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#GunViolence on Instagram and Twitter: Examining Social Media Advocacy in the Wake of the Parkland School Shooting

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Abstract

The February 2018 Parkland school shooting quickly initiated passionate social media response on Twitter and Instagram. Research on the effect of large-scale mass shootings, particularly on social media dialogue, is lacking, at a time when emerging research suggests potential for both driving mass contagion and enhancing risk perceptions for public interest communications. This study examines response to the shooting through a content analysis of Instagram and Twitter. Findings revealed that gun violence advocacy and risk perception variables were present more frequently on Instagram, while Social Ecological Model policy-level factors were observed more frequently on Twitter. Advocacy drove engagement on both platforms; however, anger was associated with higher Instagram engagement. Details of gun violence, associated with potential for mass contagion, drove engagement on both platforms.

Introduction

On February 14, 2018, an expelled student entered Marjorie Stoneman Douglas High School in Parkland, FL. Armed with an AR-15 semi-automatic rifle, he started firing at students and teachers, ultimately killing 14 students and three staff members. During the attack, a 14-year-old student named Aidan Minoff live-tweeted his experience as he hid under a desk (Griggs, 2018). In the hours following the shooting, dozens of surviving Parkland students took to social media to express their grief and anger, directing their attention to politicians and pundits who, in their opinion, failed to take appropriate action against the threat of gun violence (Meyer, 2018). They

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quickly started lobbying the Florida State Legislature and the U.S. Congress to do more than offer thoughts and prayers and instead enact stronger gun control measures (Turkewitz et al., 2018; Witt, 2018a). A mere 38 days after the Parkland shooting, a group of Parkland students co-organized the March for our Lives in Washington, D.C. (the March was planned four days after the shooting and was ultimately joined by 800+ sister marches around the globe), which brought an estimated 800,000 protestors to Washington and exclusively featured speakers who were 18 and under (Sanchez, 2018). The survivors' experiences both during and in the aftermath of this attack were inextricably linked to social media. As this shooting once again reignited the national debate over gun violence, an urgent public health problem that results in more than 33,000 deaths annually in the United States (Xu et al., 2015), it is crucial to examine the role that social media play in influencing and shaping our understanding of gun violence issues.

Although mass shootings account for only a small proportion of overall firearm injuries and deaths, they represent an important area of research for several reasons. First, recent data indicate that both the frequency and fatality of mass shootings are on the rise nationwide (Blair & Schweit, 2014; Cohen et al., 2014). Additionally, these events garner significant national media attention, providing a key window into the ongoing debate over gun violence, as well as the types and sources of information that are driving it. Finally, recent research suggests that mass killings involving firearms often may be galvanized by similar events in the immediate past, with national media coverage planting the seeds for other at-risk individuals to commit acts of violence (Gould, 2001; Towers et al., 2015).

Social media have been shown to alter collective behavior in response to disaster and crises and may loosen the relationships among entities involved in the crisis, while facilitating the potential for other audiences to become part of the conversation (Eismann et al., 2016). Research on the effect of large-scale mass shootings, particularly as to the dialogue and conversation that take place in the social media sphere, is lacking (Mazer et al., 2015). Additionally, although social media platforms, such as Twitter, have proven to be major sources of information during and after school shootings, other platforms, such as Instagram, have not been studied (Mazer et al., 2015). This study aims to fill that gap by exploring the social media conversation on Instagram and Twitter surrounding the Parkland school shooting through a content analysis of the themes and trends in posts and comments to better inform public interest communications that might seek to address this topic in the public sphere. Specifically explored within this content analysis are factors related to advocacy, mass contagion, Risk Perception Model constructs, levels/actors according to the Social Ecological Model (SEM), and engagement.

Literature review

Gun violence as a public interest communications public and health issue

The issue of school shootings and gun violence can be informed by public interest communications, which has been defined as "the development and implementation of science based, planned strategic communication campaigns with the main goal of achieving significant and sustained positive behavioral change on a public interest issue that transcends the particular interests of any single organization" (Fessmann, 2016, p. 16). Public interest communications is different from public relations in that it focuses on public interest first with a goal of social good and aims for behavior change (Fessmann, 2017).

Defining a public from a public interest communications perspective has been problematic (Austin et al., 2019), as is determining what might fall within universal public interest (Johnson & Pieczka, 2019). And, although the issue of gun control reform has become polarized within the United States, the problem of gun violence, including school shootings, has been defined as an urgent public health epidemic by many studies (Reese, 2017).

Deaths due to gun violence were not considered a public health issue until the late 20th century; this problem was previously under the purview of criminologists (Wintemute, 2015). The high level of firearm ownership in the United States has been directly associated with an increased risk of firearm-related mortality (Kalesan et al., 2016). A 1992 *New England Journal of Medicine* study concluded that ready availability of firearms increased the risk of suicide in the home (Kellermann et al., 1992), and a more recent study found that states with higher numbers of firearm laws were associated with lower rates of firearm fatalities, both overall and specifically for suicides and homicides (Fleegler et al., 2013). Recent numbers show shootings are the third leading cause of death for those under 18 in the United States (Fowler et al., 2017).

As there is no national gun ownership database, it is impossible to know the exact number of individuals who own guns in the United States; however, research estimates that there are approximately 310 million non-military firearms in the United States, 3 million of which are handguns (Bureau of Alcohol Tobacco Firearms and Explosives, 2016). That figure is significantly higher than for other developed nations (SAS, 2007). The main stated motive for firearm ownership in the United States is personal safety (Wallace, 2015). In addition, owning guns for personal safety reasons is associated with involvement in crime or fearing for one's self or family (Cao et al., 1997; Wallace, 2015). However, studies have shown that in the United States, when a gun or guns are present in homes, both men and women are at significantly higher risk of firearm homicide (Hepburn & Hemenway, 2004). In addition, when gun ownership levels are higher, a larger number of people die from suicide (Miller et al., 2002).

Gun violence conversations on social media

Although the national conversation over mass shootings and gun violence in traditional mass media has been studied extensively, little is known about these conversations as they take place on social media in the sphere of public dialogue. Given the significant media coverage surrounding these events and the potential for contagion effects (i.e., when coverage of a shooting sparks more shootings) via mass media exposure (Gould et al., 2003), understanding how this debate plays out over multiple social media platforms could have important implications for both public health and journalistic practice, particularly since far more social media messages are composed and shared by the public as compared to messages from mass media outlets.

Mazer et al. (2015), with one of the first studies of its kind, examined social media use during active shooter incidents, examining small-scale shooter events (opposed to mass shooter events) through conversation on Facebook, Twitter, blogs, and websites. In these very small-scale events, conversation was tightly clustered and easy to analyze through a mix of automated and manual analysis. Findings revealed a much greater volume of information on Twitter and Facebook than on mainstream news, with Twitter having the most volume. Social media posts were more information-focused than affect-focused, with Twitter being especially information-focused for both shootings. Misinformation and rumors, as well as calls to action on gun violence, were also part of the conversation (Mazer et al., 2015). A preliminary analysis of Twitter conversation after the Sandy Hook Elementary School shooting also revealed that calls to action and calls for gun reform were a major part of the conversation (Shultz et al., 2013), suggesting that advocacy is an important construct to examine in the aftermath of a mass shooting.

Additionally, although some studies have used social media conversation about incidents of gun violence as cases to develop big data machine-learning techniques (Li et al., 2018; Wang et al., 2017), few have examined the context of the conversations. Two of the few studies available are both content analyses of tweets by the National Rifle Association (NRA) and the Brady Campaign to Prevent Gun Violence (Auger, 2013; Merry, 2016). Results indicated that both groups mostly interacted with their supporters and avoided engagement with those who disagreed with them (Merry, 2016). However, the NRA was more likely to evoke politics and legislation in its tweets (Auger, 2013). To date, no studies have focused on gun violence, gun rights, and gun control related posts on Instagram.

Research also has been conducted about the presence of school shooting fan communities online (Oksanen et al., 2014; Raitanen & Oksanen, 2018). These studies reveal that several groups, including fan girls, researchers, Columbine fans, and copycats find communities online. They also indicate that social media have the potential to function as powerful arenas for idea sharing and violence justification (Oksanen et al., 2014; Raitanen & Oksanen, 2018).

Specifically, this paper evaluates this discussion as it is carried out on social media, with an emphasis on the potential for mass shooting contagion. Both Instagram and Twitter are among

the most popular social media platforms (Pew Research Center, 2019), one exclusively visual-based and one more text-based and can provide two potentially different social media conversations. Instagram still caters to a slightly younger audience with 67% of 18- to 29-year olds having an Instagram account, compared to 38% in that age range having a Twitter account (Pew, 2019). Instagram also appears to have a slightly more diverse audience than Twitter with higher percentages of racial minority users, although both platforms report a smaller percentage among White adults, than among racial minority groups (for example, 51% of Hispanic U.S. adults report using Instagram versus 33% of White U.S. adults (Pew, 2019).

Scholars have called for the need to investigate the conversation around large-scale school shootings on social media, as well as social media platforms that have not been investigated yet in school shootings, including Instagram (Mazer et al., 2015). In December of 2019, Instagram announced a call for more responsibility (and enforcement) on its platform regarding messages about public safety issues, such as gun violence (Thorbecke, 2019), and no studies that we could find have focused on Instagram in the context of school shootings. Although some studies have limitedly examined Twitter in the context of past shootings and the gun control debate (Benton et al., 2016; Budenz et al., 2019), more research is needed specifically in the context of unique events such as the Parkland school shooting, due to teen involvement and unique activist voices. Therefore, the first research questions for this study are:

RQ1a: What did Twitter messages look like in the wake of the Parkland school shooting?

RQ1b: What did Instagram messages look like in the wake of the Parkland school shooting?

RQ1c: How did users engage with Parkland school shooting related tweets?

RQ1d: How did users engage with Parkland school shooting related Instagram posts?

Risk Perception Model

Risk communication is an approach for communicating effectively in high-concern situations (Covello et al., 2001). Crises, such as mass shootings, are often accompanied by strong negative emotions, such as fear. These then can result in barriers to effective and necessary communication (Covello et al., 2001). Fear may result from crisis situations where there is low perceived control and predictability (Jin, 2010). Anger and distrust may be exacerbated in crisis situations where individuals perceive a high organizational responsibility for the crisis (Coombs & Holladay, 2005). For example, in the case of gun control, anger might stem from the perception that organizations are responsible for taking action and failing to do their part.

The Risk Perception Model helps explain how risk perceptions are formed. For example, risks that evoke fear are perceived as greater than risks that do not; risks associated with untrustworthy entities are perceived as greater than risks associated with trusted ones; and risks

that are portrayed as having irreversible, devastating consequences are perceived as greater than risks that are perceived to be less catastrophic (Covello et al., 2001). The public's ability to process information can be significantly impaired when serious risks are perceived to be present (Cairns et al., 2013), especially if tools to deal with the threat adequately, such as strong self-efficacy, are not available (Witte, 1992). It is therefore important to determine the presence of risk perception variables in social media gun violence conversations. Thus, the second research question is:

> *RQ2***:** How were risk perception constructs represented in Parkland shooting messages on Twitter and Instagram, and how do social media users engage with these messages?

Suicide versus mass shooting contagion

After an active shooting event, a phenomenon known as mass contagion has been observed by a growing body of research. Mass contagion described a phenomenon where more shootings tend to take place following the shooting event (Kissner, 2016). A study by Towers et al. (2015) found evidence that when a mass shooting (involving four or more fatalities) takes place, similar events seem to be more likely to occur in the community in the following 13 days. Many studies suggest that these copycat incidents are driven by a mass shooter's desire for fame or attention (Lankford, 2016; Tufekci, 2015). Recent research (Dahmen, 2018) also has revealed that newspaper visual coverage following three major school shootings "gave more attention to perpetrators than to individual deceased victims by a ratio of 16 to 1" (p. 163), indicating that newspaper and media coverage of these mass shootings may be furthering the potential for this mass contagion effect.

The World Health Organization (WHO) in 2008 developed guidelines for reporting suicides (World Health Organization, 2008). These recommendations were developed as a guide for how the media should report on suicides to minimize the risk of suicide contagion, or the potential for media reports of suicide to lead to imitative suicidal behaviors. Some of the recommendations include exercising caution in using photographs or video footage, showing due consideration for people bereaved by suicide, providing information for those in need to be able to get help, avoiding providing detailed information about the site of a completed or attempted suicide, avoiding prominent placement and undue repetition of stories about suicide, and avoiding explicit description of the method used in a completed or attempted suicide (World Health Organization, 2008). While the WHO has not yet released an advisory similar to its suicide recommendations for reporting on mass shootings, it is possible that using these variables for social media analysis will provide another vantage point for analyzing mass shooting and gun violence posts on social media. Perrin (2016) issued a call to psychologists and behavioral/social scientists to educate media professionals about the potential for the imitation of mass and school shootings and ways to prevent this imitation. In turn, we believe this mass shooting contagion

concept should be studied in the realm of social and digital media as well, and therefore the third research question for this study is:

> *RQ3***:** How are WHO media contagion prevention principles represented in Parkland shooting messages on Twitter and Instagram, and how do social media users engage with these messages?

Social Ecological Model

Many health behavior and psychological theoretical frameworks are built on the foundation of the individual and their perceptions, beliefs, and intentions. However, the CDC recommends using the four-level SEM, particularly when dealing with violence prevention (Centers for Disease Control and Prevention, 2020). Socioecological models of health (Green et al., 1996) factor in the individual as well as the social environment and the structural environment. The SEM takes into consideration the complex interactions among individual, interpersonal, community/organization, and society/policy factors (Bronfenbrenner, 1977; Perkins & Taylor, 1996) and represents the range of factors that plays a role in facilitating or preventing gun violence as well as different points and opportunities for intervention in the gun violence issue (Rubens & Shehadeh, 2014).

In the wake of the Sandy Hook Elementary School mass shooting, scholars identified different tiers of individuals affected and also groups involved in the national conversation as part of a population exposure model (Shultz et al., 2013). Beyond the direct victims, these tiers included survivors (children and staff) and their family members, extended family and emergency responders, care providers and media, the community, and then the nation at large. Considering the limited availability of gun violence research relating to social media, and the importance of using a multilevel approach in dealing with this issue, the fourth research question for this study is:

> *RQ4***:** How are SEM constructs represented in Parkland shooting-focused messages on Twitter and Instagram, and how do social media users engage with these messages?

Method

In February 2018, in the days following the shooting, all tweets and Instagram posts tagged with #parkland, #parklandshooting, or #neveragain were collected using Netlytic.[1] Researchers pulled a random sample of 500 posts from each platform, resulting in 1,000 social media posts and

[1] www.netlytic.org

conducted a quantitative content analysis. Variables coded include indicators of risk perception theory, engagement characteristics, framing, and discussions of gun violence.

Coding protocols were developed, tested, and implemented for the coding process using posts from the whole dataset but not included in the random sample. During the development process, researchers also initially conducted qualitative analyses to determine emergent themes from the data as well as newspaper reports and previous studies. These emergent themes were developed into coding categories for quantitative content analysis.

Posts were coded for engagement variables (likes, comments, and views for Instagram; likes, retweets, and replies for Twitter), website connection, advocacy strategies, risk perception factors, visual type, SEM constructs, and gun violence variables. These variables are discussed in more detail below.

Content analysis categories

Gun violence related variables

Based on an initial review of the data, a list of general variables focused on gun violence in this shooting was developed: Pro/anti-gun control, pro/anti-gun rights; mention of: NRA, Second Amendment, political references, conspiracy theories regarding gun violence and mass shootings, well-regulated militia, President Trump, gun safety practices, background checks, assault weapons sentiment, gun free zones, increased security, and arming teachers, visual signs of patriotism, and gun visuals. Coders noted the presence or absence of these topics, as well as the users' stance on them (pro or anti), which can be found in the Appendix in Table 1.

Risk Perception Model variables

Based on Covello et al. (2001), six risk perception variables were analyzed: fear, danger, the involuntary nature of being affected by gun violence, mentioning an identifiable victim, association with untrustworthy entities, and dreaded, irreversible outcomes. See Figures 1 and 2 for examples of posts that were coded matching this category. Coders noted the presence or absence of these variables, which can be found in the Appendix in Table 2.

WHO media contagion variables

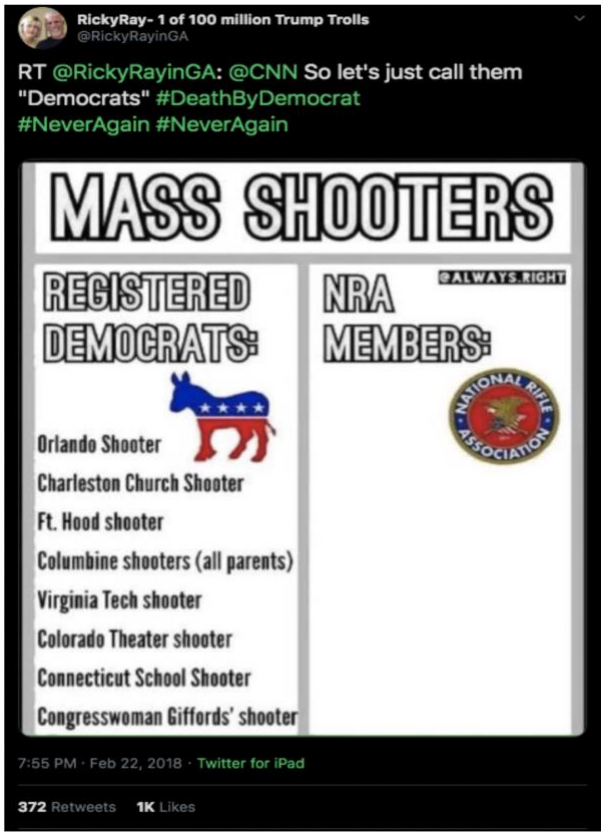
Variables for media contagion were adapted from WHO's suicide contagion identifiers. These included: gun violence education, providing detailed descriptions of gun violence, using a photo of the alleged perpetrator, and using a photo of a specific model of firearm (World Health Organization, 2008). See Figure 3 for an example of a post that was coded matching this category. Variables were coded for presence or absence and can be found in the Appendix in Table 3.

Social ecological model

Eight variables were coded based on the SEM: Individual, Interpersonal, Community/Organizational, and Societal/Policy factors (CDC, 2020). Coders noted when the content of the social media post suggested that any actor(s) from these different social levels may have the potential to stop or facilitate gun violence. See Figures 1 and 3 for examples of posts that were coded for SEM. Full SEM variables can be found in the Appendix in Table 4.

Figure 1

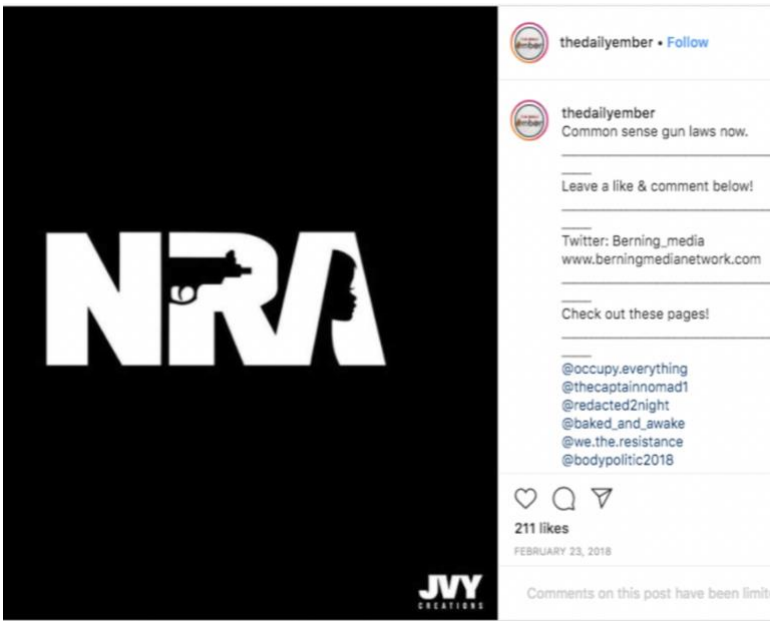
So Let's Just Call Them "Democrats"



Note. This tweet exemplifies the Risk Perception Model (framing Democrats as untrustworthy) and the SEM (framing political party as a factor that facilitates gun violence).

Figure 2

Common Sense Gun Laws Now



Note. This Instagram post demonstrates risk perception by associating the NRA with violence against children.

Advocacy variables

Coders noted when users were seeking to influence their audience into taking different forms of action. They also identified whether users were addressing a specific audience. The full list of these variables can be found in the Appendix in Table 5.

Engagement variables

Finally, post engagement was analyzed, defined for the purposes of this study as user interactions with the Twitter and Instagram posts. These engagement metrics included likes, retweets, and replies for Twitter and likes, comments, and video views for Instagram. Although these metrics cannot fully capture users' holistic responses to the social media posts, they function as a way in which platforms (and researchers) may quantify individuals' reactions. Using these metrics as a proxy for engagement is common practice in both research and industry (Barger et al., 2016; Baym, 2013; Napoli, 2011).

Figure 3

Times Have Changed

Note. This Instagram post exemplifies WHO media contagion variables by sharing details of the guns used and attempting to educate the public. This is also an example of SEM (arguing that policy affects gun violence).

Intercoder reliability

Two coders were trained to establish intercoder reliability. Both coders coded 10% of the posts (n = 100; n = 50 for Instagram and n = 50 for Twitter). Upon achieving intercoder reliability among the remaining posts, the first coder coded the remainder of the Instagram posts and 250 of the remaining tweets, and the second coder coded the remaining 200 tweets. After pretesting and subsequent changes to the coding protocol, the intercoder reliability test with the ReCal statistical program showed *Scott's Pi* (Scott, 1955) was on average .80. The individual coefficients were all considered to be reliable, with the lowest coefficient at .74.

Statistical analyses

Descriptive analyses were carried out for all variables. In addition, Mann-Whitney U tests were used to check for differences in both Twitter and Instagram engagement between posts both with and without a range of dichotomous variables. Distributions of the engagement frequencies were evaluated and found similar based on visual inspection of a box plot for all variables involved. Finally, Chi-Square tests were used to determine differences in frequency of appearance of variables between Twitter and Instagram.

Results

RQ1a-d: Themes of posts and public engagement

The *first research question* asked how Twitter and Instagram posts discussed the shooting at Stoneman Douglas High School and how users engaged with these posts. Chi-Square tests showed that Twitter included statistically significantly more posts than Instagram about the NRA, political references, signs of patriotism such as the American flag, thankfulness, and the "good guy with a gun" argument. Instagram posts, on the other hand, had significantly more mentions of conspiracy theories from a gun rights perspective, religion (often "thoughts and prayers"), and emotions such as anger/frustration and sadness (see Table 1 for complete general descriptives and Table 6 for Chi-Square results). Advocacy was significantly more frequently present on Instagram with mentions of marches, rallies, and walkouts, while boycotting businesses that work with the NRA was observed more frequently on Twitter (see Table 5).

Since social media engagement metrics in this study were not normally distributed, the median is a more appropriate measure of central tendency than the mean (Reinard, 2006). On Instagram, the median number of likes was 155.00, the median number of comments was 12.50, and the median number of video views was .00. On Twitter, the median number of likes was 59.00, the median number of retweets was 37.00, and the median number of replies was 2.00.

Mann-Whitney U tests showed that, in general, the presence of gun-related variables increased engagement on both Instagram and Twitter in this study. On both platforms, mentioning advocacy also increased engagement [likes for Instagram; retweets (*Mdn* = 156.00 present, *Mdn* = 25.50 absent, $p = .011$), likes (*Mdn* = 368.50 present, *Mdn* = 39.00 absent, $p = .008$), and replies (*Mdn* = 14.00 present, *Mdn* = 1.00 absent, $p = .006$) for Twitter). However, most of the specific variables differed by platform: On Instagram, mentioning the NRA (Comments: *Mdn* = 30.50 present, *Mdn* =10.50 absent, $p = .011$), gun rights originated conspiracy theories (Comments: *Mdn* = 30.50 present, *Mdn* = 10.00 absent, $p = .007$), and guns as the cause of mass shootings (likes: *Mdn* = 2831.00 present, *Mdn* = 136.00 absent, $p = .003$; comments: *Mdn* = 403.00 present, *Mdn* = 11.00 absent, $p < .001$) produced higher engagement, while on Twitter, references to politics did for all three engagement variables: retweets (*Mdn* = 124.50 present, *Mdn* = 17.00, absent, $p = .001$), likes (*Mdn* = 278.00 present, *Mdn* = 30.00 absent, $p = .003$), and replies (*Mdn* = 7.50 present, *Mdn* = 1.00 absent, $p = .001$). On Instagram, mentioning anger or frustration yielded higher comment frequencies (*Mdn* = 21.00 present, *Mdn* = 8.00 absent, $p = .014$), but on Twitter, it produced significantly lower engagement in all three engagement metrics (retweets: *Mdn* = 13.00 present, *Mdn* = 56.00 absent, $p = .034$; likes: *Mdn* = 17.00 present, *Mdn* = 131.00 absent, $p = .007$; replies: *Mdn* = 1.00 present, *Mdn* = 4.00 absent, $p = .018$) (see Tables 7 and 8 in the Appendix for a complete list of significant results).

Finally, as it is a visual social media platform, every Instagram post in this sample included some form of a visual. On Twitter, 53.2% ($n = 266$) of the tweets included some type of visual.

Mann-Whitney U tests showed that on Instagram, a visual of a gun/firearm was associated with higher engagement in the form of likes (see Tables 7 and 8).

RQ2: Presence of Risk Perception Model constructs and engagement

Research question two asked how Twitter and Instagram users discussed the Parkland shooting in the light of the Risk Perception Model, and how social media users engaged with these posts. Risk perception variables were present on both platforms but were more frequently present on Instagram (see Table 2 for a complete list). Chi-Square tests showed that Instagram included statistically significantly more posts than Twitter about fear, danger, dreaded irreversible outcomes, involuntariness as related to gun violence, and identifiable victims, while Twitter included more posts mentioning untrustworthy individuals or entities related to gun violence (see Table 6 for complete results).

Mann-Whitney U tests showed that the presence of specific risk perception variables was likely to increase engagement on Instagram but decrease engagement on Twitter (see Tables 7 and 8 for complete significant results). On Instagram, mentioning the involuntary nature of being affected by gun violence (likes: *Mdn* = 2831.00 present, *Mdn* = 137.00 absent, $p < .001$; comments: *Mdn* = 403.00 present, *Mdn* = 11.00 absent, $p < .001$), mentioning an identifiable victim (likes: *Mdn* = 597.00 present, *Mdn* = 131.00 absent, $p = .005$; comments: *Mdn* = 35.00 present, *Mdn* = 10.00 absent, $p = .001$), and mentioning untrustworthy entities (comments: *Mdn* = 27.00 present, *Mdn* = 8.00 absent, $p = .003$) all yielded an increase in engagement. On Twitter, the presence of untrustworthy individuals/entities (*Mdn* = 17.00 present, *Mdn* = 51.00 absent, $p = .018$) as well as mentioning irreversible outcomes (*Mdn* = 28.00 present, *Mdn* = 95.00 absent, $p = .003$) was more likely to decrease engagement (see Tables 7 and 8 for complete significant results).

RQ3: Media contagion and engagement

Research question three asked how Twitter and Instagram users discussed gun violence and mass shootings in the light of media contagion, and how social media users engaged with these posts. Possible media contagion variables were less frequently present in the sample's posts than were risk perception variables (see Table 3).

Chi-Square tests showed that Instagram included statistically significantly more posts than Twitter when mentioning a specific type of firearm, details of the gun violence incident, and stating the name of the shooter. None of the media contagion variables was present significantly more frequently on Twitter than on Instagram (see Table 2 for complete results).

Mann-Whitney U tests showed that only gun violence details significantly increased engagement—and did so on both platforms, although on Instagram only comments were affected (*Mdn* = 39.00 present, *Mdn* = 11.00 absent, $p = .006$) while on Twitter this appeared in all three engagement metrics: retweets (*Mdn* = 521.00 present, *Mdn* = 29.00 absent, $p = .010$), likes (*Mdn*

= 672.40 present, *Mdn* = 49.00 absent, p = .028), and replies (*Mdn* = 60.50 present, *Mdn* = 1.00 absent, p = .005) (see Tables 7 and 8).

RQ4: Social Ecological Model and public engagement

Research question four asked how Twitter and Instagram users discussed the Parkland shooting in the light of the SEM, and how social media users engaged with these posts. All SEM constructs—individual influence on gun violence, interpersonal influence on gun violence, community/organization influence on gun violence, and policy/society influence on gun violence—were present on both platforms of this sample (see Table 4 for a complete list).

Chi-Square tests showed that Instagram included statistically significantly more posts than Twitter on mentioning community/organization, individual, and interpersonal influence on stopping gun violence, and Twitter included statistically significantly more posts than Instagram on societal/policy responsibility for both facilitating as well as stopping gun violence (see Table 2 for complete results).

Mann-Whitney U tests showed that on Twitter, the mention of societal/policy influence and the mention of community/organization on stopping gun violence resulted in higher engagement for all three metrics—retweets (*Mdn* = 307.00 present, *Mdn* = 15.00 absent, p <.001), likes (*Mdn* = 719.00 present, *Mdn* = 28.00 absent, p <.001), and replies (*Mdn* = 23.00 present, *Mdn* = 1.00 absent, p <.001). On Instagram, mentioning community/organization influence on facilitating gun violence was associated with a higher median level of comments only (*Mdn* = 36.00 present, *Mdn* = 10.00 absent, p = .021) (see Tables 7 and 8).

Discussion

This study analyzed gun-related posts on Instagram and Twitter after the mass shooting at Marjory Stoneman Douglas High School in Parkland, FL, February 14, 2018.

Advocacy and engagement

The first finding of interest is that advocacy, although present on both platforms, is more frequently present on Instagram. When considering specific advocacy strategies, participating in marches, rallies, or walkouts was more frequently present on Instagram, while boycotting businesses because of their ties with the NRA was mentioned more frequently on Twitter. Even though the Parkland student survivors have been primarily active on Twitter, Instagram's demographics skew toward younger users (Pew, 2019), which may explain part of this variance as youth have become involved in walkouts and other protests in response to the Parkland shooting (Witt, 2018b). Additionally, research on Instagram has shown that users who are more prone to high levels of social activity (e.g., traveling, attending events, etc.) are more active users

of Instagram and have more motivation for use of the platform (Sheldon & Bryant, 2016). Mentions of advocacy and activism also increased engagement with social media posts on both platforms, furthering the conversation about gun violence, as did mentions of gun violence related variables. Worth noting here is that engagement in and of itself is not positive or negative, but it does indicate a level of visibility provided by the users for specific messages.

Emotions on Twitter and Instagram

Messages on Instagram appear to be framed through a more emotional lens than those on Twitter. In addition, on Instagram, expressing anger appeared to drive higher engagement, while on Twitter the opposite dynamic was visible—anger and frustration led to lower engagement. These findings also mirror prior research from Mazer et al. (2015) that Twitter posts are more information focused (compared to affect), even more so than Facebook. While Mazer et al. did not explore Instagram as a platform, the authors found that overall social media were more information-focused than affect-focused in small-scale shootings. Our research suggests that this may not be the case for large-scale mass shootings, such as the Parkland shooting, and particularly for the Instagram platform where more youth are participating in the conversation.

Younger audiences on Instagram who displayed anger may also display more self-efficacy or, possibly youthful confidence, that their actions will make a difference. Models such as the Anger Activism Model (Turner, 2007; Turner et al., 2006) suggest that both anger and efficacy are needed to drive activism and behavior change. Individuals with greater perceived efficacy may be more likely to take actions requiring greater involvement, such as protests, sit-ins, walk-outs, etc. (Turner et al., 2006), while individuals with lower perceived efficacy may be less likely to attend to and process information when angry (Ilakkuvan et al., 2017).

Presence of risk perception variables on Twitter and Instagram

Risk perception variables were more frequently present on Instagram, which parallels the increased expressions of anger and frustrations displayed there and the engagement for these types of posts. This finding may be related to the Instagram posts' emphasis on conspiracy theories related to mass shootings as well as the presence of anger and sadness on this platform. Tweets more frequently included mentions of untrustworthy entities and individuals (e.g., liberals, gun control activists), while Instagram posts more frequently discussed fear, danger, irreversible outcomes, involuntariness as related to gun violence, as well as identifiable victims of gun violence. Although these perceptions of risk can elevate the awareness of the problem and the need for change (Covello et al., 2001), they also may limit the ability to process information (Cairns et al., 2013) and result in decreased engagement or action.

Instagram posts, however, that reflected risk perception variables elicited higher levels of engagement, while tweets that included these constructs were associated with lower user engagement. Perhaps, again, because Instagram is associated with a younger user base who may

have increased levels of confidence or efficacy, this efficacy is needed to adequately push through fear of threats in order to take action (Peters et al., 2013).

Further, these findings are not just indicative of different conversations that occur on specific social media platforms, but they also reflect the finding that social media users tend to engage with ideologically-congruent supporters and avoid engagement with ideologically-incompatible opponents (Merry, 2016). Public health and advocacy organizations should consider this as they address the issue of gun violence on these social media platforms.

Media contagion on Instagram and Twitter

When analyzing these social media posts about gun violence using the WHO's media contagion framework regarding suicide reporting, what stands out is that these constructs invariably were more frequently present on Instagram compared to Twitter, a concern considering Instagram's primary visual nature. Mentioning specific details of gun violence (one of the subjects the WHO discourages in media representations) significantly increased engagement on both platforms, while none of the variables encouraged by the WHO guidelines increased engagement on either platform.

Although prior analysis of visuals in newspapers and media has shown the potential for mass contagion through displaying images of gun violence and focusing disproportionately on the perpetrators of the shooting (Dahmen, 2018), this study shows that, on social media, this conversation drives engagement—something that other studies have not been able to examine in this way. Although media contagion variables were not present to a large extent on either Instagram or Twitter, the fact that they are present at all is cause for concern (Kissner, 2016), and public interest communications professionals should actively address the need for decreasing this presence in their communication on these platforms.

Social Ecological Model and gun violence posts

Instagram posts focused on more levels of the SEM. However, Twitter posts included more discussion of societal/policy factors related to both gun rights and gun control. The most interesting finding related to the presence of SEM variables in this study's social media posts was that the presence of societal-level and community-level framing related to stopping gun violence elicited higher engagement on Twitter, while this dynamic was not present on Instagram. On Instagram, community-level influence on facilitating gun violence (most often operationalized as NRA activities) produced higher engagement.

This carries an important implication for gun violence prevention public interest communications frameworks: Although framing of individual rights and interpersonal factors traditionally dominates public discourse, societal-level framing seems to be increasing into the public consciousness. Models such as the SEM (McLeroy et al., 1988; Sallis & Owen, 2004) stress the importance of multiple levels of impact, such as mass media, interpersonal

communication, and influence on policy from a public health perspective, but this theory also may inform a public interest communications perspective. Also, as Snyder et al. (2004) showed in their meta-analysis, campaigns that included some element of policy change were much more likely to influence behavior change in the intended populations. Advocacy and activist organizations that wish to drive change on this issue should consider communication and intervention at multiple levels for increasing effectiveness (Rubens & Shehadeh, 2014), although engagement with posts may vary by platform, as shown here. Although public interest communications seeks to change organizational structure (Fessman, 2017), public interest communications also might seek to work within and across existing organizational structures in a variety of contexts to facilitate change on social issues.

Platform distinctions

Overall, results indicate that users expressed their reactions to the Parkland shooting differently on Twitter than they did on Instagram. Whereas conversations on Twitter tended to focus on society-level political discussions, those on Instagram were more personal, emotional, and advocacy driven. The presence of risk perception variables decreased engagement on Twitter but increased it on Instagram.

As discussed above, this may be due in part to the demographics of each platform—younger Instagram users may react differently to a school shooting as they are more directly impacted by the issue and may have higher self-efficacy regarding social change. However, users also may prefer emotional communication on Instagram due to their personal relationship with the platform itself. Research indicates that individuals tailor their self-presentation to the audience that they imagine will receive it (Marwick & boyd, 2011; van Dijck, 2013). It may be that users anticipate that their Instagram posts are more likely to be viewed by close connections, rather than a broader, more public audience that they may reach through Twitter.

Limitations and suggestions for future research

This study examined posts about gun violence after the Parkland shooting, but this focus represents a snapshot in time after a strong youth movement focused on gun control emerged. Future research is encouraged to examine how these conversations might change in relation to other mass shootings (including those that did not involve youth or schools), as well as how conversation might vary on differing types of platforms with differing demographics (e.g., Facebook, Snapchat, Pinterest, etc.).

As anger appeared to be a driver of engagement on Instagram, and the Instagram platform saw more discussion of advocacy and activist activities, future research also might examine how efficacy is portrayed in social media posts. As mentioned above, the Anger Activism Model (Turner, 2007) posits that anger and efficacy drive activism attitudes and behavior. Further

examining efficacy may lend additional insight into the trends observed here. Additionally, this study examined engagement through user likes, comments, sharing of posts, and video views. Expanded metrics to include impressions and views of posts also could provide a more complete examination of engagement.

Conclusion

The Parkland school shooting in February 2018 quickly initiated passionate social media reactions, particularly on Twitter and Instagram. However, the two platforms appeared to elicit different responses, with variations in tone, topics, and effects on engagement. Instagram posts were more focused on advocacy and activism and included more emotion and affectation. These mentions of advocacy increased engagement on all platforms; however, interestingly, inclusion of emotions (e.g., anger and fear) only drove engagement on Instagram. This may be due to core differences between the platforms, including users' demographics and their perceptions of their audiences.

Specific details of gun violence were more frequently present on Instagram, which is troubling as this is primarily a visual platform, and because this type of information is identified as a factor for media contagion—especially in visual form. As Instagram is popular among users who may still be young enough to be impacted by school shootings, it is important for them to understand the potential impact of the content that they are consuming as well as that which they post and share. As details of gun violence also drove more engagement with posts on both platforms, it is vital that we engage in careful examination of mass contagion on social media.

As mass shootings continue to occur with unfortunate consistency and dominate coverage on both news and social media, it is crucial for advocacy organizations, activists, and health and crisis communication specialists to prioritize these issues. They must first understand the nature of these conversations and then endeavor to design and test messages that will be most effective in the field of gun violence communication. This research reveals that users engage differently with the issue of gun violence on different platforms, suggesting that advocates and crisis communicators would benefit from tailoring their messages to individual platforms for maximum impact.

A public interest communications framework can help to better inform communication to prevent gun violence and school shootings. As Fessmann (2017) notes, public interest communications relies on trigger events as one of the most salient features; the Parkland school shooting was certainly an "event [with] a significant impact on the issue [that allowed] meaningful, positive behavioral change to occur in a limited time frame" (p. 26). Although most research on gun violence and school shootings has focused on public health or traditional media, a shift in perspective could help to bring new light to approaching resolutions for this important issue.

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Appendix: Tables

Table 1

General Descriptives by Platform

Variable	*Response*	*Instagram*	*Twitter*
Poster ID	Individual Organization Not clear	58.8% (*n*= 294) 38.8% (*n* = 194) 2.4% (*n* = 12)	88.4% (*n* = 442) 10.6% (*n* = 53) 1.0% (*n* = 5)
Contains hyperlinks	No	98.2% (*n* = 491)	91.3% (*n* = 639)
	Yes	9% (*n* = 5.2)	8.7% (*n* = 61)
Mentions Trump	Positive	1.4% (*n* = 7)	91.3% (*n* = 639)
	Negative	8.4% (*n* = 42)	8.7% (*n* = 61)
	Both	.2% (*n* = 1)	
	Neither	90.0% (*n* = 450)	
Political reference	No	91.6% (*n* = 458)	91.3% (*n* = 639)
	Yes	8.4% (*n* = 42)	8.7% (*n* = 61)
Gun rights	Anti	.6% (*n* = 3)	28.7% (*n* = 201)
	Pro	15.6% (*n* = 78)	14.9% (*n* = 104)
	Not present	83.8% (*n* = 419)	56.4% (*n* = 395)
Gun control	Anti	4.2% (*n* = 21)	3.1% (*n* = 22)
	Pro	52.6% (*n* = 263)	25.3% (*n* = 177)
	Not present	43.0% (*n* = 215)	71.6% (*n* = 501)

NRA	No	86.8% (*n* = 434)	97.1% (*n* = 680)
	Yes	13.2% (*n* = 66)	2.9% (*n* = 20)
Second Amendment	No	97.0% (*n* = 485)	91.1% (*n* = 643)
	Yes	3.0% (*n* = 15)	9.1% (*n* = 57)
Gun rights conspiracies	No	90.4% (*n* = 452)	91.3% (*n* = 639)
	Yes	9.6% (*n* = 48)	8.7% (*n* = 61)
Guns as cause to mass shootings	No	96.2% (*n* = 481)	97.6% (*n* = 683)
	Yes	3.8% (*n* = 19)	2.4% (*n* = 17)
Reaction to guns	Gun control	56.8% (*n* = 284)	57.0% (*n* = 399)
	Gun rights	14.8% (*n* = 74)	43.0% (*n* = 301)
	Not mentioned	28.4% (*n* = 142)	
Assault weapons sentiment	Pro	2.6% (*n* = 13)	93.4% (*n* = 654)
	Anti	213.0% (*n* = 65)	6.6% (*n* = 46)
	Not mentioned	84.4% (*n* = 422)	
Criticism of assault weapons knowledge	Yes	.2% (*n* = 1)	62.3% (*n* = 436)
	Doesn't matter	.2% (*n* = 1)	37.7% (*n* = 264)
	Not mentioned	99.6% (*n* = 498)	
Gun safety practices	No	99.8% (*n* = 499)	91.3% (*n* = 639)
	Yes	.2% (*n* = 1)	8.7% (*n* = 61)
Background checks	Laws strengthened	.8% (*n* = 4)	91.3% (*n* = 639)
	Not mentioned	99.2% (*n* = 496)	8.7% (*n* = 61)

Table 2

Descriptives Risk Perception Variables by Platform

Variable	*Response*	*Instagram*	*Twitter*
Fear	No	92.2% (*n* = 461)	97.0% (*n* = 485)
	Yes	7.8% (*n* = 39)	3.0% (*n* = 15)
Danger	No	89.2% (*n* = 446)	94.4% (*n* = 472)
	Yes	10.8% (*n* = 54)	5.6% (*n* = 28)
Involuntary	No	97.6% (*n* = 488)	100.0% (*n* = 500)
	Yes	2.4% (*n* = 12)	.0% (*n* = 0)
Untrustworthy individuals/entities	No	69.8% (*n* = 349)	59.0% (*n* = 295)
	Yes	30.2% (*n* = 151)	41.0% (*n* = 205)
Identifiable victim	No	86.8% (*n* = 434)	96.0% (*n* = 480)
	Yes	13.2% (*n* = 66)	4.0% (*n* = 20)
Dreaded, adverse outcomes	No	68.2% (*n* = 341)	91.4% (*n* = 457)
	Yes	31.8% (*n* = 159)	8.6% (*n* = 43)

Table 3

Descriptives Contagion Variables

Variable	*Response*	*Instagram*	*Twitter*
Gun violence education	No	98.2% (*n* = 491)	98.4% (*n* = 492)
	Yes	.8% (*n* = 4)	1.6% (*n* = 8)
Detailed gun violence description	No	93.4% (*n* = 467)	97.2% (*n* = 486)
	Yes	6.6% (*n* = 33)	2.8% (*n* = 14)
Name of suspected shooter(s)	No	95.0% (*n* = 475)	99.8% (*n* = 499)
	Yes	5.0% (*n* = 25)	.2% (*n* = 1)
Photo of suspected shooter(s)	No	99.0% (*n* = 495)	98.4% (*n* = 492)
	Yes	1.0% (*n* = 5)	1.6% (*n* = 8)
Mention specific type of firearm	No	85.0% (*n* = 425)	94.8% (*n* = 474)
	Yes	15.0% (*n* = 75)	5.2% (*n* = 26)
Information: help for trauma caused by gun violence	No	100.0% (*n* = 500)	99.8% (*n* = 499)
	Yes	.0% (*n* = 0)	.2% (*n* = 1)

Table 4

Descriptives Social Ecological Model Variables

Variable	*Focus*	*Response*	*Instagram*	*Twitter*
Individual	Facilitating gun violence	No	96.4% (*n* = 482)	96.4% (*n* = 482)
		Yes	3.6% (*n* = 18)	3.6% (*n* = 18)
	Stopping gun violence	No	94.6% (*n* = 473)	98.2% (*n* = 491)
		Yes	5.4% (*n* = 27)	1.8% (*n* = 9)
Interpersonal	Facilitating gun violence	No	99.6% (*n* = 498)	99.4% (*n* = 497)
		Yes	.4% (*n* = 2)	.6% (*n* = 3)
	Stopping gun violence	No	96.2% (*n* = 481)	99.0% (*n* = 495)
		Yes	3.8% (*n* = 19)	1.0% (*n* = 5)
Community/ Organization	Facilitating gun violence	No	86.6% (*n* = 433)	87.2% (*n* = 436)
		Yes	13.4% (*n* = 67)	12.8% (*n* = 64)
	Stopping gun violence	No	71.8% (*n* = 359)	78.8% (*n* = 394)
		Yes	28.2% (*n* = 141)	21.2% (*n* = 106)
Policy/Society	Facilitating gun violence	No	86.8% (*n* = 434)	80.6% (*n* = 403)
		Yes	13.2% (*n* = 66)	19.4% (*n* = 97)
	Stopping gun violence	No	85.0% (*n* = 425)	75.0% (*n* = 375)
		Yes	15.0% (*n* = 75)	25.0% (*n* = 125)

Table 5

Descriptives Advocacy Variables

Variable	*Response*	*Instagram*	*Twitter*
Advocacy	No	62.2% (*n* = 311)	79.6% (*n* = 398)
	Yes	37.8% (*n* = 189)	20.4% (*n* = 102)
Specific target	No	95.8% (*n* = 181)	95.5% (*n* = 254)
	Yes	4.2% (*n* = 8)	4.5% (*n* = 12)
Audience	Federal	48.1% (*n* = 91)	44.1% (*n* = 45)
	State	13.8% (*n* = 26)	2.0% (*n* = 2)
	NRA	1.6% (*n* = 3)	2.0% (*n* = 2)
	Businesses	.5% (*n* = 1)	14.7% (*n* = 15)
	Private citizens	3.2% (*n* = 6)	2.0% (*n* = 2)
	General	27.0% (*n* = 51)	34.3% (*n* = 35)
	Multiple	1.6 (*n* = 3)	.0% (*n* = 0)
	Not specific	4.2% (*n* = 8)	.0% (*n* = 0)
Petitions	No	100.0% (*n* = 189)	99.0% (*n* = 101)
	Yes	.0% (*n* = 0)	1.0% (*n* = 1)
Meet with representatives	No	73.0% (*n* = 138)	81.4% (*n* = 83)
	Yes	27.0% (*n* = 51)	18.6% (*n* = 19)
Boycott businesses	No	97.4 (*n* = 184)	91.2% (*n* = 93)
	Yes	2.6% (*n* = 5)	8.8% (*n* = 9)
Voting	No	85.7% (*n* = 162)	86.3% (*n* = 88)
	Yes	14.3% (*n* = 27)	13.7% (*n* = 14)
Register to vote	No	98.9% (*n* = 187)	93.1% (*n* = 95)
	Yes	1.1% (*n* = 2)	6.9% (*n* = 7)
Marches/rallies/walkouts	No	46.6% (*n* = 88)	86.3% (*n* = 88)
	Yes	53.4% (*n* = 101)	13.7% (*n* = 14)

Table 6

Chi-Square Comparisons of Instagram and Twitter

Variable	*Response*	*Frequency*	*Instagram*	*Twitter*	χ^2	*df*	*p-value*
Political reference	Yes	Observed	42	142*			
		Expected	92	92	66.603	1	<.001
	No	Observed	458	358			
		Expected	408	408			
NRA mentioned	Yes	Observed	66	99*			
		Expected	82.5	82.5	7.904	1	.005
	No	Observed	434	401			
		Expected	417.5	417.5			
Gun rights conspiracy	Yes	Observed	48*	10			
		Expected	29	29	26.429	1	<.001
	No	Observed	452	490			
		Expected	471	471			
Gun control conspiracy	Yes	Observed	0	40*			
		Expected	20	20	41.667	1	<.001
	No	Observed	500	460			
		Expected	480	480			
Guns: cause of mass shooting	Yes	Observed	19*	6			
		Expected	12.5	12.5	6.933	1	.008
	No	Observed	481	494			
		Expected	487.5	487.5			
Assault weapons	Pro	Observed	13	0			
		Expected	6.5	6.5			
	Anti	Observed	65	35	24.085	2	<.001
		Expected	50	50			
	Not mentioned	Observed	422	465			
		Expected	443.5	443.5			
"Good guy with a gun" argument	Yes	Observed	0	12*			
		Expected	6	6	12.146	1	<.001
	No	Observed	500	488			
		Expected	494	494			
Patriotism or American flag present	Yes	Observed	3	26*			
		Expected	14.5	14.5	18.786	1	<.001
	No	Observed	497	474			
		Expected	485.5	485.5			
Advocacy	Yes	Observed	189*	102			
		Expected	145.5	145.4	36.686	1	<.001
	No	Observed	311	398			
		Expected	354.5	354.4			

Boycotting businesses	Yes	Observed	5	9*			
		Expected	9.1	4.9	5.521	1	.019
	No	Observed	184	93			
		Expected	179.9	97.1			
Marches/rallies/walkouts	Yes	Observed	101*	14*			
		Expected	74.7	40.3	43.714	1	<.001
	No	Observed	88	88			
		Expected	114.3	61.7			
Anger/frustration	Yes	Observed	214*	159			
		Expected	186.5	186.5	12.934	1	<.001
	No	Observed	286	341			
		Expected	313.5	313.5			
Sadness	Yes	Observed	49*	22			
		Expected	35.5	35.5	11.052	1	.001
	No	Observed	451	478			
		Expected	464.5	464.5			
Thankfulness	Yes	Observed	2	29*			
		Expected	15.5	15.5	24.268	1	<.001
	No	Observed	498	471			
		Expected	484.5	484.5			
Mentions religion	Yes	Observed	26*	10			
		Expected	18	18	7.377	1	.007
	No	Observed	474	490			
		Expected	482	482			
Cut business ties with NRA	Yes	Observed	4	19*			
		Expected	11.5	11.5	10.013	1	.002
	No	Observed	496	481			
		Expected	488.5	488.5			
Gun rights	Pro	Observed	78*	32			
		Expected	55	55			
	Anti	Observed	3	2			
		Expected	2.5	2.5			
	Both	Observed	0	2	23.730	3	<.001
		Expected	1	1			
	Not mentioned	Observed	419	464			
		Expected	441.5	441.5			
Gun control	Pro	Observed	263	177			
		Expected	220	220			
	Anti	Observed	21	15			
		Expected	18	18			
	Both	Observed	1	1	34.024	3	<.001
		Expected	1	1			
	Not mentioned	Observed	215	307			
		Expected	261	261			

Fear	Yes	Observed	39*	15			
		Expected	27.0	27.0	11.276	1	.001
	No	Observed	461	485			
		Expected	473	473			
Danger	Yes	Observed	54*	28			
		Expected	41	41	8.980	1	.003
	No	Observed	446	472			
		Expected	459	459			
Involuntary	Yes	Observed	12*	0			
		Expected	6	6	12.146	1	<.001
	No	Observed	488	500			
		Expected	494	494			
Identifiable victim	Yes	Observed	66*	20			
		Expected	43	43	26.920	1	<.001
	No	Observed	434	480			
		Expected	457	457			
Association with untrustworthy entities	Yes	Observed	151	205*			
		Expected	178	178	12.719	1	<.001
	No	Observed	349	295			
		Expected	322	322			
Dreaded, adverse, irreversible outcomes	Yes	Observed	159*	43			
		Expected	101	101	83.476	1	<.001
	No	Observed	341	457			
		Expected	399	399			
Details of gun violence	Yes	Observed	33*	14			
		Expected	23.5	23.5	8.060	1	.005
	No	Observed	467	486			
		Expected	476.5	476.5			
Name of suspected shooter	Yes	Observed	25*	1			
		Expected	13	13	22.745	1	<.001
	No	Observed	475	499			
		Expected	487	487			
Name/model of firearm	Yes	Observed	75*	26			
		Expected	50.5	50.5	26.443	1	<.001
	No	Observed	425	474			
		Expected	449.5	449.5			
SEM: individual-level stopping gun violence	Yes	Observed	27*	9			
		Expected	18	18	9.336	1	.002
	No	Observed	473	491			
		Expected	482	482			
SEM: interpersonal-level stopping gun violence	Yes	Observed	19*	5			
		Expected	12	12	8.367	1	.004
	No	Observed	481	495			
		Expected	488	488			

SEM: community-level stopping gun violence	Yes	Observed	141*	106			
		Expected	123.5	123.5	6.586	1	.010
	No	Observed	359	394			
		Expected	376.5	376.5			
SEM: policy-level facilitating gun violence	Yes	Observed	66	97*			
		Expected	81.5	81.5	7.044	1	.008
	No	Observed	434	403			
		Expected	418.5	418.5			
SEM: policy-level stopping gun violence	Yes	Observed	75	125*			
		Expected	100	100	15.625	1	<.001
	No	Observed	425	375			
		Expected	400	400			

Table 7

Dichotomous independent variables and median engagement on Instagram

Engagement variable	**Variable**	***Mdn* present**	***Mdn* absent**	***U***	***Z***	***p*-value**
Comments	Details of gun violence	39.00	11.00	9,911.500	2.756	.006
Likes	Involuntary	2831.00	137.00	4,817.500	3.821	<.001
Comments	Involuntary	403.00	11.00	5,156.500	4.516	<.001
Likes	Identifiable victim	597.00	131.00	17,410.500	2.824	.005
Comments	Identifiable victim	35.00	10.00	17,900.500	3.279	.001
Comments	Untrustworthy entities	27.00	8.00	30,794.500	3.003	.003
Comments	NRA	30.50	10.50	17,081.500	2.529	.011
Comments	Conspiracies	30.50	10.00	13,420.500	2.708	.007
Likes	Specific firearm	276.00	136.00	18,351.000	2.092	.036
Comments	Specific firearm	29.00	11.00	18,661.500	2.366	.018
Likes	Guns as cause shootings	2831.00	136.00	6,404.500	2.971	.003
Comments	Guns as cause shootings	403.00	11.00	6,882.500	3.752	<.001
Comments	SEM-Community: facilitate gun violence	36.00	10.00	17,041.000	2.309	.021
Likes	American flag	8.00	160.00	72.500	-2.697	.007
Likes	Advocacy	186.00	131.00	32,704.000	2.116	.034
Comments	Anger/frustration	21.0	8.00	34,527.000	2.460	.014
Comments	Sadness	4.00	16.00	9,003.500	-2.134	.033
Likes	Republican mentioned	418.00	3.50	68.000	2.223	.012
Comments	Republican mentioned	17.00	.00	64.000	1.963	.048
Likes	Gun visual	38.00	19.50	68,501.000	4.223	<.001

Table 8

Dichotomous independent variables and median engagement on Twitter

Engagement variable	Variable	*Mdn* present	*Mdn* absent	*U*	*Z*	*p*-value
Retweets	Advocacy	156.00	25.50	23,577.500	2.543	.011
Likes	Advocacy	368.50	39.00	23,752.000	2.666	.008
Replies	Advocacy	14.00	1.00	23,763.000	2.773	.006
Retweets	Anger/frustration	13.00	56.00	23,944.500	-2.124	.034
Likes	Anger/frustration	17.00	131.00	23,102.000	-2.676	.007
Replies	Anger/frustration	1.00	4.00	23,697.500	-2.363	.018
Retweets	Thankfulness	1998.00	27.00	10,106.000	4.381	<.001
Likes	Thankfulness	8406.00	44.00	10,576.500	4.986	<.001
Replies	Thankfulness	168.00	1.00	9,901.500	4.238	<.001
Retweets	Gun violence details	521.00	29.00	4,764.000	2.580	.010
Likes	Gun violence details	672.50	49.00	4,564.000	2.191	.028
Replies	Gun violence details	60.50	1.00	4,828.500	2.788	.005
Retweets	Untrustworthy entities	17.00	51.00	26,502.500	-2.373	.018
Likes	Untrustworthy entities	28.00	95.00	25,530.500	-2.976	.003
Retweets	Irreversible outcomes	5.00	43.00	8,001.500	-2.033	.042
Likes	Irreversible outcomes	5.00	77.00	7,827.500	-2.216	.027
Retweets	Political reference	124.50	17.00	30,275.000	3.366	.001
Likes	Political reference	278.00	30.00	29,710.500	2.961	.003
Replies	Political reference	7.50	1.00	30,046.000	3.310	.001
Retweets	SEM-Community: stop gun violence	307.00	15.00	25.992.500	3.908	<.001
Likes	SEM-Community: stop gun violence	719.00	28.00	26,219.500	4.061	<.001
Replies	SEM-Community: stop gun violence	23.00	1.00	26,229.500	4.219	<.001
Retweets	SEM-Policy: stop gun violence	218.00	17.00	28,301.500	3.511	<.001
Likes	SEM-Policy: stop gun violence	383.00	28.00	28,794.000	3.847	<.001
Replies	SEM-Policy: stop gun violence	7.00	1.00	26,628.000	2.376	.017