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Harmful Headlines For Whom? Exploring the Relationship
Between Mass Shooting-Related Content, Secondary Traumatic
Stress, and Resilience

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1. A Public Health Crisis in the U.S.

As digitalization expands, it is becoming progressively easier for the general public to be exposed to vivid depictions of distressing content (Liu & Liu, 2020). This study specifically focuses on secondary traumatic stress (STS)—a symptom of emotional duress that is caused by exposure to another’s trauma through secondary means—and its relationship to mass shooting content consumption.¹ Despite STS’s conceptual foundation, major questions remain about how different types of violence or trauma are associated with STS, how different STS subfactors (avoidance, arousal, and intrusion), rather than STS overall, relate to content consumption, and which moderating factors may shape this relationship.

Gun violence was chosen as the focus of this research because despite being painted repeatedly by American leaders as a significant issue, a wide gap persists between the prevalence of gun violence and academics’ focus on it (Topaz & Higdon, 2024). In June 2024, the United States (U.S.) Surgeon General declared gun violence a national public health crisis (U.S. Department of Health and Human Services, 2024), largely because of (a) how lethal guns are and (b) the increasing occurrence of gun violence in the U.S. While other weapons could be used to commit violent acts, guns substantially increase a perpetrator’s ability to kill: those who experience serious gun wounds are seven times more likely to die than those who experience severe knife wounds (Cook, 2018) or wounds from other blunt objects (Braga et al., 2021). About 2/3 of adults in the U.S. have experienced firsthand gun violence in some form (Semenza et al., 2025), and since 2020, gun violence has been the leading cause of death for American children aged 1 through 17 (Villarreal et al., 2024). More than half of Americans also report *frequently* being exposed to gun violence occurring outside their communities through traditional

¹ “Content,” rather than the term “media,” is used in this study to provide a broader “catch all” term for all material (spoken, written, video) and channels (social media, traditional media, etc.).

media sources and 1/3 report being exposed through social media channels (Semenza et al., 2025), pointing to even wider reaching effects than the 45,000+ people that die per year from gun-related injuries in the U.S. (Gramlich, 2025).²

Among the various forms of gun violence, mass shootings receive disproportionate media coverage and are especially likely to be disseminated online (Topaz & Higdon, 2024), making them a particularly probable source of indirect trauma for consumers. Specifically, Jashinsky et al. (2017) found that mass shootings dominate national news coverage, comprising 59% of articles on gun violence, while suicides, accidents, and forms of domestic violence involving guns attract far less attention. Though no universally accepted definition of “mass shooting” exists, this research goes with the Congressional Research Service’s definition of a mass shooting as an incident involving the murder of four or more individuals with firearms—excluding the shooter(s)—within a single occurrence (Krouse, 2015). This violence typically occurs in public spaces and is not linked to criminal activities, like gang violence.

The large volume of available content about or including mass shootings means more indirect exposure for consumers. For instance, hashtags like #SandyHook and #Parkland, referring to high-profile school shootings, generate hundreds of thousands of posts on platforms like Facebook and Instagram. These social media posts go into considerable detail and at times, garner substantial interaction from users; this aligns with research indicating that social media algorithms prioritize emotionally charged content, since it often generates higher engagement (Milli et al., 2025). *Figures 1-4* show the types of graphic images that appear on Instagram when one searches the hashtag #Parkland: these posts include political critiques of leaders not taking enough action against gun violence, images of the injuries of victims and survivors, various

² Racial disparities are also evident here. Gun-related suicides among Hispanic and Black teens significantly exceed those of their white peers, and Black children and teens have a homicide rate 18 times higher than that of their white peers (Villarreal et al., 2024).

reminders of the mass shooting, and firsthand videos with audible screams and gunshots from during the mass shooting.



Figure 1
Infographic highlighting Florida Governor Ron DeSantis's efforts to roll back gun violence prevention measures enacted after the Parkland mass shooting (@giffords_org, 2025).

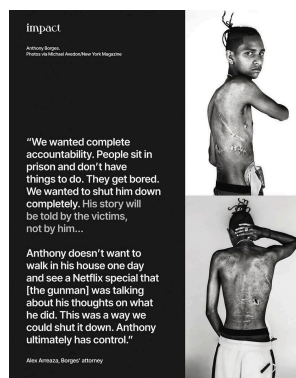


Figure 2
Photos of Anthony Borges, one of the injured victims of the Marjory Stoneman Douglas High School mass shooting, along with quotes from his lawyer regarding Borges winning the legal rights to the shooter's name (@impact, 2024). Note. Injuries on Borges's back can be seen.



Figure 3
Demolition crews are tearing down the classroom building at Marjory Stoneman Douglas High School, where a mass shooting happened (@foxnews, 2024).



Figure 4
Video taken by a student inside a classroom during the Marjory Stoneman Douglas High School shooting (@unfiltered.politics, 2018).

Mass shooting content is not limited to photos and videos: text depictions of mass shootings can be just as graphic. A 2023 article about a mass shooting from National Public Radio (NPR)—a news sources typically regarded as highly reliable (Ad Fontes Media, n.d.)—demonstrates the highly detailed nature of this coverage:

Engelbert and at least two other officers begin searching the school's first floor as an alarm blares. They check several rooms, including what appear to be classrooms. Some doors are locked, and the rooms are dark. Muffled gunshots can be heard in the background, and Engelbert and the other officers rush upstairs to the second floor. (Hernandez, 2023)

With evocative depictions of a violent scene made through phrases like “alarm blares,” “dark” rooms, and “muffled gunshots,” this excerpted media coverage presents violent events in a vivid and emotionalized manner that goes far beyond merely minimalistic descriptions: through such media coverage, consumers can “experience” the traumatizing event secondhand through numerous types of content.

Yet despite the widespread nature of gun violence-related content exposure, only a small number of studies investigate the relationship between STS and mass shooting content consumption. A few examples include Abdalla et al. (2021) and First et al. (2023) who found that exposure to news coverage of the Marjory Stoneman Douglas High School and Pulse Nightclub mass shootings, respectively, were positively linked to symptoms of STS. In addition to the necessity for more studies on STS, many existing studies do not look at how the STS sub-dimensions—avoidance, arousal, and intrusion (see Section 1.1)—differ across participants. Therefore, current literature also lacks a nuanced understanding of STS's effects.

In addition to the necessity for further studies on STS deriving from mass shooting content consumption, the widespread nature of violent content highlights the urgent need to better understand factors that might buffer adverse psychological effects of STS. One factor that has been highly studied in trauma research is resilience, a subjective quality which has been

identified as a critical protective mechanism against the development and severity of trauma-related symptoms (see Section 1.3). Some studies suggest that resilience negatively moderates the relationship between trauma exposure and STS. For example, Austin et al. (2018) found that emergency medical workers ($n = 54$) who exhibited higher resilience experienced significantly less STS ($p < 0.001$) from hearing about others' trauma. However, resilience has not been thoroughly examined for its potential buffering effects on STS resulting from *content* consumption. Considering the violence inherent to mass shooting content, it is crucial to investigate whether a teachable quality like resilience might mitigate the documented impact of this indirect trauma on consumers' mental health.

1.1 Introduction to Secondary Traumatic Stress

Trauma is a complex psychological phenomenon caused by substantially painful experiences that overwhelm one's ability to cope and weaken one's ability to feel "the spectrum of emotions and perspectives available to them" (Yoon et al., 2017). Trauma can result from singular, multiple, or long-lasting events and can affect individuals in varied ways: symptoms can include feelings of hopelessness, anxiety, physical arousal, depression, and intrusive recollections (Center for Substance Abuse Treatment, 2014). Emotional, pain, and alertness dysregulations can also occur due to changes because of the trauma in the brain's emotional control center (limbic system) and natural pain-relief center (endogenous opioid systems; Center for Substance Abuse Treatment, 2014). Collectively, these psychological and biological aspects show the multifaceted impact that trauma can have: it can fundamentally affect how a person thinks, feels, and functions.

Secondary trauma, in contrast, occurs when individuals experience emotional distress due to exposure to *another's* trauma. One of the earliest research insights into this idea was vicarious

trauma (VT), a term originally conceptualized in the 1990s by researchers McCann and Pearlman to describe the deep and lasting psychological shifts—such as increased feelings of guilt or apathy—that healthcare practitioners experienced from working closely and over long periods with trauma survivors (1990). Initial research on VT promoted the idea that trauma symptoms could occur due to secondary (seeing, hearing, reading) experiences, helping coin further concepts such as STS.

Similar to VT’s roots, psychologist Charles Figley popularized the concept behind STS in the 1990s to explain PTSD-like symptoms that developed in healthcare workers (Figley, 1995). Both STS and VT reflect what Figley (2013) describes as the “cost to caring.” Symptoms of STS include, but are not limited to, exhaustion, hypervigilance, avoidance, and emotional detachment (Baird & Kracen, 2006). According to Figley (1995), these indications of STS are generally categorized into 3 subdimensions:

- *Avoidance*: defined as the avoidance of triggers and emotions related to the traumatic narrative, such as refraining from people or activities that remind one of the trauma.
- *Arousal*: involves a heightened arousal in one’s environment, such as increased awareness of one’s surroundings.
- *Intrusion*: defined as re-experiencing emotions from the traumatic narrative, such as “reliving” the distressing events through nightmares.

While STS and VT are both terms that are frequently interchanged due to their overlapping symptoms and shared focus on an indirect exposure to trauma, there are several key differences between the two that resulted in STS being chosen as the focus of this study, rather than VT. For instance, exposure time to the trauma can be quite short and still result in STS (Baird & Kracen, 2006), reflecting typical content consumption behavior where individuals are

briefly exposed to traumatic materials. In contrast, VT is more gradual and cumulative, such as from a “psychotherapist bearing witness to years of sexual abuse” (Baird & Kracen, 2006). Further, STS is most often applied when analyzing content exposure (see Abdalla et al., 2021; First et al., 2023; Gökçen et al., 2024; Holman et al., 2014; Taskin et al., 2024; Thompson et al., 2019). These studies, conducted across various cultures, ages, and genders, support STS’s association to content consumption about violent topics and lay a strong groundwork for this study. Nevertheless, previous studies also reveal gaps that this study seeks to address, such as the lack of separate consideration of STS subfactors—which have different manifestations and consequences—as well as the limited analysis of potential moderating factors.

1. Introduction to Resilience

The idea of resilience primarily gained traction in the 1970s (Reich et al., 2010), as researchers began to move towards focusing on strength-based models of psychological processes (Masten, 2009). There are a wide variety of definitions of resilience (Terrana & Al-Delaimy, 2023), but there is agreement across the research that resilience involves healthy adaptation and well-being, regardless of adversity or threat (Luthar et al., 2015).

Resilience was chosen as the moderator for this study for several reasons. For one, resilience is a common concept in trauma research (Crouch et al., 2018). Yet, whether resilience also plays a role when it comes to secondary trauma deriving from content has yet to be explored. Secondly, the literature suggests that resilience can be developed or strengthened through certain factors (social support, improved coping skills, etc.). The American Psychological Association (APA) even recommends various ways to “build resilience,” such as through social connections, fostering wellness, finding purpose, embracing healthy thoughts, and seeking help (APA, 2020). In this regard, resilience is both an intrinsic and developable factor

that can be cultivated. Thirdly, this research aligns with the growing movement in psychology toward strength-based models. In the late 1990s, Martin Seligman coined the term *positive psychology* to describe a branch of psychology focused on mental wellness that focuses on concepts such as resilience (Wilkinson & Chilton, 2017). Nearly three decades after its initial establishment, positive psychology is now taught in universities around the world, supported by journals such as the *Journal of Positive Psychology*, and funded by major institutions like the National Institutes of Health (NIH) and the U.S. Army (Wilkinson & Chilton, 2017). Therefore, this study's focus on resilience is both timely and aligned with modern research trends in psychology.

Contemporary research in the field of resiliency distinguishes between two interrelated categories: (a) promotive factors and (b) protective factors. Promotive factors indicate higher levels of positive outcomes, while protective factors—including social support, social skills, prioritizing and planning behavior, and goal efficacy—are associated with lower levels of psychological symptoms and decrease the likelihood of experiencing mental health problems (Patel & Goodman, 2007). Research suggests that protective factors may help reduce the likelihood of adverse experiences and may be linked to “breaking the cycle” of trauma (Crouch et al., 2018). It is clear that promotive and protective factors, to a degree, overlap. As protective factors are generally seen to act as a buffer, this study operationalizes resilience by focusing on promotive factors.

Considering content consumption, STS, and resilience (promotive factors), this study seeks to provide descriptive and nuanced insights into Americans' relationship with mass shooting content. It is guided by two hypotheses and one descriptive research question. Based on recent findings by Thompson et al. (2019), Abdalla et al. (2021), First et al. (2023), and others,

the first hypothesis (H1) predicts a positive relationship between exposure to mass shooting content and STS symptoms. The second hypothesis (H2) posits that resilience factors negatively moderate this relationship, as illustrated by *Figure 5*. The third research question (RQ3) explores how U.S. adults consume content about mass shootings. Subquestions for RQ3 analyze how often and intentionally participants consume mass shooting content, where they access this type of content, their views on where mass shootings usually occur, and which incidents they recall most.

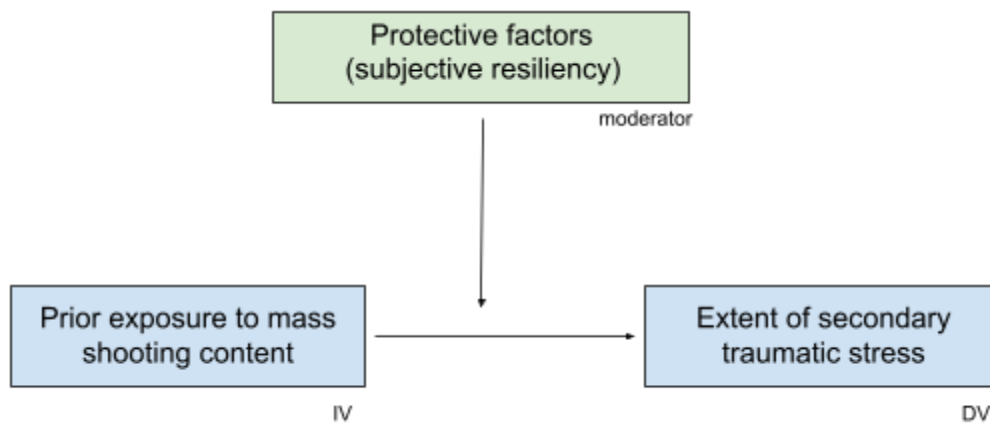


Figure 5

The postulated relationship between mass shooting content exposure (IV), STS (DV), and resilience (moderator).

Note. It is hypothesized that higher resilience levels are associated with lower STS symptoms.

2. Methodology

To test the relationship between mass shooting content consumption, STS (including subfactors), and resilience (including subfactors), and to obtain descriptive data regarding mass shooting content consumption and perceptions, a cross-sectional online survey was conducted. The survey was administered via SoSci, an online survey tool. Statistical analyses were performed, and all figures except *Figures 1-4* were created in R using the RStudio environment (see Appendix C for key code excerpts and Appendix A for aid disclosure). GPT-4o was used as

an assistance tool (see Appendix A). Prior to distribution, the survey received approval from the Institutional Review Board of the University of Vienna, ensuring that the study met the university's ethical standards and minimized the potential of psychological distress for participants.

2.1 Sample

The obtained convenience sample consists of 52 individuals aged 18 years of age or older who identify as U.S. citizens or nationals. Given the sensitive and violent nature of gun violence, a conservative pre-screening process was implemented, resulting in a notable number of individuals ($n = 101$) being unable to fully complete the survey. Participants were excluded if they were under 18, not U.S. citizens or nationals, failed attention checks requiring them to identify a color and a food item, or reported recent psychological distress (see Section 2.2). Ages ranged from 18 to 70, with a mean age of 35 ($\bar{x} = 35.30$, $SD = 13.55$).³ The majority of participants fell within the 18-30 age range. 30.77% of participants identified as male, and 69.23% as female. Note that for demographics, additional options (such as non-binary for gender) were provided to capture diverse responses.

Participants' highest level of educational attainment was as follows: 3.85% had a high school diploma, 3.85% held an associate's degree, 46.15% held a bachelor's degree, 30.77% held a master's degree, 7.69% held a doctorate, 3.85% held a law degree, and 3.85% held a medical degree. Only 5.77% reported current student status. Political affiliation was predominantly Democrat (63.46%), with Independents comprising 19.23%, Republicans 9.62%, and smaller percentages identifying as Other (5.77%) or Libertarian (1.92%). Participants' current residences were domestically and internationally varied, with current residences as follows: Alabama

³ Originally provided in categorical ranges, age data were converted into numerical values using the midpoints of each category for analysis purposes (ex: "81-90" was re-coded as 85.5).

(1.92%), California (3.85%), Florida (1.92%), Georgia (11.54%), Illinois (1.92%), Louisiana (7.69%), Maryland (3.85%), Minnesota (1.92%), New Jersey (5.77%), New York (1.92%), North Carolina (3.85%), Pennsylvania (7.69%), Tennessee (1.92%), Texas (3.85%), Virginia (15.38%), U.S. Virgin Islands (1.92%), and outside of the U.S. (21.15%). 1 participant preferred to not disclose their current location. Studies indicate that lottery-style incentives increase response rate, representativeness, and the rate of completed responses (Olsen et al., 2012). Thus, a lottery raffle was conducted for a \$50 gift card for the e-commerce site Etsy to encourage participation.

2.2 Procedure

To assess psychological distress, participants completed the Patient Health Questionnaire-9 (PHQ-9; Kroenke et al., 2001) and the Primary Care PTSD Screen for DSM-5 (PC-PTSD-5; Prins et al., 2016). Individuals reporting low interest or pleasure in activities, depressive symptoms, thoughts of self-harm, or trauma-related symptoms—including intrusive memories, avoidance, hypervigilance, emotional numbness, or self-blame—over the past four weeks were excluded. Participants who had experienced trauma but had not received psychological counseling were also disqualified. Exclusion was conservative to facilitate ethics board approval and minimize the risk of psychological harm to participants. Moreover, considering that nearly two-thirds of U.S. adults have been personally affected by gun violence (Semenza et al., 2025), such precautions were justified.

Before beginning the survey, participants were shown an informed consent form outlining the study's purpose, emphasizing that participation was voluntary, and informing them that they could exit the survey at any time. Additionally, participants received an information brochure containing more general details about the survey and data protection policies. Contact information was also provided, including free mental health resources—such as the Suicide &

Crisis Lifeline—ethics contacts, the university’s Data Protection Officer, and the Principal Investigator. Content warnings were also given in the introductory sections to emphasize the study’s focus on mass shooting content.

At the end of the survey, participants were shown a debriefing form thanking them for their participation, restating the purpose of the study, and again providing free mental health resources.

Throughout the survey, terms of interest were also clearly explained as follows:

- *Traumatic event*: an event that is unusual or particularly frightening, horrible, or traumatic, such as sexual assault or witnessing someone being killed.
- *Content*: social media posts, podcasts, magazine articles, news articles, movies, or any other way information is shared, online or offline.
- *Mass shooting*: an event where at least 4 people are killed by a gun at one time. These shootings can include a wide-range of motivations, such as mental health crises, ideological extremism, and domestic violence.
- *Content exposure*: seeing, reading, watching or hearing content, on any platform, for any duration of time.

These definitions helped ensure consistent understanding among participants.

2.3 Measures

2.3.1 Content Consumption

A comprehensive single-item was used to measure intentional and unintentional content consumption across all platforms: “On average, how many times per week do you see, hear, watch, or read content about mass shootings from any source...?” Research shows that single-item measures can be a valid and reliable measurement for unidimensional constructs,

especially when constructs are simple and clear (Allen et al., 2022). “Per week” was chosen as the specified time span because it offers a balance between recency and recall: participants can reflect on a period that is recent enough to remember, but long enough to likely yield responses other than zero. Shorter durations could be too short to capture exposure.

2.3.2 Secondary Traumatic Stress Factors

To measure STS, this study utilized the Secondary Traumatic Stress Scale self-report measure (STSS; Bride et al., 2004), which is recognized as one of the two most commonly used instruments for measuring STS (Jang et al., 2023). The scale consists of 17 Likert-type items, each scored from 1 to 5, resulting in a total possible score ranging from 17 to 85. Participants rated statements describing things that might happen on an average day, such as “My heart started pounding when I thought about things I’ve seen on social media.” The scale measures STS through measuring 3 sub-dimensions: avoidance, arousal, and intrusion (Bride et al., 2004). This study referenced Mancini’s STSS-SM, a slightly modified version of the original STSS designed to measure STS from social media exposure (Mancini, 2019).

In this study, the STSS was conceptualized as a two-factor model, differentiating between (a) intrusion and (b) a combined avoidance-arousal factor. This decision was based on more modern research utilizing confirmatory factor analyses and exploratory structural equation modeling supporting a two-factor structure, which provided the strongest factorial validity (Jacobs et al., 2019). Additional studies reported difficulties in differentiating between avoidance and arousal when measuring post-traumatic stress symptoms (Benuto et al., 2018; Mirsaleh et al., 2014; Setti, 2012, Jacobs et al., 2019), further supporting the use of a two-factor model.

Evidence was found for the scale’s reliability, as well as its convergent, discriminant, and factorial validity (Bride et al., 2004). Cronbach’s α of the entire scale is .95, indicating a high

level of internal consistency (Balcı Celik & Altınışık, 2021). The STS scale also demonstrated good internal consistency for the current sample, with an α of .88. Previous studies, such as Taskin et al.'s (2024), also used self-report measures to obtain STS scores, validating the widespread use and acceptance of self-report measures in similar research.

2.3.3 Resilience Factors

The Scale of Protective Factors (SPF), developed by Ponce-Garcia et al. (2015), is a widely used instrument to measure self-reported resilience across various demographics and cultures (Ponce-Garcia & Madewell, 2024). The SPF evaluates both cognitive aspects of resilience, including planning behavior and goal efficacy, and social dimensions, including social support and interpersonal skills. The scale consists of 24 Likert-type items, each rated on a 5-point scale. An example item includes, "I am confident in my ability to achieve goals." Ponce-Garcia et al. (2015) reported strong internal consistency for the SPF, with α coefficient values for the subscales ranging from .86 to .92. In the current study, the SPF similarly demonstrated good internal consistency, with an α of .85.

2.3.4 Additional Measures

Throughout the survey, additional descriptive data were collected to gain a more detailed understanding of how Americans consume and perceive content related to mass shootings. To understand their perceptions about mass shootings, participants were asked where they think mass shootings usually occur, which specific mass shootings come to mind when prompted, and how often they think about mass shootings on a daily basis. Furthermore, to contextualize content consumption habits, participants reported how often they consume various types of media and whether their mass shooting consumption was usually intentional. At the end of the

survey, participants were given the opportunity via an open-text box to share any thoughts or comments they had regarding the survey and topics mentioned.

2.4 Statistical Analyses

The dataset was cleaned by removing invalid or missing responses. Then, a simple linear regression analysis was conducted between mass shooting content exposure overall and STS scores as a whole. Next, regression tests were conducted between mass shooting content consumption and the STS subscales, avoidance-arousal and intrusion. Next, moderation analyses using linear regression were run, with overall resilience included as the moderator. Hierarchical regression analyses were then done to examine the resilience subfactors, perceived social support, social skills, planning behavior, and goal efficacy. In all moderation analyses, the predictors were also centered to reduce multicollinearity and simplify the interpretation of the coefficients.

3. Results

3.1 Exploratory Results

Content consumption: On average, participants reported consuming 2.12 hours of TV per day ($SD = 4.66$), 6.19 hours of online content per day ($SD = 6.59$), and 1.72 hours of news per day ($SD = 2.09$).

Mass shooting content consumption: Participants reported consuming (seeing, hearing, watching, or reading) content about mass shootings from any source, including intentionally or unintentionally, approximately 1 time a week ($\bar{x} = 1.12$, $SD = .96$).

*Specific sources of mass shooting content:*⁴ The most common sources for mass shooting content were Cable News Network (CNN; $n = 17$), New York Times (NYT; $n = 11$), Columbia

⁴ For some questions, participants could select several responses.

Broadcasting System (CBS; $n = 5$), and American Broadcasting Company ($n = 5$). *Figure 6* illustrates which sources participants wrote in.

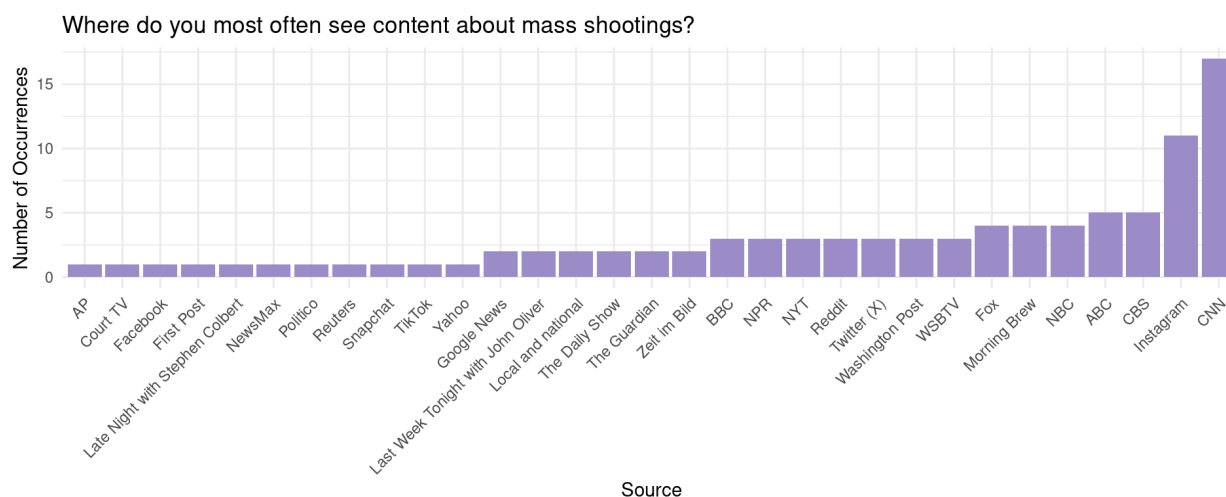


Figure 6

Bar chart indicating through which sources participants usually see content about mass shootings.

Note. Answers were given through an open-text box. The y-axis shows how many times participants wrote in the option, and the x-axis lists the different sources they specified.

Specific locations of mass shooting content exposure: Online newspapers highly surpassed other options as the most common place where participants are exposed to mass shooting content ($n = 25$). Facebook was the second most common ($n = 17$), followed by Instagram ($n = 16$). *Figure 7* illustrates the locations participants selected.

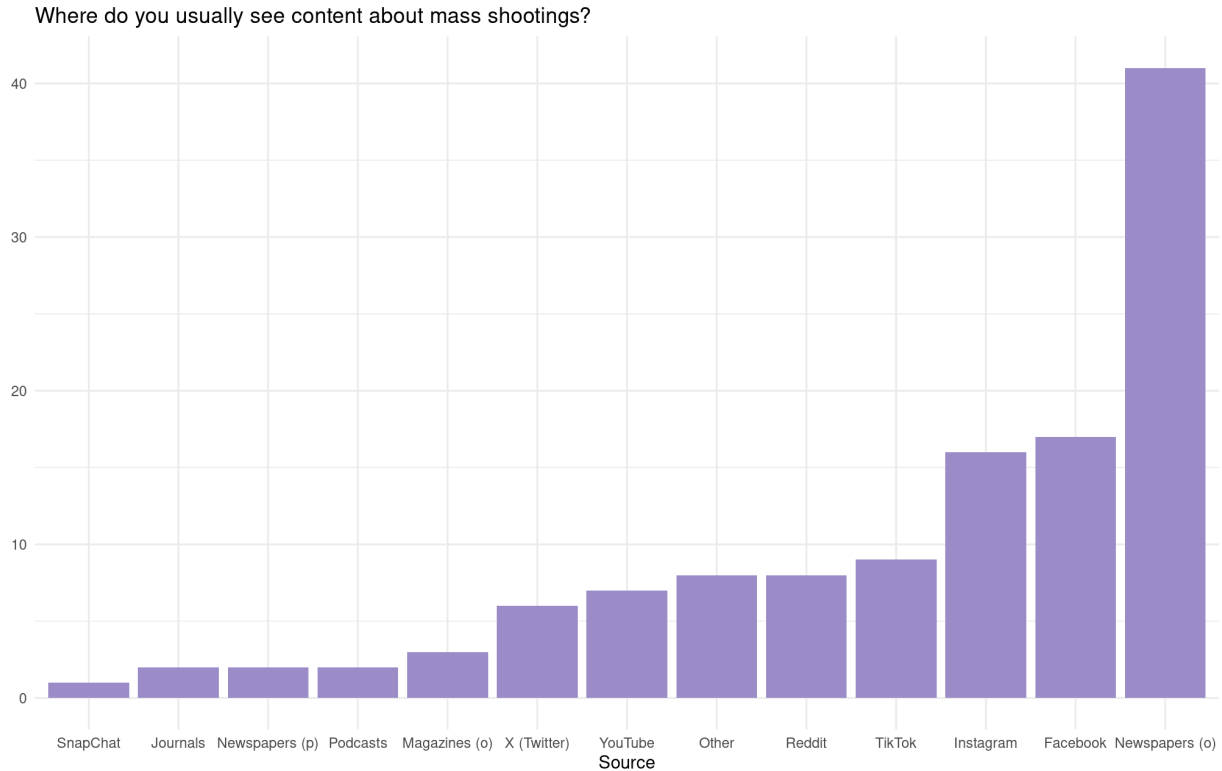


Figure 7

Bar chart indicating the locations where participants usually see content about mass shootings. Note. “O” refers to online content, and “p” refers to physical content, such as handheld newspapers. The y-axis shows how many times participants selected each option, and the x-axis lists the different locations of mass shooting content.

Where participants think that mass shootings usually occur: By and large, participants believe that mass shootings most often occur at elementary, middle, or high schools ($n = 51$), as illustrated in *Figure 8*. Next, they chose workplaces ($n = 21$) and colleges ($n = 20$) as the most common places mass shootings occur.

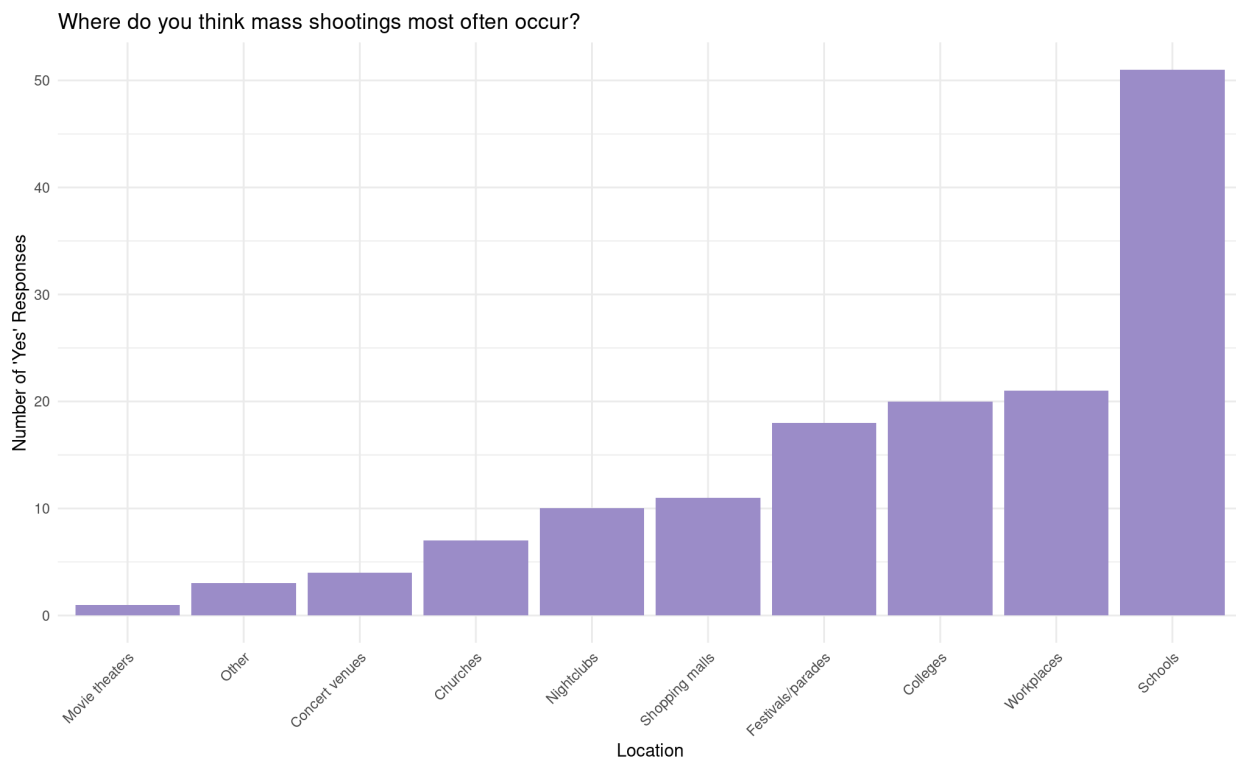


Figure 8

Bar chart showing at which locations participants think that mass shootings typically take place. Note. The y-axis shows how many times participants selected each option, and the x-axis lists the different locations.

Most recalled mass shootings: Through an open-text box, participants most often recalled mass shootings that occurred in schools, with the top 3 overall selections being Columbine High School (1999) ($n = 27$), Sandy Hook Elementary (2012) ($n = 26$), and Marjory Stoneman Douglas High School (2018) ($n = 12$). *Figure 9* illustrates the mass shooting incidents participants wrote in. Note that not all shootings that participants wrote in here are “mass shootings” according to the study’s definition (four or more people killed at once), but they were included to still capture participants’ associations with mass shootings.

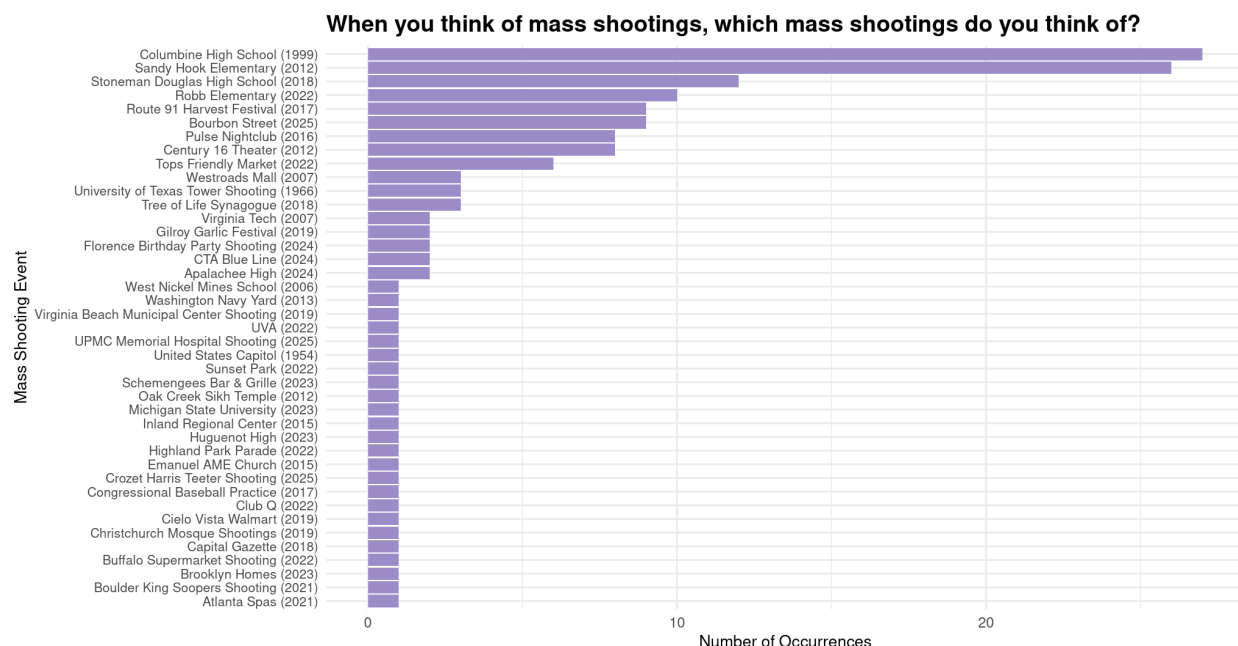


Figure 9

Bar chart indicating which mass shootings participants recalled when prompted.

Note. The y-axis shows the specific shootings written in, and the x-axis displays the number of times each mass shooting was mentioned.

Intentional vs. Unintentional: When participants were asked whether they usually consume mass shooting content intentionally or unintentionally, only 7.7% of mass shooting content consumption was rated as intentional.

Correlation between daily mass shooting thought and mass shooting content exposure:

There is a statistically significant, moderately positive correlation between the frequency of thinking about mass shootings on a daily basis and mass shooting content exposure ($r = 0.30, p = .033$). This suggests that as media exposure increases, so does concern about daily mass shootings. This relationship can be seen in *Figure 10*.

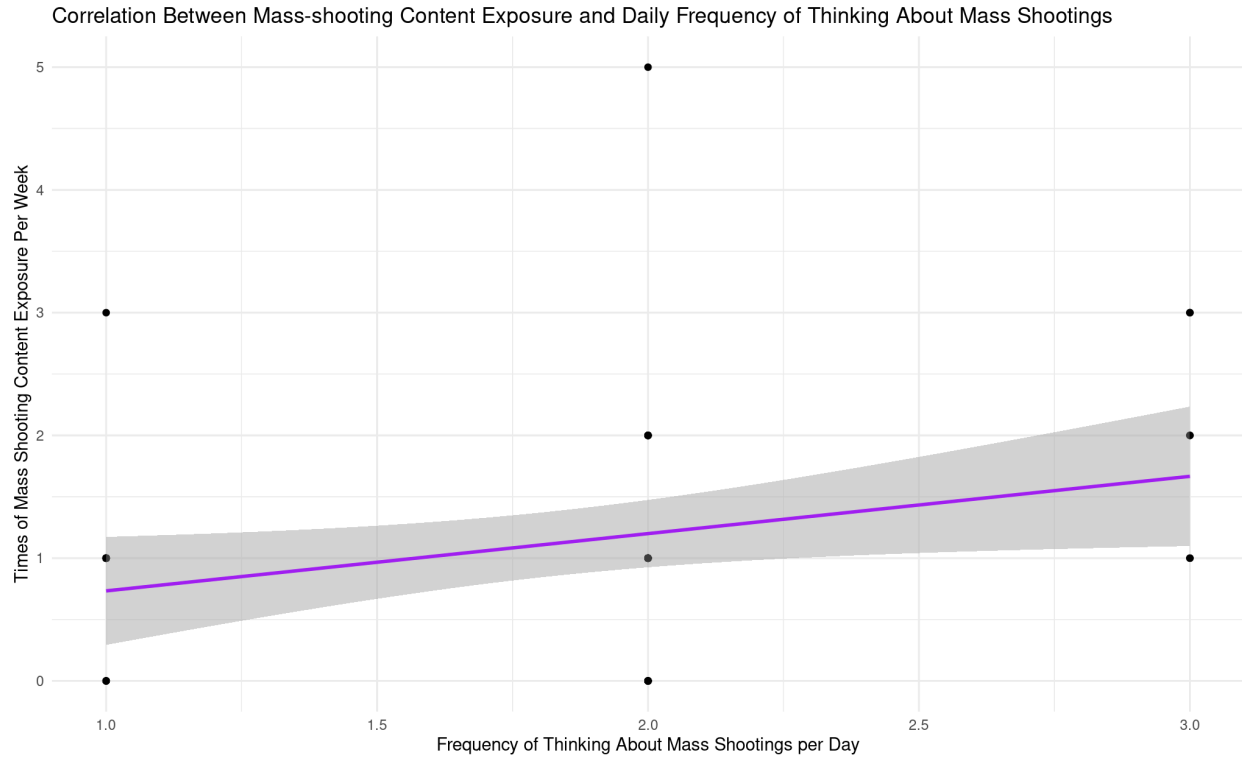


Figure 10

Scatter plot displaying the relationship between the daily frequency of thinking about mass shootings and weekly exposure to mass shooting content.

Note. The x-axis represents how frequently participants thought about mass shootings on an average day, while the y-axis shows the estimated weekly exposure to mass shooting content. Fewer dots than participants are visible due to overlapping data points.

3.2 Mass Shooting Content Consumption and Secondary Traumatic Stress

A regression analysis revealed that mass shooting content consumption was significantly associated with STS scores ($b = 0.19, p = .043$). These results show that for every one-unit increase in content consumption, there is an estimated 0.19-point increase in STS scores. While the effect size is small (adjusted $R^2 = .08$), this relationship is statistically significant. *Figure 11* illustrates this association.

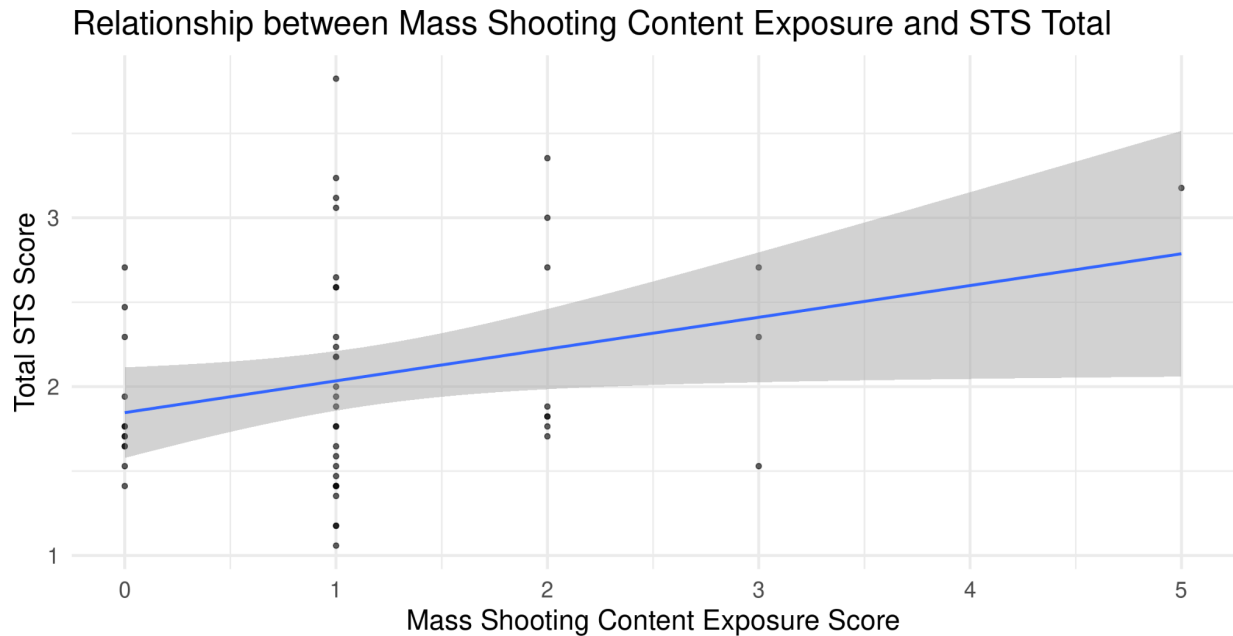


Figure 11

Scatter plot illustrating the relationship between mass shooting content exposure and STS.

Note. The x-axis shows how many times participants reported consuming mass shooting content during a typical week, while the y-axis displays their average Secondary Traumatic Stress (STS) scores, ranging from 1 to 5, with most scores falling below 3. Each dot represents an individual participant's data.

Separate linear regression models were used to examine whether mass shooting content exposure predicted two subdimensions of STS symptoms: avoidant-arousal and intrusion.

Results as seen in *Figure 12* showed that content exposure was a significant predictor of avoidant-arousal symptoms ($b = 0.18, p = .038$), showing that increased media exposure was associated with higher avoidant-arousal scores. However, content exposure did not significantly predict intrusion symptoms ($b = 0.20, p = .101$).

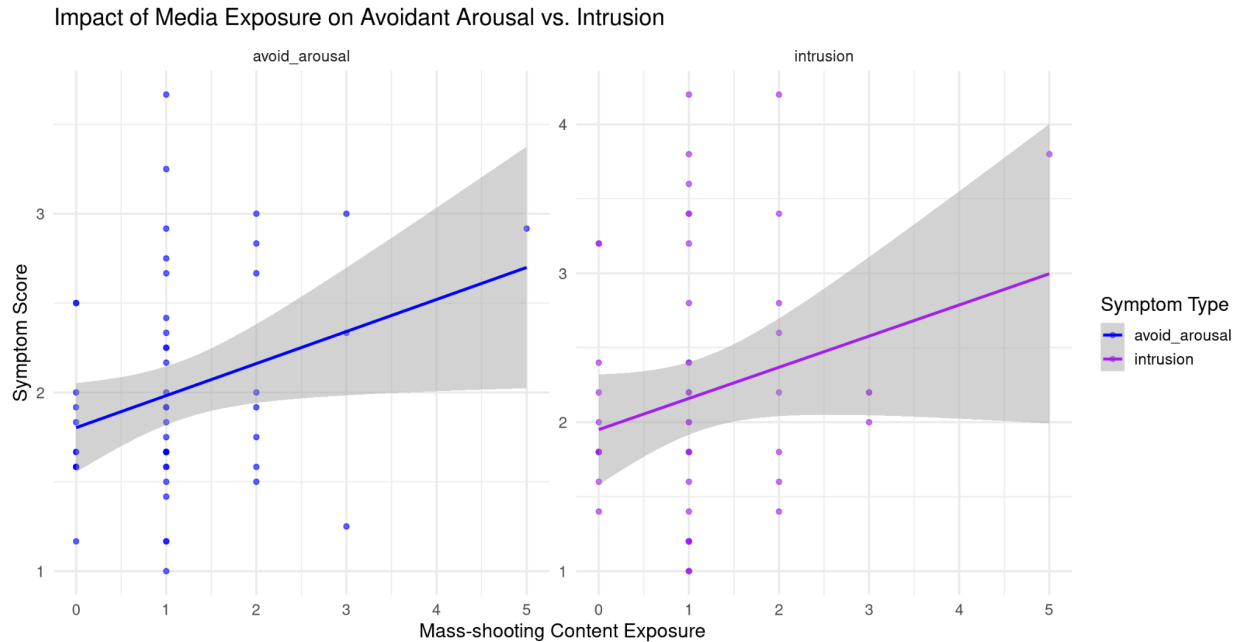


Figure 12

Scatter plots illustrating the relationship between mass shooting content exposure and the STS subscales: avoidance-arousal and intrusion.

Note. The x-axis for the blue graph on the left shows how many times participants reported consuming mass shooting content during a typical week, while the y-axis displays their average avoidance-arousal (STS) scores, ranging from 1 to 5, with most scores falling below 3. The x-axis for the purple graph on the right shows how many times participants reported consuming mass shooting content during a typical week, while the y-axis displays their average intrusion (STS) scores, ranging from 1 to 5, with most scores falling below 3. Each dot represents an individual participant's data, and the trend line shows the overall relationship between exposure and STS.

3.3 Resilience and Secondary Traumatic Stress

No multicollinearity issues were present between mass shooting content exposure, resilience, and their interaction term (all VIFs < 1.1), suggesting no significant multicollinearity issues in the moderation analysis. The moderation analysis looking at resilience overall as a moderator in the content consumption and STS relationship revealed that the interaction term between mass shooting content exposure and resilience was not statistically significant ($p = .03$, $p = .908$). The R-squared ($R^2 = .09$) suggests that after accounting for the model's predictors, only

about 9% of the variation in the STS results is explained by resilience and mass shooting content exposure. Conversely to what was expected, higher resilience levels actually correlated with higher levels of STS, as seen in *Figure 13*.

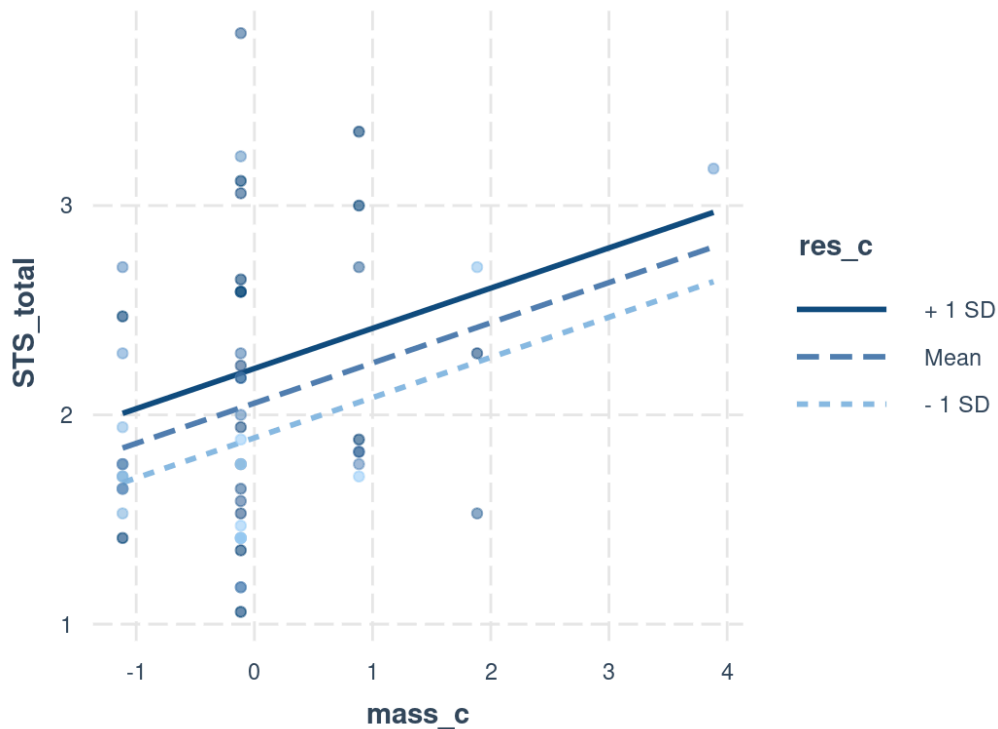


Figure 13

Moderation analysis plot displaying the relationship between STS and mass shooting content exposure, and how STS changes depending on the level of resilience (operationalized as protective factors).

Note. The x-axis shows the level of mass shooting content exposure, and the y-axis shows STS scores. The different dots represent individual data points. As seen in the dark blue line (1 *SD* above the mean), those with higher protective factor levels actually experienced higher STS scores, which increase with mass shooting content exposure (see key on the right-hand side).

To examine whether the different protective factors of resilience moderate the relationship between mass shooting content consumption and STS, four separate models were tested using hierarchical regression analyses. Variables were centered to reduce multicollinearity. Each moderated regression analysis model included a centered mass shooting content exposure variable, a centered protective factor, and an interaction term representing the product of the two.

Model 2 assessed the moderating effect of perceived social support on the relationship between mass shooting content consumption and STS. No multicollinearity issues were present between the variables (all VIFs < 1.1). The interaction term between social support and mass shooting content exposure was not statistically significant ($b = 0.01$, $p = .908$), suggesting that social support did not have a moderating effect on STS. Overall, this model explained approximately 14% of the variance in STS (adjusted $R^2 = .14$), the highest out of the 4 subfactors. Again with an unexpected outcome, higher social support actually correlated with higher levels of STS, as seen in *Figure 14*.

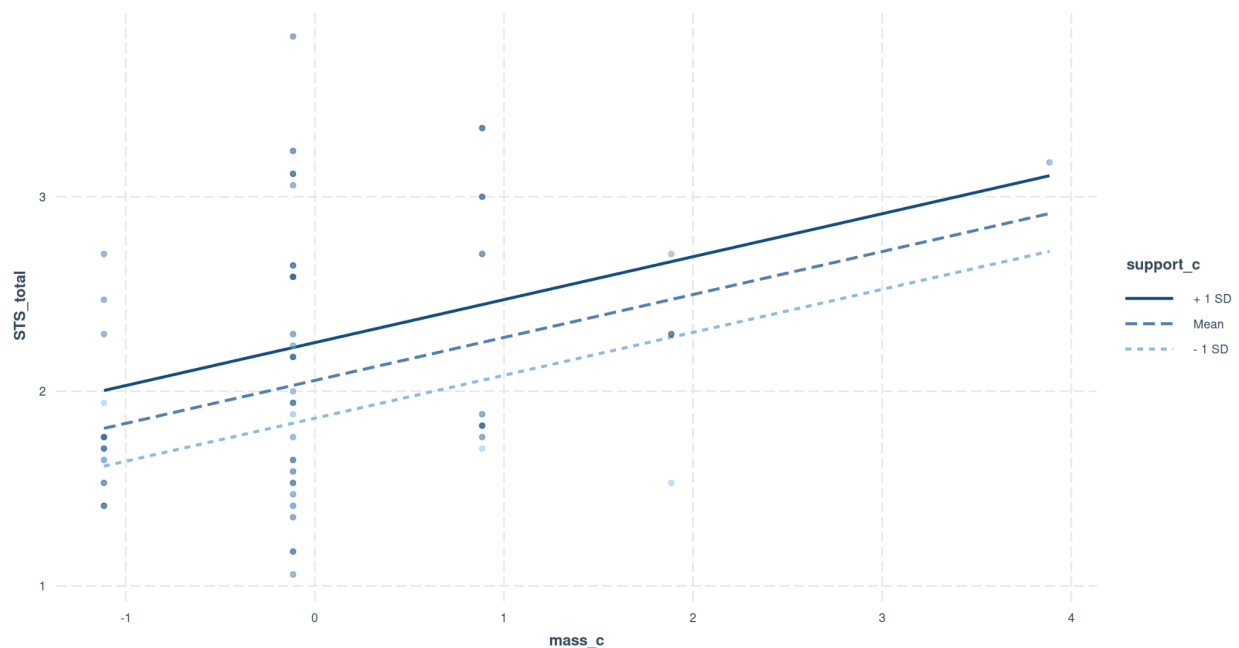


Figure 14

Moderation analysis plot displaying the relationship between STS and mass shooting content exposure and how STS changes depending on the level of perceived social support.

Note. The x-axis shows the level of mass shooting content exposure, and the y-axis shows STS scores. As seen in the dark blue line, those with higher perceived social support (1 *SD* above the mean) levels actually experienced higher STS scores, which increase with mass shooting content exposure (see key on the right-hand side).

Model 3 assessed the moderating effect of social skills on the relationship between mass shooting content consumption and STS. No multicollinearity issues were present between the variables (all VIFs < 1.3). The interaction term between social skills and mass shooting content exposure was not statistically significant ($b = 0.01, p = .938$), indicating no moderation effect. Overall, this model explained approximately 9% of the variance in STS (adjusted $R^2 = .09$). Similar to Model 2, higher social skills surprisingly correlated with higher STS levels, as seen in *Figure 15*.

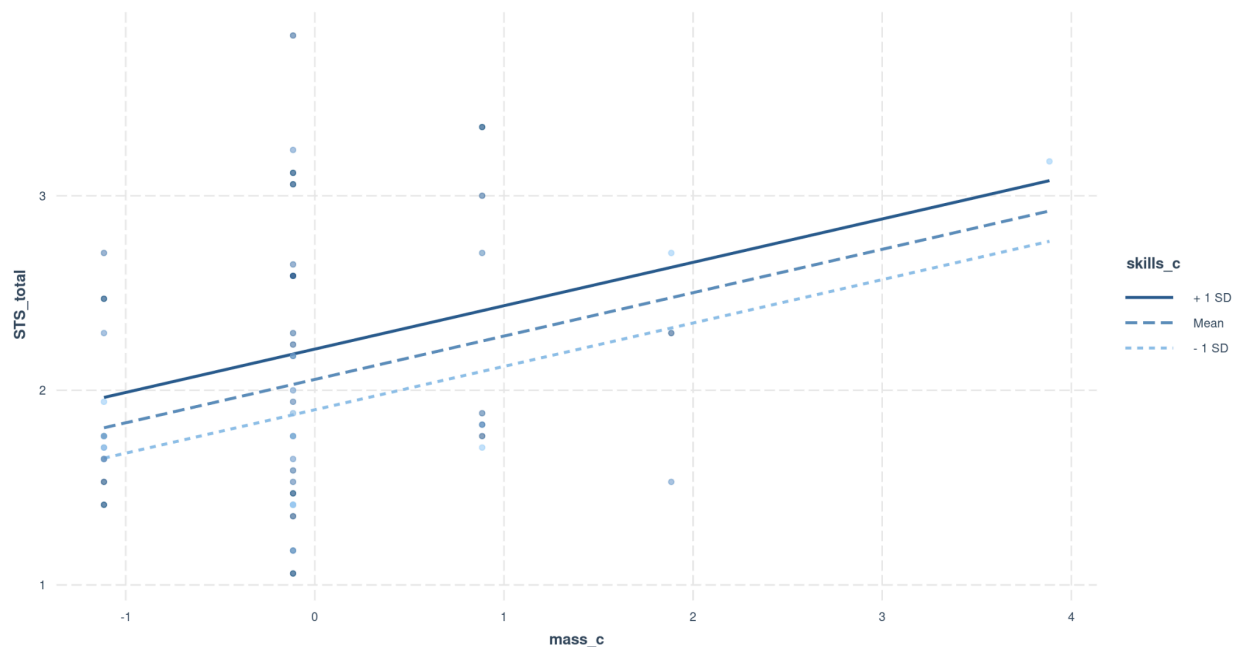


Figure 15

Moderation analysis plot displaying the relationship between STS and mass shooting content exposure and how STS changes depending on the level of social skills.

Note. The x-axis shows the level of mass shooting content exposure, and the y-axis shows STS scores. As seen in the dark blue line, those with higher perceived social skills (1 SD above the mean) levels actually experienced higher STS scores, which increase with mass shooting content exposure (see key on the right-hand side).

Model 4 assessed the moderating effect of planning behavior on the relationship between mass shooting content consumption and STS. No multicollinearity issues were present between the variables in Model 4 (all VIFs < 1.2). The interaction term between planning behavior and mass shooting content exposure was also not statistically significant ($b = -0.09, p = .533$), indicating that planning behavior did not moderate the relationship between mass shooting content exposure and STS. Overall, this model explained approximately 5% of the variance in STS (adjusted $R^2 = .05$). Similar to previous models, higher planning behavior was associated with slightly increased STS symptoms, as seen in *Figure 16*.

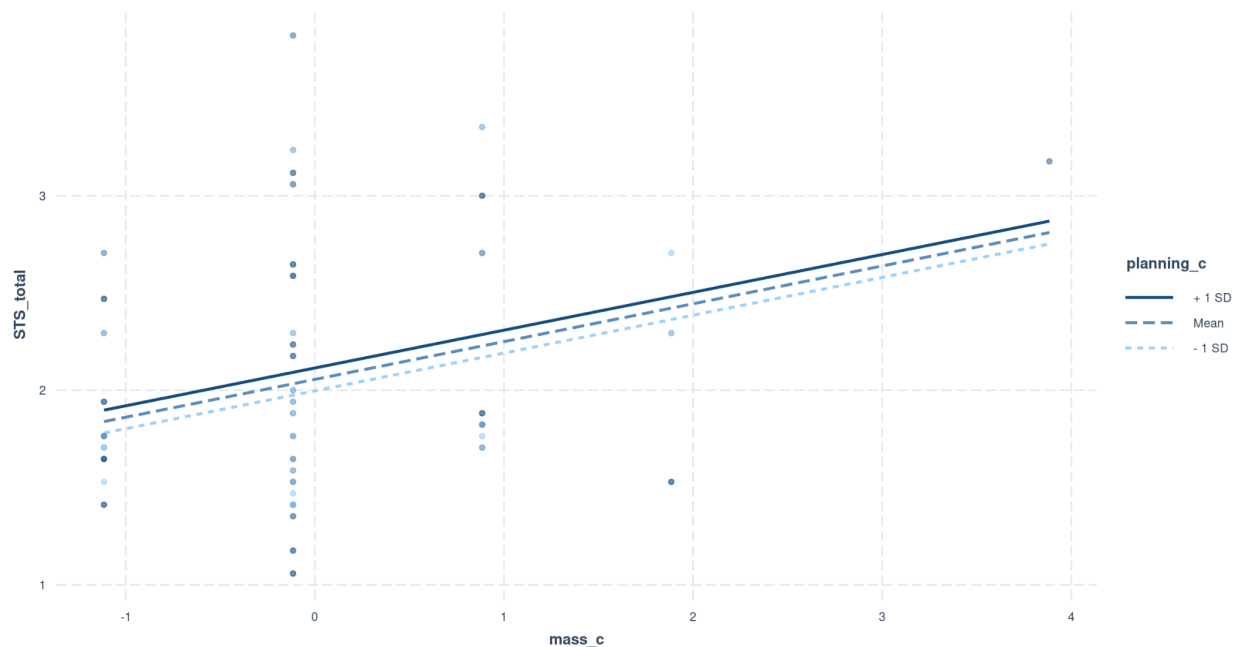


Figure 16

Moderation analysis plot displaying the relationship between STS and mass shooting content exposure and how STS changes depending on the level of planning behavior.

Note. The x-axis shows the level of mass shooting content exposure, and the y-axis shows STS scores. As seen in the dark blue line, those with higher planning behavior (1 SD above the mean) levels actually experienced higher STS scores, which increase with mass shooting content exposure (see key on the right-hand side).

Model 5 evaluated the moderating effect of self-efficacy on the relationship between mass shooting content consumption and STS. No multicollinearity issues were present between the variables (all VIFs < 1.1). The interaction term between self-efficacy and mass shooting content exposure was not statistically significant ($b = -0.01, p = .974$), indicating no moderation effect. Overall, this model explained approximately 2% of the variance in STS (adjusted $R^2 = .02$), the lowest among the four subfactor models. Similar to the previously tested models, higher levels of self-efficacy did not appear to reduce the effects of STS, as shown in *Figure 17*.

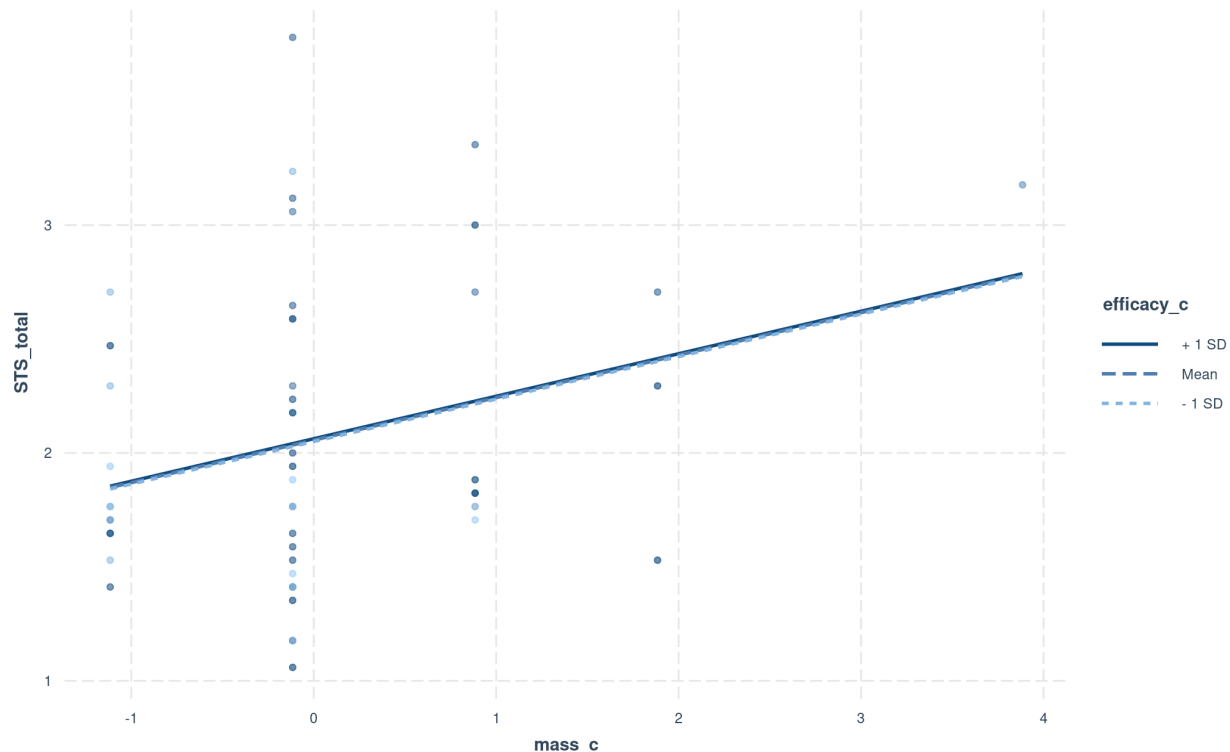


Figure 17

Moderation analysis plot displaying the relationship between STS and mass shooting content exposure and how STS changes depending on the level of goal efficacy.

Note. The x-axis shows the level of mass shooting content exposure, and the y-axis shows STS scores. As seen in the dark blue line, those with higher goal efficacy (1 SD above the mean) levels actually experienced higher STS scores, which increase with mass shooting content exposure (see key on the right-hand side).

Across all models, mass shooting content exposure consistently predicted increased STS symptoms. However, none of the four resilience subcomponents—social support, social skills, planning behavior, or goal efficacy—significantly moderated this relationship. These conclusions are supported by the models' non-significant interaction terms and delta R-squared (ΔR^2) results. The latter explains how changes in STS can be explained by adding protective factors to the model. The addition of interaction terms explained minimal additional variance across models (ΔR^2 s ranged from .0000 to .0394; all $p > .13$).

4. Discussion

4.1 Key Findings

Other public health crises have been extensively covered in the media, but mass shootings are a noteworthy topic of study in media psychology in that they (a) have persisted for decades in the U.S., and (b) are indiscriminate. Despite the salient nature of gun violence in the U.S., however, there is little research on the psychological toll of mass shooting content, and the already existing research has notable gaps. The present study sought to provide deeper insights into Americans' relationship with mass shooting content by looking at how mass shooting content in a general sample correlates with STS and whether resilience moderates this relationship. Through looking at subfactors of STS and resilience, this study also took a more nuanced approach to analyzing these relationships. Further, information was obtained regarding general perceptions of mass shootings and how and where mass shooting content is consumed.

H1 predicted a positive relationship between mass shooting content consumption and STS. As expected, it was found that individual levels of mass shooting content consumption significantly predicted STS scores, confirming H1 ($p = .043$). Overall, the positive significant relationship between mass shooting content consumption and STS suggests that **repeated**

exposure over time has not necessarily led to widespread desensitization to mass shootings.

Rather, the data suggest that seeing, hearing, or reading mass shooting content remains impactful. This is confirmed by the regression analysis revealing the **positive relationship between mass shooting content consumption and the frequency one thinks about mass shootings on a daily basis** ($p = .033$).

Notably, when STS subscales were analyzed, rather than overall STS, the relationship between content exposure and avoidant-arousal symptoms was positive ($p = .038$), while the relationship with intrusion symptoms was not ($p = .101$). These findings provide evidence to suggest that **consumers are not necessarily traumatically re-experiencing the mass shootings that they see, hear, or read about in content, but they are feeling more “on edge” and are actively avoiding reminders of the violence.** These findings have implications for mental health initiatives; when addressing anxious behaviors around mass shooting concern, practitioners can focus on avoidant-arousal behaviors in particular. Further, the data illustrate that **most participants encounter mass shooting content infrequently**, with the majority reporting exposure about once per week. **A considerable portion (92.3%) of mass shooting content exposure was stated as unintentional**, suggesting that mass shooting content is often a byproduct of general media consumption.

H2—that resilience factors negatively moderate the relationship between mass shooting content exposure and STS—was not supported ($p = .908$), despite evidence that resilience helps one positively adapt in stressful situations and when exposed to threats (APA, 2020). Neither overall resilience, nor the individual protective factors significantly moderated the strength of the relationship between mass shooting content exposure and STS. The limited variance explained

by each model also suggests that other (unmeasured) variables could play a more impactful role in moderating content-related STS.

Curiously, the moderation results were not only non-significant, but yielded results opposite of what was expected: higher levels of the protective factors correlated with *more* STS. It is possible in this case that resilience as measured by this research could have actually been capturing another concept, such as empathy or sensitivity, offering more explanation to these unexpected results.

Overall, the findings regarding resilience suggest that **resilience—as measured by this research—possibly does not substantially buffer the negative psychological impacts of exposure to mass shooting content.** This underscores the possible need for different interventions to address secondary trauma in the public, as well as for a continued investigation into resilience.

The other findings in this study regarding how Americans consume mass shooting content and perceive mass shootings (RQ3) also revealed key insights. For one, **the extensive role of the digital sphere in Americans’ relationship with mass shootings was found.** For instance, participants reported consuming about six hours of online content per day, highlighting the substantial time spent on online platforms daily. This aligns with data on digitalization in the U.S.: nearly 90% of adults own a smartphone (Poushter et al., 2024), and at least 70% of American adults use social media (Auxier & Anderson, 2021). This is consistent with the finding that mass shooting content was typically consumed via online newspapers, Facebook, and Instagram.

The study also revealed that school shootings specifically are at the forefront of Americans’ minds: when Americans think of mass shootings, **school shootings are most**

commonly recalled. Interestingly, **neither the number of casualties, nor the recency of the event necessarily correlates with recall.** For instance, Columbine (1999)—despite having 13 casualties—was mentioned 19 more times than the Route 91 Harvest Festival (2017), which had 59 casualties. Similarly, Sandy Hook Elementary (2012), with 26 casualties, was recalled 26 times. Data shows that school shootings are not actually the most common setting for mass shootings (Topaz & Higdon, 2024), yet they are disproportionately recalled, reflecting a bias in public memory. Media coverage of shootings involving children and/or occurring in schools tends to be greater (Topaz & Higdon, 2024), suggesting that media reporting choices likely contribute to this bias.

The findings of significant avoidant-arousal scores and the heightened attention to school shootings raise interesting questions about whether and how individuals might avoid reminders of school shootings in particular, due to possibly affected perceptions of school safety. Notably, 83% of parents who choose to homeschool cite concerns about the school environment—including safety—as a primary reason for their decision to homeschool (Pula, 2025). During the 2023–2024 school year, homeschooling rates increased in 90% of U.S. states; however, this rise could not be explained by pandemic-related disruptions alone (Watson, 2024). It is possible that exposure to mass shooting content, and the biases that exist around the prevalence of school shootings, could contribute to more parents considering an at-home education.

The study also reinforces the idea that **mass shootings are a concern shared across political affiliations, ages, and geographic locations.** Demographic results reveal that Democrats, Republicans, and Independents in various states all express concern over mass shootings (see Appendix B for participant open-ended comments). This is also reflected in the

language used by American politicians, who have described gun violence as causing “horror and pain” (Jeanne Shaheen, Democrat, New Hampshire), “horrific rampage(s)” (Bernard Sanders, Independent, Vermont), and “abhorrent” (Roger Wicker, Republican, Mississippi; PBS NewsHour, 2022). Therefore, language expressing widespread concern about mass shootings can be observed among both leaders and laypeople. Taken together, these findings highlight the deep and pervasive resonance of mass shootings across American society.

4.2 Limitations and Future Directions

Several limitations of this study open avenues for future research. One notable challenge was participant recruitment, partly due to the conservative pre-screening process. The current sample did have diverse qualities, such as by having participants from the U.S. Caribbean territories. Further, similar studies had almost identical sample sizes (see Austin et al., 2018; $n = 54$). Nevertheless, studies with larger sample sizes are needed to strengthen both internal and external validity. Future studies could also try to include a more diverse sample, for example, in regards to age and geographic location. Though, a challenge for participant recruitment is the lack of free or low-cost participant panels in the U.S., which restricts researchers’ ability to recruit American samples.

With careful ethical consideration, obtaining data from a population with a history of trauma might also yield interesting insights to investigate how those with histories of gun violence trauma react to mass shooting content. Further, ethical concerns limited this research. Participants could not be ethically exposed to mass shooting content experimentally, which limited control over variables, inhibited causal inferences, and made the results vulnerable to recall errors. It is also essential that research on gun violence content consumption draws from a wider variety of sources. Scholars have pointed out the potential circularity of analyses because

many studies rely on the same data sources, such as the Gun Violence Archive, the Mother Jones mass shootings database, and the Northeastern University Mass Killings Database (Topaz & Higdon, 2024).

Future research should also explore the broader effects of exposure to gun violence content. Many questions remain unanswered: How do demographic factors, such as race or age, shape responses to gun violence media? How do different narratives about mass shootings influence audiences? While findings are mixed, some research suggests that media exposure to gun violence can affect awareness and vigilance, potentially influencing behaviors such as firearm storage and carrying (Semenza et al., 2024). Beyond secondary traumatic stress (STS), this points to additional effects of gun violence exposure, suggesting a possible cycle of gun violence, in which content plays a role. Despite the impact of these secondary effects, indirect trauma remains widely overlooked (Jang et al., 2023).

This is likely due in part to limited funding for gun violence research. Currently, research on gun violence receives a minuscule fraction of federal funding: less than .09% of the Centers for Disease Control and Prevention's multi-billion-dollar annual budget (Rubin, 2016). This lack of funding is due in part to the 1996 Dickey Amendment, legislation that effectively prevented the CDC from funding research that could be seen as advocating for gun control (Alcorn, 2017). David Hemenway, director of the Harvard Injury Control Research Center, describes the amendment as "a symbolic gesture to scare away research" (quoted in Wan & Sullivan, 2018). Decades later, the amendment remains in effect. But, without adequate resources to support empirical studies, the indirect aspects of gun violence's psychological toll will remain unclear. Increased funding would strengthen research on what is frequently referred to as a domestic

public health crisis. In turn, this would support individuals affected by gun violence, both directly and indirectly.

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Appendix A: Aid Disclosure

Source	Function	Used in Chapters
GPT-4o (AI) ⁵	creating APA-7 citations, wording check (ensuring clarity, academic tone, and correct grammar), R script creation, checking format is in APA-7 compliance, translating the abstract to German, supporting in exploring, verifying, and expanding on information	full report
Master's Research Seminar 1 term paper ⁶	research proposal inspired thesis	full report
Master's Research Seminar 2 term paper ⁷	research proposal inspired thesis	full report

⁵ The University of Vienna allows the use of AI tools as support for master's theses when their assistance is properly disclosed and approved by their supervisor (University of Vienna, n.d.). This master's thesis is original work and all included text and references have been diligently reviewed.

⁶ Course entitled "Scientific Skills: Scientific Writing, Presentation and Publication, Grant Writing" (winter semester 2023).

⁷ Course entitled "SE Master Seminar" (winter semester 2024).

Appendix B: Participants' Comments

Open-ended comments from participants: At the end of the survey, participants were provided an open-ended text box to share their thoughts.⁸

“Really interesting survey! It's incredibly important, and hopefully, guns will be banned in the U.S. soon to prevent more of these tragedies.” -male, non-student, 18-30, independent, living abroad

“...The mass shootings are evil. Evil exists in this world. My hope for a better future comes from my faith in Jesus Christ. I choose not to dwell on the pain or navigate the grief of loss caused by a mass shooting. I have empathy and concern for those involved and pray that it never happens to me or my loved ones...” -female, non-student, 51-60, Republican, Pennsylvania

“I genuinely worry everytime I'm in a public place like the movie theatre, a parade, etc. I always think about the possibility of a shooting and what I'd do.” - female, non-student, 18-30, Democrat, living abroad

“...I was really disturbed by the TikTok videos of shootings. People can post videos so quickly, and they don't get taken down fast enough. It made me sick seeing this and how disrespectful it was. It's hard to believe that kind of violence exists.” - female, non-student, 18-30, Republican, Maryland

⁸ The comments were slightly edited for grammar and clarity.

“Glad you're studying this. The US needs tougher gun laws. There's so much corruption from gun lobbyists.” - male, non-student, 61-70, Democrat, New Jersey

“A well-designed set of questions on a topic that is very relevant to the USA.” - male, non-student, 51-60, Democrat, New Jersey

Appendix C: Code Excerpts

Key excerpts from code used

```
#Descriptive statistics and exploratory analyses
mean_age <- mean(df$age, na.rm = TRUE)
table(df$gender)
table(df$education)

# Plot mass shooting source frequencies
library(ggplot2)
ggplot(data, aes(x = reorder(source, occurrences), y = occurrences)) +
  geom_bar(stat = "identity", fill = "#9b8cc8") +
  labs(title = "Mass Shooting Content Sources", x = "Source", y = "Frequency") +
  theme_minimal() +
  theme(axis.text.x = element_text(angle = 45, hjust = 1))

#Correlation between exposure and daily thoughts
cor.test(df[,78], df[,10], use = "complete.obs")

#Simple Linear Regression between STS and mass shooting content consumption
model_main <- lm(STS_total ~ mass_media, data = df)
summary(model_main)

#Simple Linear Regression between STS subscales and mass shooting content consumption
#Create avoid_arousal and intrusion subscale averages
df$avoid_arousal <- rowMeans(df[, c(60, 63, 64, 66, 67, 68, 70, 71, 73, 74, 75, 76)], na.rm = TRUE)
df$intrusion <- rowMeans(df[, c(61, 62, 65, 69, 72)], na.rm = TRUE)

#Run regression models
lm(avoid_arousal ~ mass_media, data = df)
lm(intrusion ~ mass_media, data = df)

#Checking internal consistency
library(psych)
alpha(df[,60:76])$total$raw_alpha
alpha(df[,108:131])$total$raw_alpha

#Moderation analyses between mass shooting content consumption, STS, and resilience
mass_c <- scale(df$mass_media, center = TRUE, scale = FALSE)
res_c <- scale(resilience_total, center = TRUE, scale = FALSE)
int_res <- mass_c * res_c

model2 <- lm(STS_total ~ mass_c + support_c + int_supp)
summary(model2)
```

```
interact_plot(model2, pred = mass_c, modx = support_c, plot.points = TRUE)
```

```
#Moderation analyses of resilience subscales
```

```
model2 <- lm(STS_total ~ mass_c + support_c + int_supp)
```

```
summary(model2)
```

```
interact_plot(model2, pred = mass_c, modx = support_c, plot.points = TRUE)
```

```
model3 <- lm(STS_total ~ mass_c + skills_c + int_skills)
```

```
summary(model3)
```

```
interact_plot(model3, pred = mass_c, modx = skills_c, plot.points = TRUE)
```

```
model4 <- lm(STS_total ~ mass_c + planning_c + int_plan)
```

```
summary(model4)
```

```
interact_plot(model4, pred = mass_c, modx = planning_c, plot.points = TRUE)
```

```
model5 <- lm(STS_total ~ mass_c + efficacy_c + int_efficacy)
```

```
summary(model5)
```

```
interact_plot(model5, pred = mass_c, modx = efficacy_c, plot.points = TRUE)
```

```
model1 <- lm(STS_total ~ mass_c + res_c + int_res)
```

```
summary(model1)
```

```
interact_plot(model1, pred = mass_c, modx = res_c)
```

Abstract (English)

Literature grounded in resilience theory indicates that protective factors—such as social support, social skills, and prioritizing and planning behavior—are associated with lower levels of traumatic stress (Crouch et al., 2018). This study examines whether these resilience factors continue to be associated with reduced traumatic stress in the context of indirect exposure, specifically through media coverage of mass shootings. A cross-sectional survey was administered to U.S. participants ($n = 52$) to assess mass shooting media consumption, resilience factors, secondary traumatic stress (STS) symptoms, and perceptions of mass shootings. Regression analysis revealed that mass shooting content consumption significantly predicted avoidant-arousal symptoms ($b = 0.18, p = .038$), but not intrusion symptoms ($b = 0.20, p = .101$). Hierarchical moderated regression analyses further showed that although protective resilience factors were associated with variations in STS symptoms, they did not significantly moderate the relationship between content exposure and traumatic stress (p -values $> .500$ for all moderation models tested). Additional findings revealed Americans' biased recall of mass shootings and highlighted the influence of digital media on consumption patterns. Taken together, these results explore the complex and pervasive impact of indirect trauma exposure and address the role of resilience.

Abstract (Deutsch)

Die auf der Resilienztheorie basierende Literatur weist darauf hin, dass protektive Faktoren—wie soziale Unterstützung, soziale Kompetenzen sowie Priorisierungs- und Planungsverhalten—mit geringeren Ausprägungen traumatischen Stresses in Verbindung stehen (Crouch et al., 2018). Die vorliegende Studie untersucht, ob diese Resilienzfaktoren weiterhin mit einer reduzierten Ausprägung traumatischen Stresses im Kontext indirekter Exposition, insbesondere durch mediale Berichterstattung über Amokläufe, assoziiert sind. Eine querschnittliche Umfrage wurde unter US-amerikanischen Teilnehmenden ($n = 52$) durchgeführt, um deren Medienkonsum in Bezug auf Amokläufe, Resilienzfaktoren, Symptome sekundären traumatischen Stresses (STS) sowie Einstellungen zu Amokläufen zu erfassen. Die Regressionsanalyse zeigte, dass der Konsum von Inhalten über Amokläufe signifikant mit Symptomen von Vermeidung und Erregung zusammenhängt ($b = 0.18, p = .038$), jedoch nicht mit Intrusionssymptomen ($b = 0.20, p = .101$). Hierarchische moderierte Regressionsanalysen ergaben zudem, dass protektive Resilienzfaktoren zwar mit Variationen in STS-Symptomen assoziiert waren, die Beziehung zwischen Medienexposition und traumatischem Stress jedoch nicht signifikant moderierten (p -Werte $> .500$ für alle getesteten Moderationsmodelle). Weitere Ergebnisse zeigten eine verzerrte Erinnerung an Amokläufe bei U.S.-Amerikaner:innen und hoben den Einfluss digitaler Medien auf die Konsummuster hervor. Insgesamt beleuchten diese Ergebnisse die komplexen und weitreichenden Auswirkungen indirekter Traumaexposition und thematisieren die Rolle von Resilienz.