behaviors such as weapon purchase. Another alternative explanation is contextual. Because protests and responses were posted on social media during the civil crisis when the data were gathered, adolescents may have construed events as cyberbullying threats, which led to more sanguine attitudes toward violence and weapon purchasing behaviors. On a theoretical note, previous literature speculates that cyberbullying is simply an extension of in-person bullying (Kowalski et al., 2014). However, the present study found that bullying and cyberbullying victimization

had different relationships with protective weapon purchase. This finding suggests there may be different dynamics between bullying and cyberbullying, and their effects should be examined separately.

Limitations and Future Research Directions

Several limitations should be noted. First, the study only looked at protective weapon purchase. Adolescents may already have a weapon or have ready access to common household items (e.g., knives, machetes) as a weapon and thus have no need to purchase one. While common household items like knives and machetes are widely available and affordable for purchase in Nicaragua, most of the adolescents in our sample reported lower SES and may not purchase one. However, they may still acquire weapon access through other means (e.g., being gifted a weapon by or borrowing one from a family member or friend); the actual rates of weapon ownership or access thus could be higher than the 23% of weapon purchase. Future research should gather data that differentiate weapon purchase, ownership, and access in adolescents, and examine various reasons. Second, the study focused on purchasing behavior of weapons for self-protection purposes, but the subsequent use of these purchased weapons was unknown. Longitudinal data are needed to follow up with adolescents who have purchased weapons about their storage and use behaviors. Third, the study did not differentiate the types of weapons (e.g., knife vs. firearm) purchased. Given the different regulations in place for firearms and other types of weapons in Nicaragua and the scale of damage different types of weapons are capable of, future research is warranted. Fourth, the study utilized cross-sectional data and thus no causal inference can be made. Because our data are cross-sectional, we

cannot establish temporal precedence or confirm mediation; longitudinal data are needed to clarify these relationships. Fifth, we used MI to address missing data, which assumed the data were missing at random, an assumption commonly violated in datasets (Schafer & Graham, 2002). Finally, the study examined weapon behaviors among adolescents in Nicaragua, which is reliant on its cultural context and may not be generalizable to other populations.

Implications for Health Behavior Research

Protective weapon purchase, intended for self-help, may be perceived as emotionally beneficial (Asencio, Merrill, and Steiner, 2014), however, accessibility to weapons does not always serve that purpose well (Hemenway, 2011). Few studies have examined the purpose for purchasing a weapon (e.g., self-protection, revenge, recreational use; Kleck et al., 2011; Carter et al., 2013), but to our best knowledge, the present study is the first to examine factors associated with adolescent protective weapon purchase behaviors and has important implications for health intervention. Interpersonal, weapon-related injuries are preventable, and the present study findings provide several directions for prevention. A safe community and environment with little violence are essential in preventing adolescents from engaging in weapon purchase. Stricter regulation and monitoring of weapon purchasing are needed for the adolescent population. Violence intervention programs should target youth with cyberbullying victimization experiences. Training in alternative coping strategies (as opposed to weapon-related retaliation) is needed to curtail weapon ownership for victimized youth in neighborhoods with high violence incidence. Furthermore, school-based education

programs may benefit from targeting and addressing attitudes toward weapons to prevent weapon-related violence.

Discussion Questions

Our results indicated exposure to community violence and peer victimization can contribute to positive attitudes toward weapons, and in turn protective weapon purchase in adolescents. What strategies can be implemented for violence prevention?

Our study identified large incidences of protective weapon purchase behaviors in Nicaraguan adolescents following a national crisis. How can future research better understand the impact of national crisis on adolescent health outcomes?

Ethical Approval

The study procedure was approved by the institutional review board at Arizona State University.

Conflict of Interests

The authors have no conflict of interest to declare.

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