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# Political Speech on Twitter: A Sentiment Analysis of Tweets and News Coverage of Local Gun Policy

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Political Speech on Twitter:  
A Sentiment Analysis of Tweets and News Coverage of Local Gun Policy

A thesis submitted in partial fulfillment  
of the requirements for the degree of  
Master of Arts in Journalism

by

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University of Manouba  
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May 2019  
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## **Abstract**

While the gun debate has been one of America's most politically contentious issues, Twitter has become, in recent years a popular venue for politicians to carry out the debate. The present thesis is aimed at better understanding of political speech on Twitter, as well as the ways in which political frames and sentiment on Twitter differ from those of news media coverage regarding gun policy in the state of Arkansas.

The study uses framing theory, which assumes that both news media and individuals use frames to construct perceptions and narratives about issues. Adopting an automated content analysis as a method, the study examined 354 gun-related tweets downloaded from the Twitter accounts of three Arkansas politicians (Charlie Collins, Denise Garner, and Greg Leding) and 40 news articles about gun policy involving these politicians from three local newspapers.

The results indicated that state politicians' discourse on Twitter constituted of a variety of extremely polarized words and frames pertaining and appealing to the core values of their local constituents, while local newspapers' frames were very fact-based and unbiased. The results also showed that political sentiment on Twitter was extremely negative, fearful, and agitated, while news media expressed a very neutral sentiment in their coverage of gun policy, suggesting a new venue for further investigation of current assumptions about the negative nature of news tone.

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# I. Introduction

## *I.1 Introduction*

Gun ownership has comprised a high point of contention in current American politics (Bishop & Cushing, 2008; Bohr, 2017). Partisans groups are creating political division over the issue (Denton & Voth, 2017). Social media, especially Twitter, play an essential role in the gun debate, offering a realm for like-minded individuals to strengthen their ideological views, which creates deeper divisions (Gunnarsson Lorentzen, 2014; Merry, 2016a).

Despite the fact that gun deaths in the United States have surged in recent years, averaging around 38,000 cases annually (Rosenberg, 2019), many states have made policies allowing more gun ownership in public places (Hultin, 2018). The state of Arkansas, for instance, enacted a concealed handgun law in 2017, allowing individuals to possess a concealed gun~~carry~~ in most public areas, including colleges. This thesis is inspired by these developments. The project studied. Twitter messages, or “tweets,” sent out by former state Rep. Charlie Collins, a Republican of Fayetteville, the major sponsor of this concealed carry law, as well as the tweets of state Rep. Denise Garner and state Sen. Greg Leding, both Democrats of Fayetteville, who both opposed it. The law was contentious and raised safety concerns among local communities such as Fayetteville Chamber of Commerce, and the Fayetteville Police Department (Bartholomew, 2017a, 2017b). It also comprised a focal point in local political discourse on Twitter and in the news media, especially during the elections of 2018.

That said, the present thesis seeks to analyze political tweets and news media coverage regarding gun policy in Arkansas. It seeks insights into (a) the structure of local political discourse about the gun policy on social media and how it compares to local news media coverage; (b) how state-level policymakers establish their political narratives in the gun debate



on Twitter; (c) how political sentiment on Twitter differs from the sentiment in news media coverage regarding the gun policy.

This thesis relies on framing theory to describe and analyze how local politicians in Arkansas frame the gun policy in their discussions on Twitter and also examines frames in local news coverage. Framing theory holds that media, as well as individuals, frame issues according to their own views and values. According to Robert Entman (1993), framing is to “select some aspects of a perceived reality and make them more salient in a communicating text, in such a way as to promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation for the item described” (p. 52). Research on framing in social media has shown that the public, including journalists and politicians, use these platforms, namely Twitter, to construct narratives and frame issues (van der Meer & Verhoeven, 2013; Choi & Park, 2014; Merry, 2016b; Moody-Ramirez & Cole, 2018). Accordingly, previous research on news coverage suggests that media organizations capitalize on negative framing of political issues to gain more exposure (Eshbaugh-Soha, 2010; Dunaway, 2013; Soroka & McAdams, 2015).

For a closer look at political sentiment towards gun policy on Twitter, as well as the tone in news media coverage, this thesis uses sentiment analysis, which is the computational study of opinions and emotions in texts (Liu, 2015), as a method. Sentiment analysis is a popular approach to study and analyze attitude and emotional valence in online data (Cho et al., 2003; Bollen, Mao, & Pepe, 2011; Cody et al., 2015; Mohammad, 2016; Barnaghi, Breslin, & Ghaffari, 2016; Sobhani, & S. Kiritchenko, 2017; Oliveira et al., 2017; Dorle, & Pise, 2018).

This thesis offers a local analysis not only of the ways state politicians and news media frame and discuss the local gun policy, but more importantly how their feelings, attitudes, and opinions regarding such a policy diverge.

## ***1.2 Twitter Uses in Politics***

Twitter is a micro-blogging system that eases communication between individuals by allowing them to exchange personal messages, as well as pictures among other types of information (Park, 2013). Previous research has indicated the importance of such a microblogging site as a channel for political discourse online (e.g., see Wells et al., 2016; Fuchs, 2018; Gaughan, 2017; Zhang, Wells, Wang, & Rohe, 2018). The dynamic nature of Twitter and the fact that it is public and free, give the platform a greater popularity (del Olmo & Díaz, 2016, p. 111). According to a Pew Research Center study, Twitter users demonstrate a high interest in politics compared to other social network sites (Mitchell, Gottfried, Kiley, & Matsa, 2014).

Twitter offers politicians a platform to engage and deliberate with the public, as well as the ability to attack political opponents more effectively (del Olmo & Díaz, 2016). The presidential campaign of Donald Trump in 2016 has demonstrated the tremendous potential that Twitter offers for political speech and campaigning. This platform allowed President Trump the ability not only to address the public in a two way form of communication, but also gave him the opportunity to dodge traditional media by disseminating his views and sometimes important policy statements instantly on Twitter (Gabler, 2016; Fuchs, 2018). In other words, the way by which important political figures, such as President Trump, utilize Twitter sets the agenda for traditional news media and thus turns such a microblogging system into a competing medium (Gabler, 2016).

As it was designed mainly for efficient mobile use (Einspänner, Dang-Anh, & Thimm, 2014) and quick messaging, Twitter, established in 2006 (del Olmo & Díaz, 2016), initially limited its users to 140 characters per post. This limit aimed to reduce the time spent in creating messages and improve “communication flexibility, interactivity, and speed” (Park, 2013, p. 1642). However, as the platform has increasingly attracted more conversations that are important both in political and social issues, Twitter developers realized how hard it was for users to fit, especially, complex ideas or concepts within such a small number of characters. Thus, the message limit on Twitter was doubled in 2017 (Hilliard, 2017), which was indicative not only of the increasing popularity of this platform, but also showed how important it was for people to use it to disseminate information and better communicate with one another.

Recent scholarship on social media shows that politicians nowadays increasingly rely on Twitter for their campaigns and communication strategies (Aharony, 2012; del Olmo & Díaz, 2016; Graham et al., 2016; Theocharis et al., 2016). In one of the earliest studies of political uses of Twitter, Lassen and Brown (2011) indicated that politicians would use Twitter only in cases where they are senators, ordered to do so by their leaders, or representing a minority party. Nonetheless, it is well known nowadays that this is not necessarily the case. People with a particular interest in politics, as well as politicians—in the office or running for one—tend to use Twitter not only to elicit engagement with followers, but also seek information pertaining to certain topics (Theocharis et al., 2016) and attack political rivals (del Olmo & Díaz, 2016).

### *1.2.1 Twitter as a Tool of Political Polarization*

Some argue that Twitter inherently encourages cynicism and divisive discourse. Ott (2017), for instance, claims that this microblogging medium, as well as traditional

communication media, “trains our consciousness in particular ways (...) to devalue others, thereby, cultivating mean and malicious discourse” (p. 60). He identifies features that constitute Twitter’s “ill” nature. These features include (a) its *simplicity* that hinders detailed and sophisticated discourse; (b) *impulsivity*; the convenience of tweeting anywhere and at any time, impairs people’s ability to be considerate and thoughtful; (c) *incivility*, which comes from Twitter’s informal structure, normalizing grammatical mistakes and thus uncivil speech among users (APA citation missing).

Ott (2017) suggests that Twitter can help cause political polarization, which is the construct of individuals’ opposing attitudes toward social phenomena (Morales, Borondo, Losada, & Benito, 2015; Hong, & Kim, 2016). For instance, the debate over controversial issues, such as gun control and gun rights, is accentuated in Twitter’s environment, (Choi, 2014; Gruzid & Roy, 2013). According to Merry (2016b), Twitter facilitates communication among “like-minded individuals” (p. 624) and creates “echo chambers” for polarized views (Hong & Kim, 2016). Hence, these features of Twitter drive people toward a greater division when it comes to political discussions over controversial issues like gun ownership (Hong & Kim, 2016; Merry, 2016b).

Bail et al. (2018) examined individuals’ attitudes when they are exposed to political tweets from users who represent an opposing ideological spectrum and concluded that “Republican participants expressed substantially more conservative views after following a liberal Twitter bot, whereas Democrats’ attitudes became slightly more liberal after following a conservative Twitter” (Bail et al., 2018, p. 9217). This enforces the idea that polarized views and political partisanship are easily established on Twitter. Such an innate ability to aggregate

ideological hegemonies in one place has gained Twitter great popularity that goes beyond political actors and interest groups.

### *1.2.2 Twitter as an Instrument for Political Campaigning*

Research on Twitter and politics shows that using the platform for political campaigning is crucial for politicians because it helps them communicate with voters (Gibson, 2013; Vergeer & Hermans, 2013; Theocharis et al., 2016). Graham, Broersma, Hazelhoff, and Guido (2013) investigated the ways in which political candidates used Twitter in the United Kingdom general election of 2010, concluding that most of these politicians adopted the platform merely as a channel for “unidirectional communication” or, in other words, “broadcasting” (Theocharis et al., 2016). That is, as Graham et al. (2013) suggest, politicians tend to exploit Twitter only for information dissemination instead of conversing with their voters. However, much of the literature shows Twitter suitability for engagement and bidirectional communication. For instance, Lee and Oh (2012), in their study of the effect of politicians’ personalized Tweets on the public reactions, claim that personalized/direct messaging on Twitter enhances positiveness and the sense of intimacy perceived by the voters towards the candidates.

Vergeer and Hermans (2013) reached a similar conclusion in their study of political use of Twitter during the Dutch general campaign of 2010. They suggest that campaigning on Twitter has similar mechanisms to those offline in terms of the communication process and that earlier exploitation of Twitter by political candidates “is more effective than adoption shortly before Election Day” (p. 399). Even Graham et al. (2013) admit that some politicians used Twitter during the UK general election of 2010 to mobilize and interact with their constituencies.

The increasing political interest in Twitter among both politicians and the public is due to what Jungherr, Schoen, and Jürgens (2016) describe as “the influence of political reality” (p. 52). That is, people tend to use Twitter as a public space to reflect on the numerous political stimuli surrounding their lives. These stimuli, as Jungherr et al. (2016) wrote, include:

Subjective experiences of politics—be they problems attributed to politics (e.g., unemployment), campaign contacts, participation in campaign events, or meetings with politicians. Alternatively, users might react to indirect experiences of politics—be they media events, like televised debates, election night coverage, or other high-profile political programs on television. Finally, they might also react to content on the web referring to politics, tweets posted by other users, or content prominently displayed on Twitter based on the service’s algorithmic relevance-assessment. (p. 52)

Therefore, as Jungherr et al. (2016) suggest, Twitter has transformed from a simple personal platform into “a new public space where there is a parallel debate to the traditional media such as radio, press or television” (del Olmo, & Díaz, 2016, p. 109). According to Bimber (2001), the affordability of information on the Internet improves people’s political participation. Hence, having a Twitter account is both inexpensive and convenient and allows one the ability to converse with the world about a myriad of topics.

### ***1.3 Research Questions***

As shown in the previous section, Twitter has become more than just a microblogging system for personal messaging. It has become an essential communication medium for political and ideological views. As this thesis’s goal is to analyze political tweets, as well as the tone of news coverage of local gun issues, it aims to answer the following research questions:

**RQ1:** How do these Arkansas state politicians frame the gun policy when conversing it on Twitter and how do political frames compare to the frames in news media coverage of such a policy?

**RQ2:** What are the most common words used by these Arkansas state politicians when tweeting about gun policy and how these words shape their political narrative?

**RQ3:** How does the sentiment of Arkansas local newspapers' coverage compare to the sentiment of state politicians on Twitter regarding gun policy?

#### ***I.4 The Debate on Gun Policy in the United States***

Gun policy has been an early and essential issue in American politics. The first gun control policy dates back to the 17<sup>th</sup> century. In July 1619, the First General Assembly of Virginia colony stated “[that] no man do sell or give any Indians any piece, shot, or powder, or any other arms offensive or defensive, upon pain of being held a traitor to the colony and of being hanged as soon as the fact is proved, without all redemption” (Lutz, 1998, p. 287). This law, according to Spitzer (2017), was the first of its kind in American history. Spitzer (2017) argues that “America's early governmental preoccupation with gun possession, storage, and regulation was tied to the overarching concern for public safety, even as it intruded into citizens' private gun ownership and habits” (p, 58).

During the twentieth century, government attempts to regulate firearms' ownership resulted in a few major federal statutes; the National Firearms Act (NFA) of 1934 was the first significant gun law at the time (Spitzer, 2017). The law was proposed by the administration of President Franklin D. Roosevelt, arguing that firearms had exacerbated gangsterism and organized crimes resulting from alcohol prohibition in the 1920s (Lewis, 2011). However, the NRA lobbied for the exclusion of handguns from this federal law before its legislation (“National Firearms Act of 1934,” 2016).

Federal Firearms Act (FFA) of 1938 followed the NFA Act (Vizzard, 2015). These prohibitions included private ownership of submachine guns, shotguns, and silencers ("Gun Control," 2017; Vizzard, 2015). Mysteriously, gun policies would disappear from the scope of public and legislative debates until the 1960s, when the assassinations of President John F. Kennedy, Martin Luther King, Jr., and Robert Kennedy coincided with an escalating crime rate (Vizzard, 2015). The Gun Control Act (GCA) of 1968 was enacted to enforce existing gun control laws. This act represented "the primary federal statute governing the possession of, and commerce in, firearms" (Vizzard, 2015, p. 882). This law was eventually amended by the Brady Handgun Violence Prevention Act of 1993, requiring "background checks be completed for all unlicensed persons seeking to obtain firearms from federal firearms licensees" (Krouse, 2013, p. 224).

Since then, the local debate on gun control and gun rights has escalated, especially in recent years when rates of gun violence surged. This point of contention, despite the alarming numbers, has deepened the divide among Americans. The debate over this issue comprises mainly two opposing arguments: first, advocates want more access to guns so that citizens can defend themselves (Rood, 2018); second, others champion more gun control laws as they argue easy access to guns results in more gun violence. Nonetheless, Kristin Goss (2006) argues that the voices of gun rights had overshadowed those of gun control, and only after the school shooting of Columbine High School near Denver in 1999 and other "sensational" ones that voices of gun control became efficient, especially with the aid of an increasing media coverage that raised public awareness of this issue.

Spitzer (2017) argues that proponents of gun control "carried more weight in America of the 1600s through the early 1900s than they do today" (p. 82). For instance, the U.S. Supreme



Court indicated that the Second Amendment protects gun ownership (Duignan, 2018), which This put an end to a District of Columbia attempt to ban handguns and “has rendered uncertain the constitutional limits of gun control measures” (“Gun Control Act,” 2014, p. 2146). As Spitzer (2017) concludes, state gun policies in recent decades tend to supply more access to guns. He wrote:

[The] reduction of gun sale inspections, the shielding of manufacturers and dealers from criminal and civil liability, the rise of unregulated internet gun and ammunition sales--as well as the spread of concealed carry laws, the open carry movement, and most recently of "stand your ground" laws are not a return to the past. (...) And these changes have nothing to do with improving safety or security in society, but everything to do with politics. (p. 83)

The political exploitation of gun laws has, according to Goss (2006), created some “loopholes” easily manipulated by politicians and gun lobbies, such as the National Rifle Association (NRA) that have been successful in shaping current regulations concerning carrying concealed weapons. The increasing numbers of mass shootings, especially those in schools, convinced some state legislatures, particularly in the South, to take actions allowing more concealed weapons on campuses (Hultin, 2018). The National Conference of State Legislatures (NSCL) states that more than 30 states have introduced or passed new laws regarding the carrying of concealed weapons on campuses, including Arkansas and Georgia in 2017. According to Hultin (2018), all the fifty states now allow concealed carry in public spaces if the carrier fulfills certain requirements. In 2019, while half of the states require a background check for buying an arm from a private seller, the other half does not (“Gun Law Trendwatch,” 2019), an example of the “loopholes” described by Goss (2006).

Nevertheless, Goss’s (2006) argument that “sensational shootings” are paving the way for tighter gun regulation appears to be true, especially in the more recent years. For instance, the

mass shooting in Parkland, Texas, in 2017 led to the passing of 69 state gun control laws in the same year, higher than any previous year since the shooting at Sandy Hook Elementary School in Newtown, Conn. in 2012 (Astor, & Russell, 2018). According to Giffords Law Center, the 2018 midterm election has contributed to the surge of state gun control policies, as numerous anti-gun candidates are now in office and tightening local gun laws; Michelle Lujan Grisham, Governor of New Mexico, for instance, has supported legislation that requires a background check on all forms of gun commerce ("Gun Law Trendwatch," 2019).

Unsurprisingly, the majority of Americans advocate gun restrictions in public spaces, especially schools (Wolfson, Teret, Azrael, & Miller, 2017). However, some state legislators still view public safety in allowing more guns in public (Wolfson et al., 2017; "Gun Law Trendwatch," 2019).

### ***1.5 The Case of Gun Policy in Arkansas***

In January 2017, Charlie Collins, then a Republican House Representative of District 84, Fayetteville, Arkansas, filed House Bill number 1249, known as HB1249, to the House Judiciary Committee, which passed it into Act 562 on March 23, 2017 (Arkansas State Legislature, 2017). This bill allowed licensed individuals “to carry a concealed handgun in additional areas, such as most public buildings and facilities and a public university or college campus” (“*Summary of General Legislation*,” 2017, p. 60). Licensees, according to this law, must complete certain training before carrying a firearm. Not only did this law allow carrying firearms in public places, but also permitted licensees to carry a concealed handgun in private areas “unless the private entity takes affirmative steps to explicitly prohibit the possession of a concealed handgun on the private entity’s premises” (*Summary of General Legislation*, 2017, p. 60).

HB1249 was not Rep. Collins's first gun bill (Doug, 2017). He tried passing his proposal in 2011, 2013 and 2015, but never successfully included educational institutions before 2017. The 2013 law, for instance, was amended to allow higher educational institutions such as the University of Arkansas to decide whether their staff members should carry firearms on campuses (Fanney, 2017). The House Bill 1249 immediately became controversial and faced a backlash from local communities, especially the campus community, Fayetteville Chamber of Commerce, and the Fayetteville Police Department (Bartholomew, 2017a, b). As a result, Rep. Collins gained a remarkably high statewide profile due to the public debates and discussions on his proposed bill (Thompson, 2018). Shortly after Gov. Asa Hutchison signed Act 562, legislation quickly was passed to exempt "public daycares, collegiate sporting events, the University of Arkansas Medical Sciences, and the Arkansas State Hospital if those places submit a security plan to the Department of Arkansas State Police that would designate them as arm-sensitive areas" (*Summary of General Legislation*, 2017, p. 60).

## II. Theoretical Framework

### II.1 *Framing Theory*

Framing theory assumes that mass communication media decide which aspects of the social world are newsworthy and in what frame they should be presented to the public. To understand this process, scholars have developed the concept of *framing* (Entman, 1993; Scheufele, 1999; Hurtíková, 2013). Framing, as a concept, is rooted in the agenda-setting theory; both methods are compliant with each other in influencing the target. If agenda setting tells people what to think about, framing tells them how to think about it. This is what Entman (1991) describes as the creation of salience, which is the process wherein news organizations tend to focus on specific aspects of social phenomena and omit or ignore others from their news stories so that the audience would interpret them accordingly (De Vreese, 2004; Scheufele, 1999). Framing, hence, allows the news media to manipulate and form a social reality “by framing images of reality (...) in a predictable and patterned way” (McQuail, 1994, p. 331).

Due to its interdisciplinary nature, the notion of framing lacks a unified definition (Hurtíková, 2013). Within the realms of political communication and journalism, however, scholars have attempted to define the concept. For instance, Gitlin (1980, p. 7) conceives of frames as types of social mechanisms that are “largely unspoken and unacknowledged, organize the world both for journalists who report it and, in some important degree, for us who rely on their reports.” Accordingly, Kinder and Sanders (1990) provide a clearer analysis that frames “are internal structures of the mind that help individuals [comprehend public issues;] they are also devices embedded in political discourse, invented and employed by political elites” (p. 74). Similarly, Entman (1991, p. 13), defines framing as “information-processing schemata.” These schemata, he states, is the process wherein news media choose “to select some aspects of a

perceived reality and make them more salient in a communicating text, in such a way as to promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation” (Entman, 1993, p. 52).

In this light, Scheufele (2009) pushes the analysis further and identifies two distinct concepts of frames—individual and media frames--as “schemes for both presenting and comprehending news” (p. 106). Following Entman’s (1993) conceptualization of the framing process, Scheufele (2009) views media frames as a necessary process to “turn meaningless and non-recognizable happenings into a discernible event, (which) allows the journalists to quickly identify and classify information” considering their audiences” (p. 106). According to Gamson and Modigliani (1987, p. 2), within the political realm, both individuals and media depend on others for the construction of frames. “Media discourse is part of the process by which individuals construct meaning, and public opinion is part of the process by which journalists (...) develop and crystallize meaning in public discourse” (Gamson & Modigliani, 1987, p. 2).

Further, previous research on news media coverage and tone suggests that media frames have a strong tendency towards negativity, especially when it comes to politics. Eshbaugh-Soha (2010) for instance, examined 288 local news articles about the Bill Clinton and George W. Bush administrations. He concluded that the news coverage of these two presidencies was more negative than positive. Similarly, Soroka, Young, and Balmas (2015), for instance, examined 55,000 front-page news stories for negativity and concluded that “fear” and “anger” predominated news sentiment. Soroka and McAdams (2015) arrived at similar results, arguing that “negative news elicits stronger and more sustained reactions than does positive news” (p. 1).

Additionally, Haselmayer & Jenny (2016) applied sentiment analysis to measure media tone and negative campaigning by political parties and found that the news sentiment was overall

negative, especially when a politician's name was mentioned, suggesting that the news coverage of politicians was cynical. Dunaway (2013) suggests that ownership and business financial goals are determinants of the tone (negative, positive, neutral) of news media coverage. On the other hand, Soroka and McAdams (2015) argue that humans, in general, are more attentive to negative information and thus the news bias towards negativity should be perceived “in part as a consequence of this asymmetry bias observed in human behavior” (p. 1). This negativity in news tone is implicated in this thesis findings.

## ***II.2 Framing Gun Policy***

According to Kinder and Sanders (1990), political elites capitalize on issue framing to serve their own ideological and political ends. Tadlock (2014) highlights that *issue frames* take place because people tend to relate their social values. For example, politicians who advocate gun rights policy would focus on the *right* and *safety* aspects of owning a firearm to frame it in a manner that is relatable for their followers (Tadlock, 2014). This idea is implicated in some of the main findings of this thesis (see Findings and Discussion sections).

Scholars who study the gun debate tend to view it as a subject of political polarization, which makes it also subjective to frames in mass communication media. The literature on framing the gun debate can be categorized into two themes: framing via news media and via social media.

### ***II.2.1 Framing Gun Policy in the News Media***

Drawing on Entman's (1991) definition of framing, news media frames are powerful and influential due to their ability to create salience and decide the frame in which the public see,

read, or hear about a particular reality. Some observers posit that mass shootings in the United States in the last two decades have intensified the local and national debate about gun policy, as well as the news coverage of such a phenomenon (Goss, 2006; Spitzer, 2017).

Callaghan and Schnell (2001), for instance, studied the extent to which news media frame the political conversation about gun control. They compare news media frames of the Brady Bill of 1994 that mandated federal background check and the Federal Assault Weapons Ban of 1994 to the frames of interest groups and public figures. They concluded that while political players tended to frame the gun control debate according to their interest, “Constitutional Rights” vs. “Constitutional Limits,” news media mitigated the overall process and structured the debate, using different and distinct frames like “Political Contest” and “Court Challenges” (p. 196). This study also suggested that news frames about Brady Bill and Assault Weapons Ban were more likely to include frames from the anti-gun political discourse—due to its dramatic and emotional nature—than those of the pro-guns ideology (Callaghan and Schnell, 2001). Similarly, Birkland and Lawrence (2009) investigated news media frames of the school shooting of Columbine in 1999 and concluded that most of the news media’s causal frames were “pertaining to gun violence and pop culture” (p. 1422).

Further, McGinty, Webster, Jarlenski, and Barry (2014), examined news stories about gun violence from 14 different news sources from 1997 to 2012. The study measured the impact of news media frames on individuals’ attitudes toward gun policy and found that media frames like “dangerous-people” were predominant in news stories they reviewed than frames such as “dangerous weapons.”

Also, McGinty, Wolfson, Sell, and Webster (2016) examined news media framing of sale background checks in the wake of Newtown mass shooting in 2012, and concluded that pro-

background check news media frames were factual and argumentatively rational, whereas anti-background check news media “often used rights-based frames designed to activate the core values of politically engaged gun owners” (p. 3).

Recently, Steidley and Colen (2017) studied the framing strategies in the press releases by the National Rifle Association and the Brady Campaign. They found that the press releases both organizations constructed frames strategically in their press releases as an appealing instrument to the public, while news media had their own frames that at times aligned with some those of the organizations.

Although the literature suggests that news media framing is influential in shaping individuals’ perceptions and attitudes, yet it fails at times to influence gun policy. For example, McGinty et al. (2014) discovered two main news frames “dangerous people” and “dangerous weapons” in coverage of gun policy. According to the study, dangerous-weapons frame improved public support for more legal restrictions on certain types of guns, while dangerous-people frame failed to raise public support for more constraints on gun ownership for people with severe mental illness (McGinty et al., 2014).

### *II.2.2 Framing Gun Policy on Social Media*

Previous research on social media and gun policy suggests that the public, including journalists and political groups, mainly use Twitter to construct narratives and frame policy issues (van der Meer & Verhoeven, 2013; Choi & Park, 2014; Merry, 2016b; Moody-Ramirez & Cole, 2018).

Merry (2016a) described how pro-gun rights organizations like the NRA and pro-gun control groups such as the Brady Campaign to Prevent Gun Violence used Twitter to frame the



debate about the policy. She found that these organizations framed “villains” and “heroes” strategically based on their ideological views of policy solutions. In this study, she analyzed roughly 10,000 tweets from 2009 to 2014 and found out that both the NRA and the Brady campaign tended to avoid their opponents in their conversations about gun policy on Twitter, keeping the conversation amongst their followers and allies instead. The study also pointed out that both interest groups employed different frames when tweeting about gun policy. Tremayne and Minnoie (2013) examined the effect of opinion leadership on the debate on Twitter after multiple mass shootings. They found that gun rights leaders’ frames predominated those of gun control leaders. In other words, the overall pro-gun rights discourse on Twitter was prominent during the three-month study period although pro-gun control voices dominated at times.

Moreover, Wasike (2017) examined how persuasion and credibility were framed via Twitter messages after the Newtown mass shooting. The study demonstrated that the frames used by pro-gun control advocates had more credibility and persuasion than those of pro-gun rights advocates. It also found online news media frames were more credible and persuasive than those of Twitter (Wasike 2017).-Framing, hence, is an appropriate theoretical framework for this thesis since the thesis; it helps deconstruct the political discourse on Twitter, as well as the news coverage of gun policy.

### **III. Methodology**

In this section, I describe automated content analysis as a method to examine tweets (n = 354) gathered from the Twitter accounts of the three Arkansas politicians, Collins, Garner, and Leding. I also examine news articles (n = 40) gathered from the *Northwest Arkansas Democrat-Gazette*, *Jonesboro Sun*, and *Malvern Daily Record*. I use the R programming language to conduct the analysis. I categorized and summarized textual data into clusters of words to find the most common words and frames and then applied sentiment dictionaries on data to generate scores of emotional contents. I created data visualizations with the results. These processes are discussed in detail as follows:

#### ***III.1 Content Analysis***

Content analysis is one of the most efficient ways to examine content be it written, audiovisual, or verbal (Wimmer, & Dominick, 2014, p. 156). Berelson (1952) defined content analysis as a “systematic, objective, quantitative description of the content of communication” (p.18). Krippendorff (2004) adds that content analysis is “a research technique for making replicable and valid inferences from texts to the contexts of their use.” (p. 18).

Content analysis can be either quantitative or qualitative (Elo, & Kyngäs, 2008). “Where quantitative content analysis helps answer ‘what’ questions, qualitative content analysis can help answer ‘why’ questions” (Julien, 2008, p. 120). The quantitative analysis is the task of transforming communication materials (e.g., news article or tweets) into a manageable way that helps make inferences and drawing conclusions from the data (Riffe et al., 2014, p. 18). Nonetheless, Krippendorff (2004) argues that, “all reading of the text is qualitative, even when certain characteristics of a text are later converted into numbers” (p. 20). That is, the qualitative

nature is inherent in almost any text, and computer summarization of a given text does not alter this fact. Therefore, this thesis is considering both quantitative and qualitative analyses, an approach known as “mixed methods.” While a quantitative content analysis will reflect the numerical face of political tweets and news (i.e., numbers of percentages of words or frames and sentiment in the data), qualitative content analysis will interpret the findings and make inferences from them.

Content analysis nowadays can benefit from new data analytics strategies such as text mining. Text mining is an interdisciplinary approach that extends data mining from computer science and statistics to linguistics, which has earned an increasing popularity among scholars from all over the scientific world (Feinerer, Hornik, & Meyer, 2008). Text mining is the task of using algorithms for document clustering and text categorization to elicit latent information from unstructured textual data like tweets (Sebastiani, 2002; Zhao, Karypis, & Fayyad, 2005; Hornik, et al., 2013; Yunis, 2015).

This thesis adopts text-mining techniques to conduct an automated content analysis because this approach is much more convenient for the task of structuring and discovering knowledge latent in political tweets and news articles than otherwise. Retrieving non-superficial knowledge from big and unstructured texts is not only expensive but also time-consuming for an individual to achieve without text mining methods (Feinerer et al., 2008).

### ***III.2 Sentiment Analysis as a Method***

Automated sentiment analysis is an approach rooted in text mining. However, while text mining offers the ability to cluster, categorize, and summarize texts, sentiment analysis employs

these algorithmic operations to measure sentiment and emotions in texts. Soroka, Young, and Balmas (2015) define sentiment as:

A broad construct comprising attitudes, opinions, and emotions, where (1) attitudes refer to positive or negative evaluations, (2) opinions refer to judgments and beliefs, and (3) emotions refer to feelings” (p. 111). Therefore, sentiment analysis detects and extracts these features from a given discourse to make “inferences about the attitudes, opinions, or affective state of a speaker. (p. 112)

The Internet, social media in particular, comprise great avenues for sentiment analysis. That is, people use social media, namely Twitter, to express their opinions and reflect on social issues. According to Liu (2015), here is where sentiment analysis gains its importance as a computational method to study these opinions and attitudes. He says, “to extract and exploit information in social media, sentiment analysis is a necessary technology” (p. 3). Similarly, Li et al. (2018) explain that Twitter users lack “facial cues” to express their emotions and attitudes physically, and that their only way to do so is through tweets; they ought to embed those feelings and attitudes within their tweets. Sentiment analysis has become a popular approach to study and analyze opinion and emotional valence in online data (Cho et al., 2003; Bollen, Mao, & Pepe, 2011; Cody et al., 2015; Mohammad, 2016; Barnaghi, Breslin, & Ghaffari, 2016; Sobhani, & S. Kiritchenko, 2017; Oliveira et al., 2017; Dorle, & Pise, 2018). Some scholars in the realm of social science have also adopted it to examine polarity and tone in media news stories (Hopkins & King, 2010; Monroe, Colaresi, & Quinn, 2008). This offers an excellent opportunity for sentiment analysis and makes it a suitable approach for studying political opinions about gun policy on Twitter.

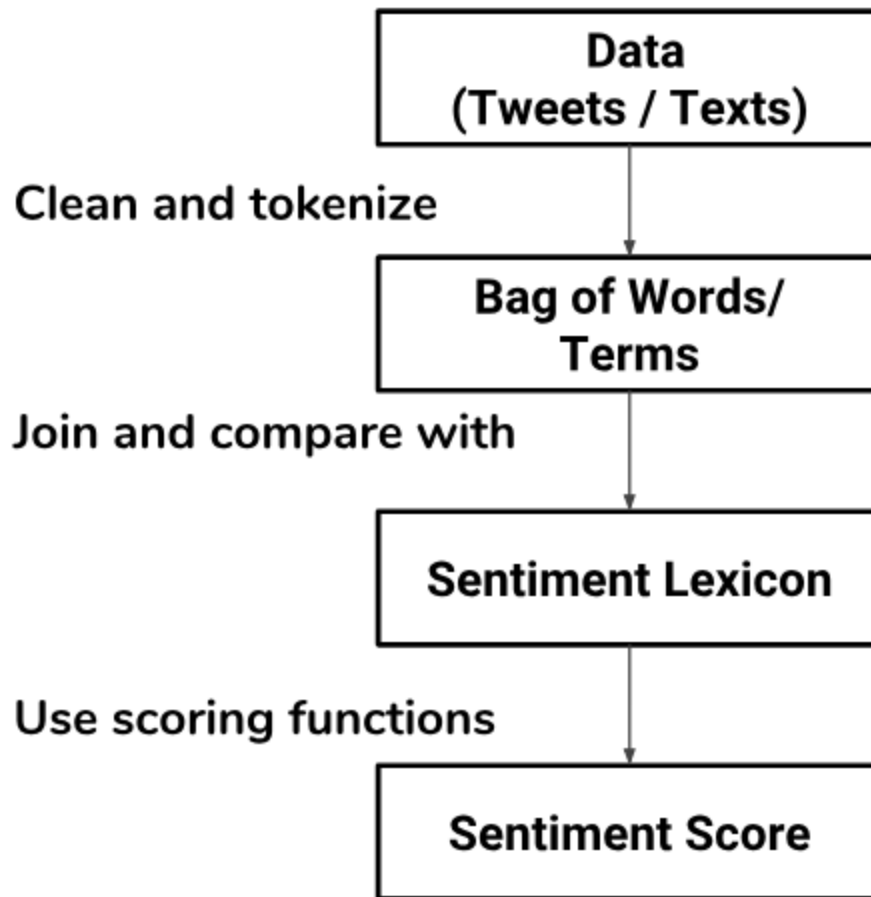
Previous research on sentiment analysis indicates that it is a powerful tool for structuring and classifying unstructured online textual data, like Twitter messages. It helps identify feelings and degree of polarity, such as whether a tweet is positive, negative, or neutral (Oliveira,

Bermejo, & dos Santos, 2017). In the context of this thesis, sentiment analysis helps detect a politician's or a newspaper's sentiment towards gun policy in Arkansas.

This computational method of coding and annotating textual data, especially a large corpus of Twitter data, is generally difficult for a single person (Haselmayer & Jenny, 2016; Mohammad, 2016). Automated sentiment analysis produces similar results as humans in terms of sentiment associations and scoring (Haselmayer & Jenny, 2016).

Automated sentiment analysis can be performed in two ways, through machine learning or a lexicon-based method. In machine learning approach, the computer is initially trained by a training data set, which is a list of words that already have been humanly annotated and given sentiment (positive/negative/neutral) (Mohammad, 2016). The training set allows computers to detect and predict sentiment in similar data (Haselmayer & Jenny, 2016). This thesis uses a lexicon-based method, as figure (1) shows. It is the process wherein sentiment scores are assigned to the data based on a lexicon or dictionary that has a list of humanly annotated words with their own sentiments. In this approach, the computer, without prior training, assigns sentiment scores to words in the data based on their scores in the lexicon that has been already trained and validated by computer scientists.

The lexicon-based approach of sentiment analysis tends to outperform machine learning method (Zhang, Ghosh, Dekhil, Hsu, & Liu, 2011; Younis, 2015). Nowadays, numerous lexical dictionaries were created by scholars specifically to perform sentiment analysis. These dictionaries include the Bing Lexicon by Hu and Liu (2004) and the NRC Emotion Lexicon by Mohammad and Turney (2010) that are famously used for sentiment analysis. Thanks to these dictionaries sentiment analysis of large textual data is more efficient through machines (Mohammad, 2016).



*Figure 1: Process of a Lexicon-based Sentiment Analysis.  
Note: chart adapted from Younis (2015).*

Moreover, previous research indicates that sentiment analysis of textual data is mostly applied at the document, sentence, and word levels. At the document-level, sentiment scores are assigned to the text document as a whole, whereas, at the sentence-level, the text is broken into sentences, and each sentence has its sentiment score, Finally, at the word-level, words in the text document consist of sentiment units and each word is independently associated with a sentiment score (Mohammad, 2016; Dorle & Pise, 2018). This thesis adopts sentiment analysis at the word level because most sentiment dictionaries were designed to treat words as individual entities and,

thus, associate sentiment each word independently. However, it is worth noting that one big downside of sentiment analysis is that it lacks the ability to handle negating words like “no,” “yet,” and “not,” which reverse the actual sentiment of the word that follows (Hu & Liu, 2004; Kaur, Manga, & Krail, 2017), and, thus, fails to capture the contextual sentiment of a term. In the example of “gun are not good,” typical word level sentiment analysis would associate a positive score to “good,” while it, in fact, has a negative sentiment in this context. Therefore, in this thesis, the overall sentiment of both the news articles and the political tweets will be measured at the sentence level with negation in mind so that the contextual sentiment will be preserved, according to the methodology of Hu and Liu (2004).

In the process of sentiment analysis, words can be clustered and categorized using either Unigrams, Bigrams, or Ngrams; while Unigrams refer to single words, like “gun,” Bigrams refer to a combination of two words like “gun control,”(Mohammad, 2016; Hachaj & Ogiela, 2018) and Ngrams refer to a word cluster of two or more terms. According to Soroka et al. (2015), lexical dictionaries are well suitable when it comes to detecting emotionality in textual data. In this study, the author applied the sentiment analysis at the word-level, using Bing, and the NRC dictionaries because words are the smallest meaningful units from which sentiment can be determined and that both sentence and document levels’ sentiment is calculated based on the average score of total words.

The NRC Lexicon, in particular, is the largest available dictionary, with around 14000 words associated with sentiments, and also ranked number one in sentiment analysis of tweets, with an F-score of 88.93 at the word-level (Mohammad, Kiritchenko, & Zhu, 2013). Whereas Bing only measures polarity (positive and negative) scores, the NRC dictionary provides

sentiment scores for eight basic emotions besides polarity. According to Mohammad (2016), these emotions include (joy, trust, fear, anger, sadness, anticipation, disgust, and surprise).

### ***III.3 Proposed Methodology – R Programming Language***

The methodology in this thesis follows a combination of a traditional text mining method developed by Homik and Meyer (2008) and a “tidy approach,” which is a subsequent way to text mining and sentiment analysis presented by Silge and Robinson (2017). Additionally, the R open source software is used to perform these tasks (Younis, 2015). R is an open source software with great data management, statistical, and graphing abilities. It has wide usage in journalism and data science (R for Journalism, n.d.). Details about the R can be found at <https://www.r-project.org/>. The R code and data for this study can be found on GitHub website (see appendix).

The traditional method and the tidy approach to text mining and sentiment analysis suggest similar, but slightly different computational operations. The tidy approach is much faster and generally more effective. Whereas the traditional method relies on the tm package in R (Homik & Meyer, 2008), the tidy approach is based on the tidytext package (Silge & Robinson, 2016). Packages, also known as libraries, are software programs that make R functions. The proposed methodology follows these steps respectively, as shown in figure (2):



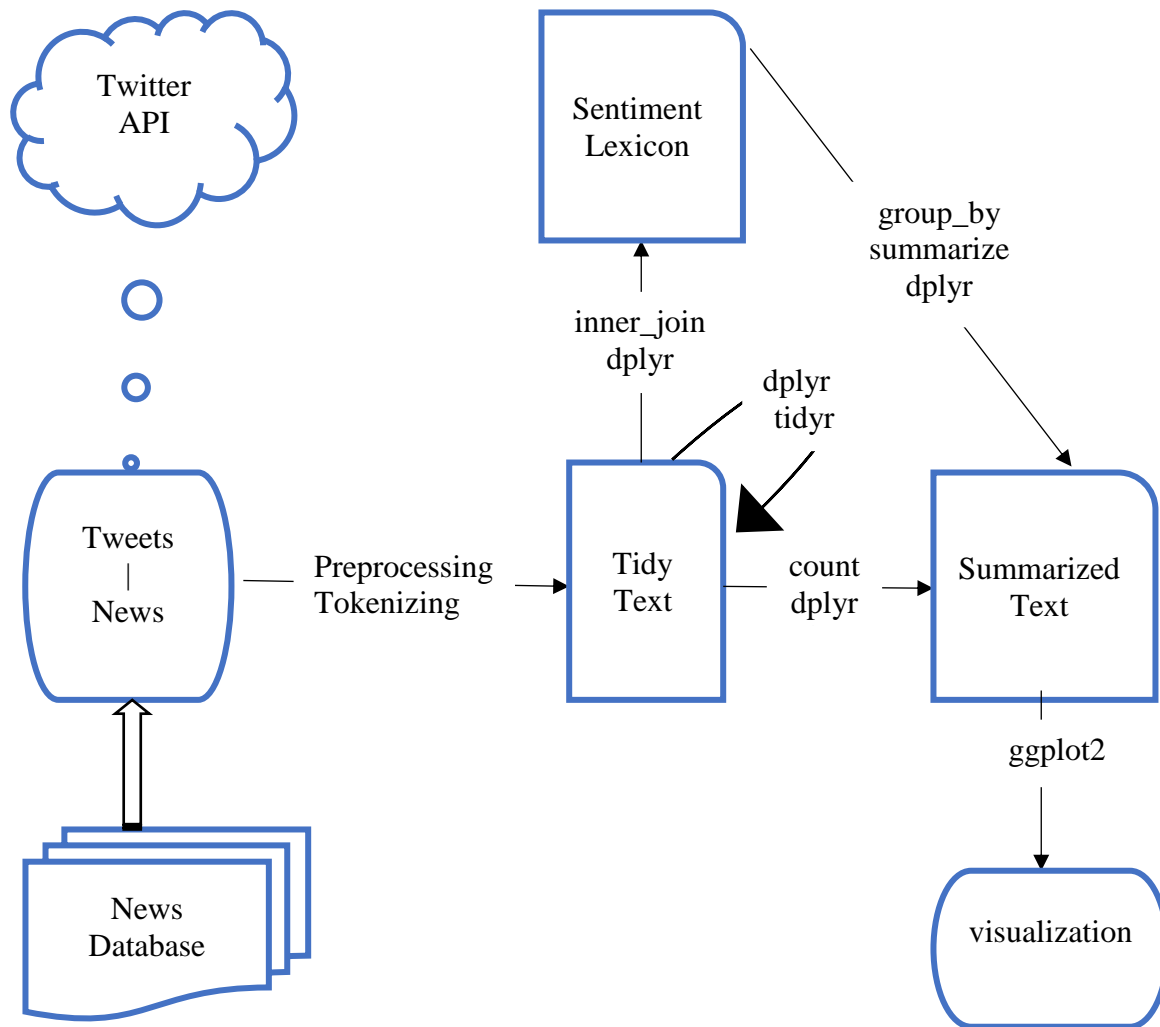


Figure 2. The Proposed Methodology of Sentiment Analysis using the R Programming Language  
 Note: Graphic adapted from Silge and Robinson (2017).

(a) **Data Collection:** the data in this thesis constitute of Tweets and news articles. The data collection process is as follows:

*Twitter Data:* the tweets were retrieved from Twitter Application Programming Interface (API), using “rtweet” package in R (Kearney, 2018) to search for specific users by their Twitter handles. In this research thesis, tweets were collected from the accounts of Collins, Leding, and Garner (n = 354 gun-related tweets) from June 1, 2018 to November 30, 2018. It should be noted that the initial data obtained from Twitter API consisted of 5,086 tweets, and then reduced to

include only the gun-related tweets (the filtering description is in the Data Preprocessing section). These political figures were manually identified because they are prominent users of the platform and were leading voices in the gun debate. It is worth noting that the free version of Twitter API set a maximum 3,200 limit on the number of tweets that can be retrieved from personal accounts.

*News Data:* Using America's News database, I conducted a search for articles on gun policy using keywords like "campus carry," "concealed carry," "handgun law," and "act 562" (see appendix for a complete list of keywords). The search included three newspapers, *Northwest Arkansas Democrat-Gazette*, *Jonesboro Sun*, and *Malvern Daily Record*. The period of news coverage was from March 23, 2017, which was the date when the concealed carry legislation was enacted, to November 30, 2018. I restricted the search engine to look for articles solely from newspapers, considering the research question involving newspapers' coverage of the gun policy. All redundant, non-editorial, and unrelated articles were disregarded. The final total number of news articles ( $n = 40$ ) includes the headline and the full text of each.

**(b) Data Preprocessing:** This step, also known as tidying or cleaning, is necessary for sentiment analysis and text mining (Soroka et al., 2015). The first step in this process is using R filtering functions to identify tweets that are specifically about guns. This task is achieved using these keywords (gun|ccl|chcl|guns|murder|death|killer|violence|act562|act589|carry). Then, the Text Mining (tm) package in R (Feinerer, 2018) and dplyr package (Wickham, Francois, Henry, & Müller, 2015) were utilized for initial data cleaning. These packages allow researchers to to (a) omit (URLs) embedded within tweets; (b) remove punctuation; (c) remove stop-words like "to," "at," and "in"; (d) remove numbers and specific and irrelevant words like "can," "do," and "today." This preprocessing reduces the noise and ambiguity in the data (Soroka et al., 2015) and

produces the text in a document-term-matrix or a bag of words. I applied the same preprocessing operations to the news data except for the first step that was performed in the collection process.

In addition, there were no links in the news data.

*(c) Data Summarization:* At this stage, the data is structured and cleaned, and the analysis is carried out using a myriad of R functions. For instance, term frequency functions in the dplyr package helped find the most frequent words used the data. At this point, tasks of sentiment analysis could be performed, and scores could be generated joining sentiment dictionaries to the data, as figure (5) demonstrates.

*(d) Visualization:* This is the last part the process of text mining and sentiment analysis wherein the data are summarized, and text patterns are visualized with or without sentiment scores, using multiple R packages such as “wordcloud” (Fellows, 2018) and “ggplot2” (Wickham, 2016).

## IV. Findings

### IV.1 Political Frames

To extract frames from the political tweets, I clustered words in each politician's dataset into bigrams (sequences of two words in each.) These bigrams repeatedly appeared, as frames, in the gun-related tweets of Collins, Garner, and Leding, and then I aggregated them based on their frequencies in each dataset, following a pre-processing step.

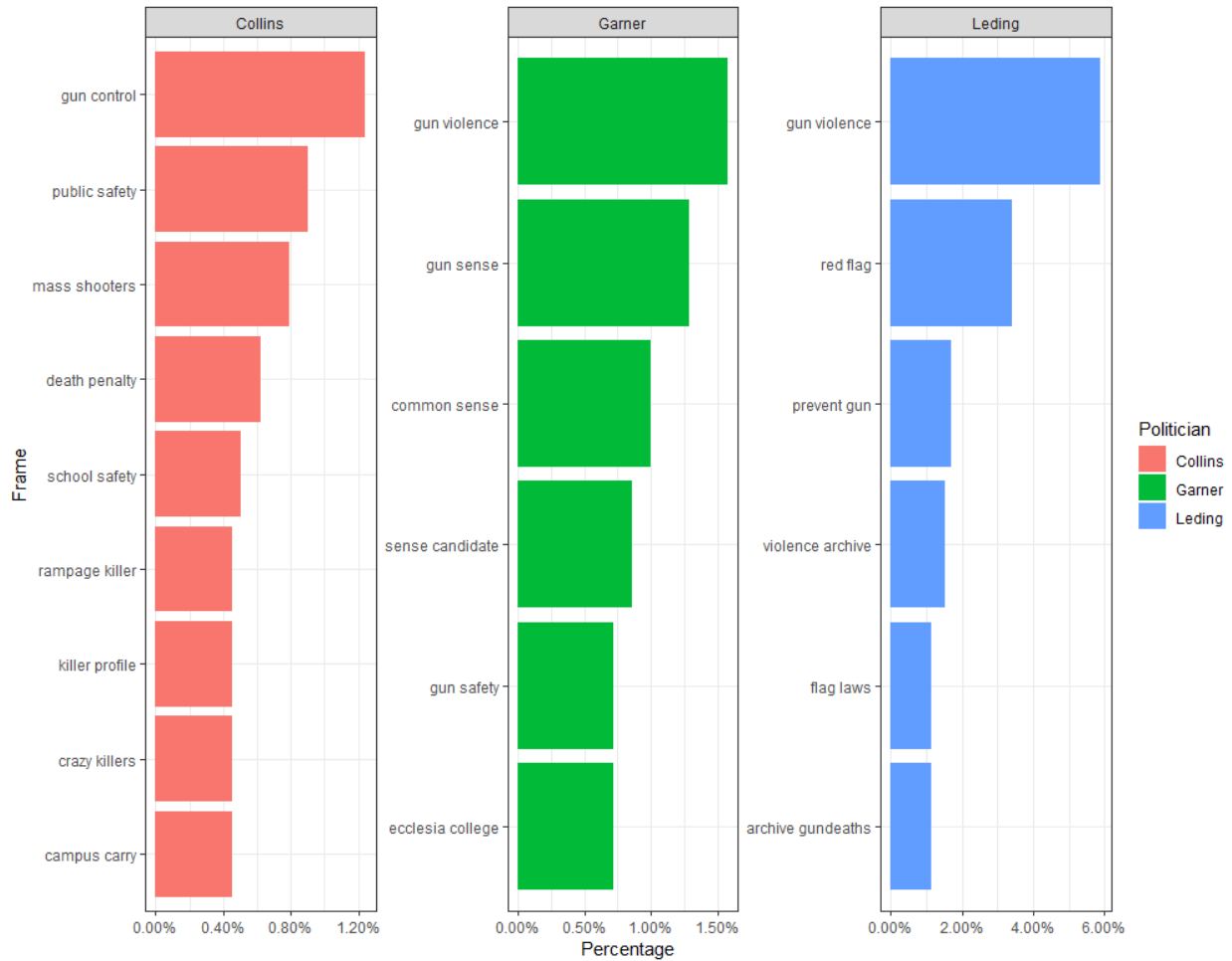


Figure 3. Political frames in the gun-related tweets.

Note: Chart represents the most frequent frames used by Collins, Garner, and Leding.

Bigrams, according to Hachaj and Ogiela (2018), can demonstrate what a writer is talking about in their text. This analysis shows the discourse used by the politicians to frame gun policy. In other words, the frames reveal these politicians' perceptions and rhetoric.

Figure (3) represents the most common frames in the gun-related tweets of Collins, Garner, and Leding. "Gun control<sup>1</sup>" is the main frame in Collins's tweets, whereas "gun violence" is the main frame in both Garner's and Leding's tweets. Frames such as "public safety," "mass shooter," and "rampage killer" in Collins's rhetoric indicate that he is promoting a high concern narrative about public safety without guns. Garner, on the other hand, relies on frames such as "gun sense," "common sense," and "sense candidate," appealing for a more meaningful and middle ground policy, while Leding exploits frames such as "red flag," "prevent gun," and "flag laws," expressing his dissatisfaction of the current gun policy.

#### ***IV.2 News Media Frames***

News media frames, as figure (4) shows, were different from political frames. The most used frame by the *Jonesboro Sun*, *Malvern Daily Record*, and *Northwest Arkansas Democrat-Gazette* was "concealed carry." These local newspapers used almost identical frames in their coverage of the gun policy, and none of the political frames was included. Also, these frames appeared to be fact-based or not opinionated. For instance, *Jonesboro Sun* journalists wrote about "enhanced training," "concealed handguns," and "carry permit." Similarly, *Northwest Arkansas Democrat-Gazette* journalists wrote more about "carry permit" and "permit holders." The *Malvern Daily Record* used slightly different frames such as "active shooter" and

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<sup>1</sup> The essence of this frame is that Collins uses it to argue against or attack others who use gun control arguments.

“constitutional carry.” The discussion of newspapers’ frames is more detailed in the Discussion section.

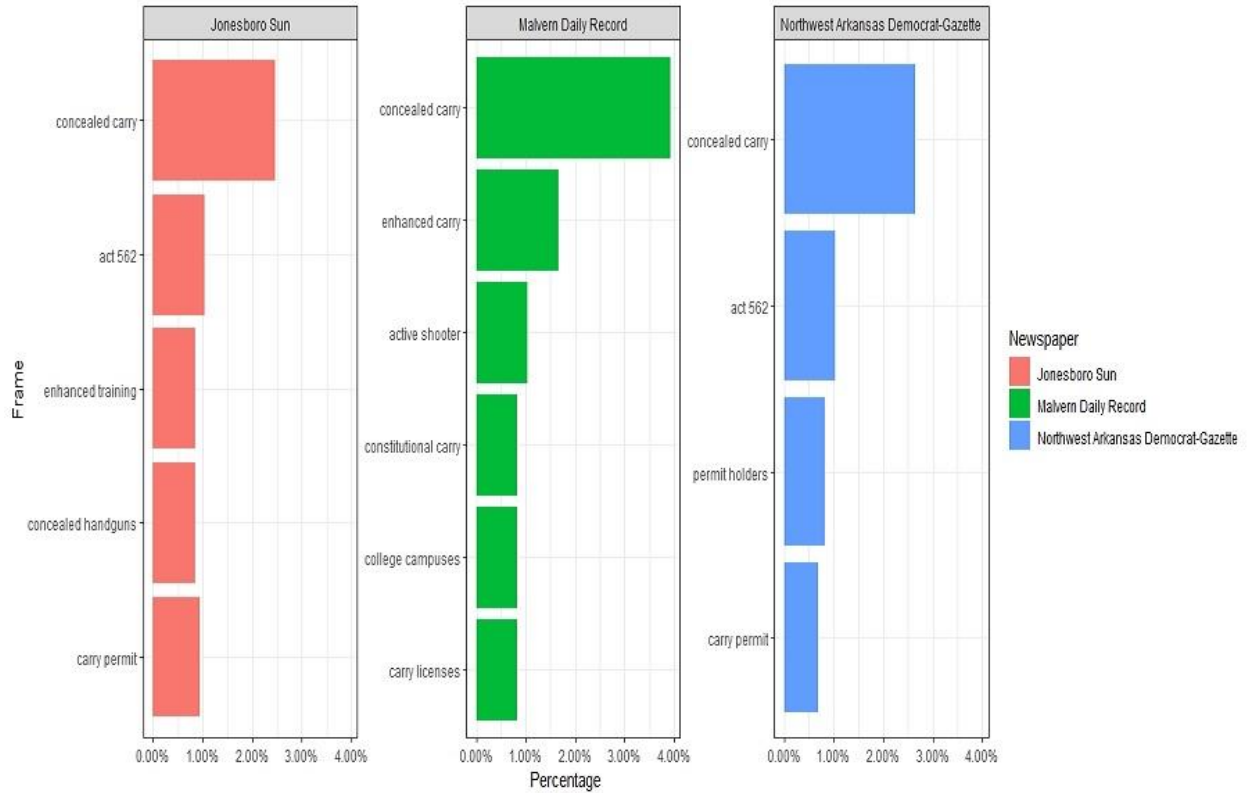


Figure 4. News media frames.

Note: Chart represents the most frequent frames used in news articles about gun policy, from March 2017 to November 2018, by Jonesboro Sun, Malvern Daily Record, and Northwest Arkansas Democrat-Gazette.

### IV.3 Word Usage

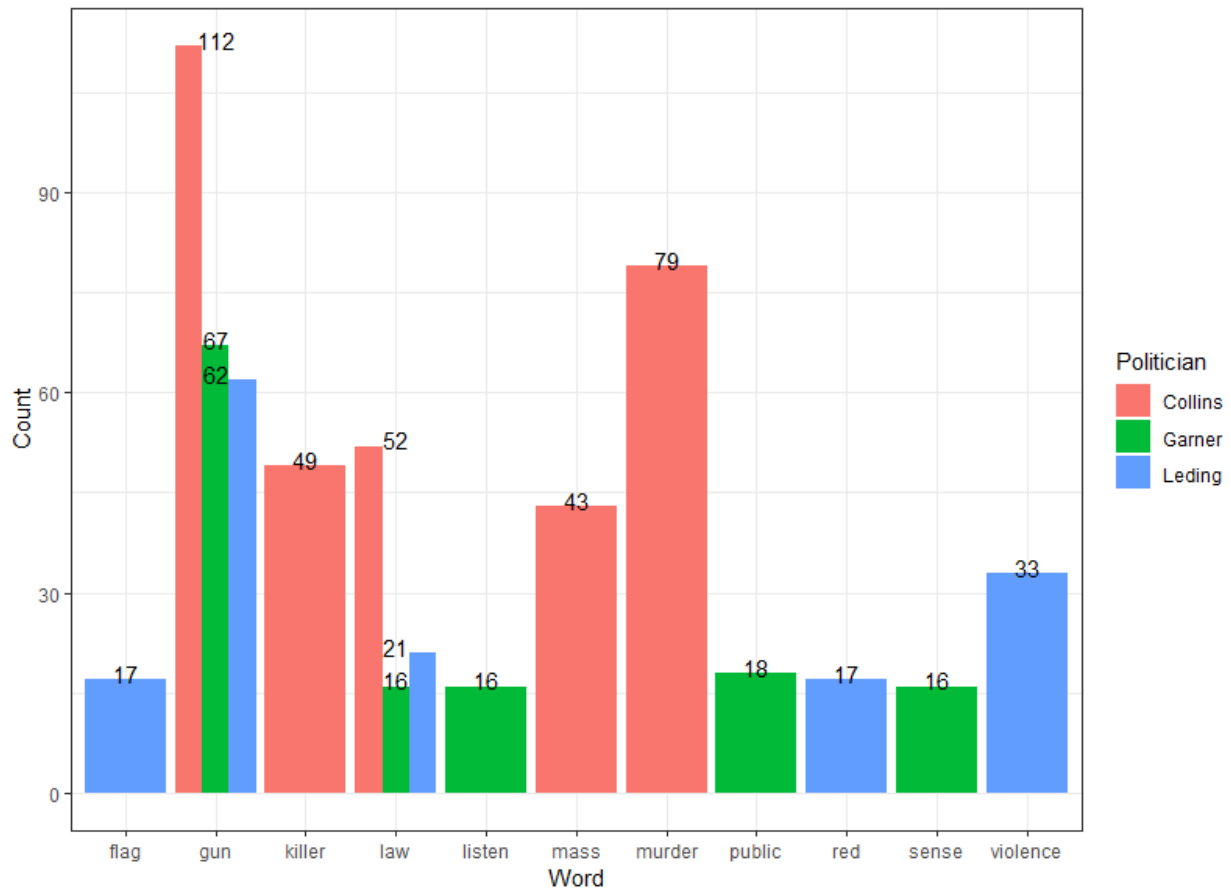


Figure 5. The most common words in political tweets.

Note: The chart compares the most frequent words in each politician's tweets based on their occurrences in each politician's data set. The Y axis represents word's occurrence.

There was a significant variation in the gun-related tweets generated by Collins, Garner, and Leding. Figure (5) shows counts of the most frequent words in each politician's tweets. The comparison of word usage was based on word's weight in their own datasets instead of a mere word count, which is important for illustration purposes. That is, the significance of a word frequency comes from its *coefficient* compared to other words in the same document. This is important for measuring the extent to which a term is used.

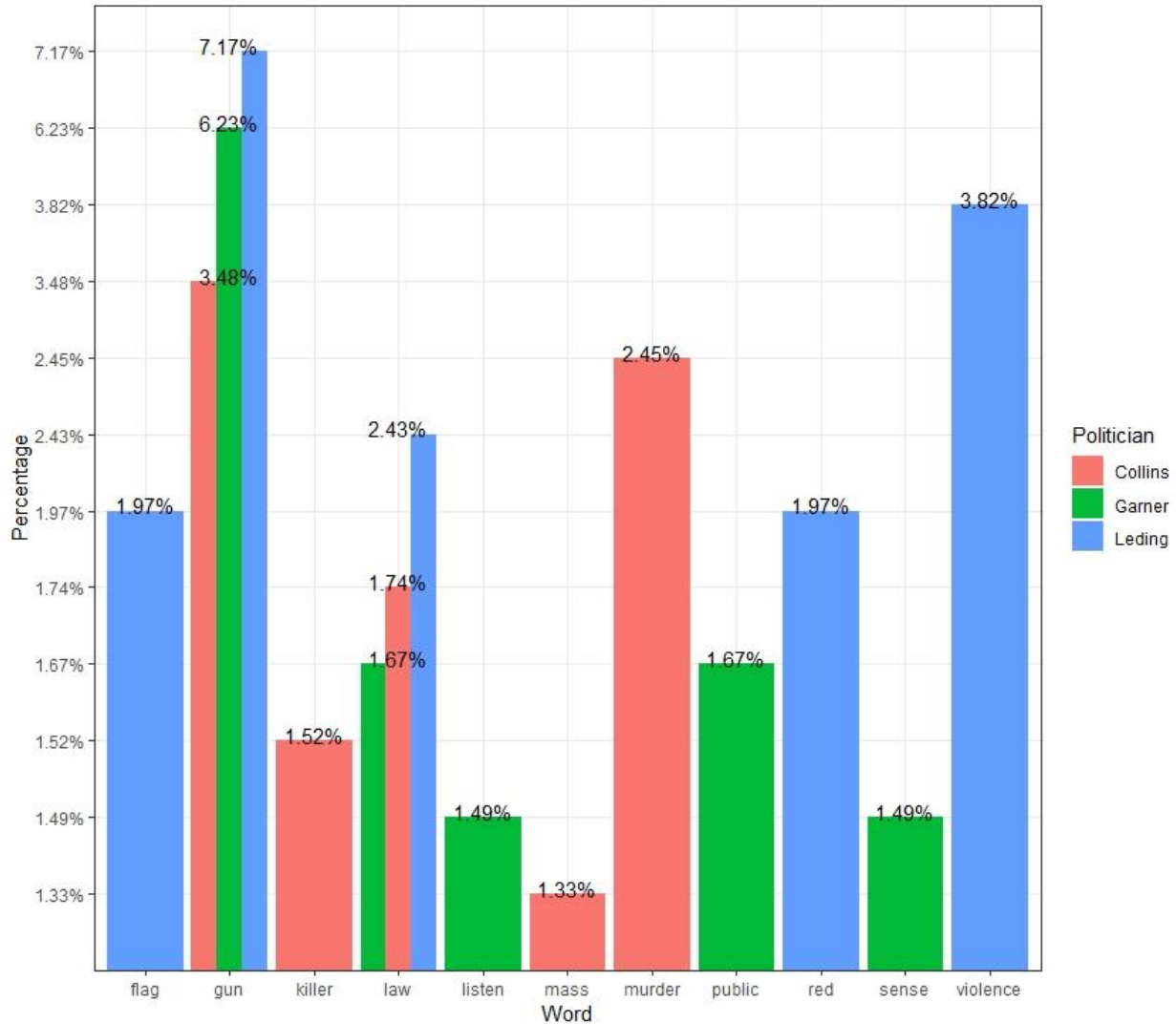


Figure 6. The most common words in political tweets.  
 Note: This chart show the most commonly used words based on their percentage in politician's data set.  
 The Y axis represents word's coefficient..

The preliminary automated results indicated that the term “gun” is the most used in gun-related tweets of the state politicians. Although this finding was intuitively obvious, it was still important to find out the extent to which the term “gun” was used by each politician, as figure (5) shows. Additionally, To discover more informative and latent terms, hashtags like “#arleg” and “#arpx” as well as user handles like “@DeniseforAR” and “@CollinsARK” were omitted from this stage of analysis because they tell very little about word usage regarding gun policy.



Figures (5 and 6) show that the word “gun” usage varies among the gun-related tweets of Collins, Garner, and Leding in terms of occurrences and how much the word weighs in each politician’s tweets. Collins, for example, uses the “gun” almost double the time Leding uses it. However, the word’s percentage in Leding’s tweets is 7.1%, while it is only 3.4% in Collins’s and 6.2% in Garner’s tweets. This suggests that the term “gun” is more important in both speeches of Leding and Garner than it is in Collins’s tweets.

Figures (5 and 6) indicate the term “law” and “gun” are commonly used across Collins, Garner, and Leding’s gun-related tweets. These terms are found most in Leding’s tweets at 2.4%, which is slightly higher than it is in Collins’s 1.7% and Garner’s 1.6%, tweets. This, hence, suggests the word has a higher importance in Leding’s speech than the other politicians.

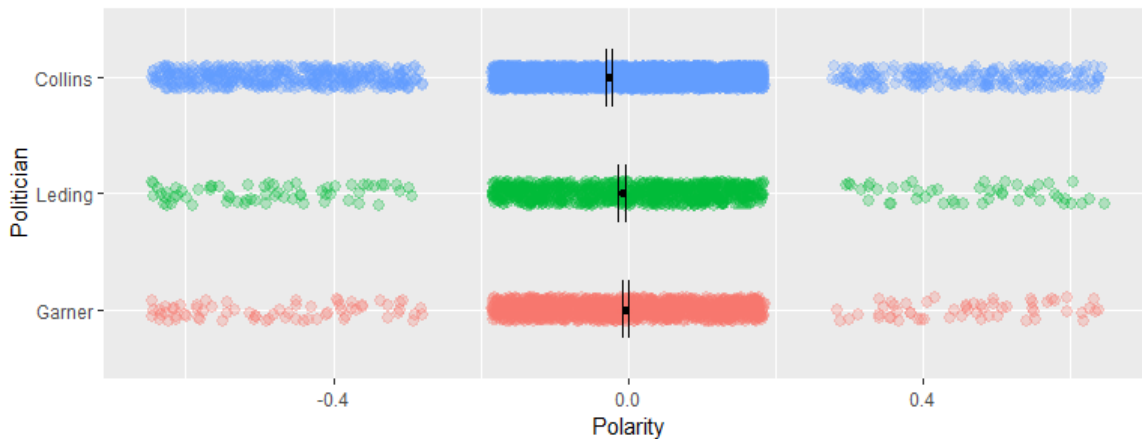
The figures, also, show that there are terms that seem to be unique for each politician. Collins, for example, highly uses “murder,” “killer,” and “mass” that do not appear to be used much by both Garner and Leding. Also, Leding uniquely uses “violence,” “red,” and “flag.” Garner, on the other hand, highly employs “public,” “listen,” and “sense” at a high rate that do not appear as much in Collins and Leding’s gun-related tweets.

#### ***IV.4 Sentiment Analysis***

##### ***IV.4.1 Political Sentiment***

Given that polarity is the degree to which people’s opinions and attitudes toward a particular phenomenon diverge (Morales et al., 2015; Barnaghi, Breslin, & Ghaffari, 2016), the gun-related tweets of each politician were assigned average polarity scores, using the Bing Lexicon Dictionary. Polarity measures the average sentiment in the language used by Collins, Garner, and Leding in their tweets. This process was performed using the “sentimentr” package

in R by Rinker (2019). “Sentimentr” allows the application of dictionary lexicons, like Bing, on documents taking into consideration “valence shifters,” which “are words that alter or intensify the meaning of the polarized words and include negators and amplifiers” (Rinker, 2018, p. 4).



*Figure 7. Average sentiment in political tweets.*

Note: The plot shows the average polarity of the whole discourse of each politician based on the number of negative vs positive words they use on Twitter. Whereas (-) represents negative sentiment, (+) indicates positive sentiment.

The findings, as figure (7) shows, indicate these politicians’ overall sentiment is negative although they hold different stances when tweeting about gun policy. Collins, for instance, has the most negative sentiment in his gun-related tweets, averaging -.026 on the Bing Lexicon sentiment scale, which ranges from -1 to 1. Leding also shows similar, although slightly less negative, degree of polarity in his sentiment to that of Collins, averaging -.025, whereas Garner shows less negativity than both in her gun-related tweets, averaging -.008. As figure (7) indicates, Garner’s sentiment being closer to the median suggests that she holds a less polarized opinion on the gun policy than both Leding and Collins. Although sentiment polarity is informative in terms of discovering the average sentiment in which these politicians are conversing the gun policy in their tweets, it would be more insightful to find out how this sentiment is distributed in terms of emotional valence.

Therefore, as figure (8) shows, the analysis was carried out one step further, wherein words in the gun-related tweets were classified into eight basic emotional categories: anger, anticipation, disgust, fear, joy, sadness, surprise, and trust, based on the NRC Emotion Lexicon. Figure (8) indicates that “fear” was the most expressed feeling by Collins, Garner, and Leding, followed by “anger.”

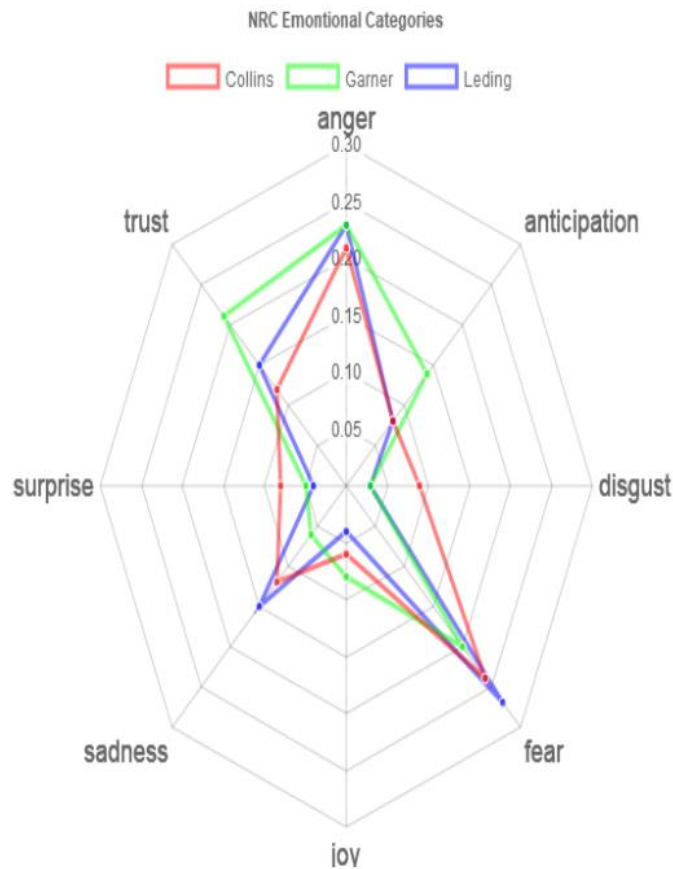


Figure 8. A Radar chart of emotional valence in political tweets.

Note: numbers 0.5 to 0.30 on the vertical line indicate a percentage (%) scale for emotions’ distribution.

As the radar chart indicates, Leding expresses “fear” in 27 percent of his gun policy discourse, significantly higher than both Collins at 24% and Garner, 20%. Both Leding and Garner expressed “anger” 2 percent higher than Collins, who exhibited this feeling in 20% of his gun-related tweets. While both Collins and Leding expressed more negative emotions like

“sadness” 13% and 15% respectively, Garner shows substantially higher “trust” 21% and “anticipation” 14% in her policy. It should be noted that Collins, particularly, tends to express “disgust” and “surprise” substantially higher than both Garner and Leding. One interesting finding here is that although Collins has overall the most negative rhetoric about gun policy, he is less fearful than Leding, and less angry than both Garner and Leding.

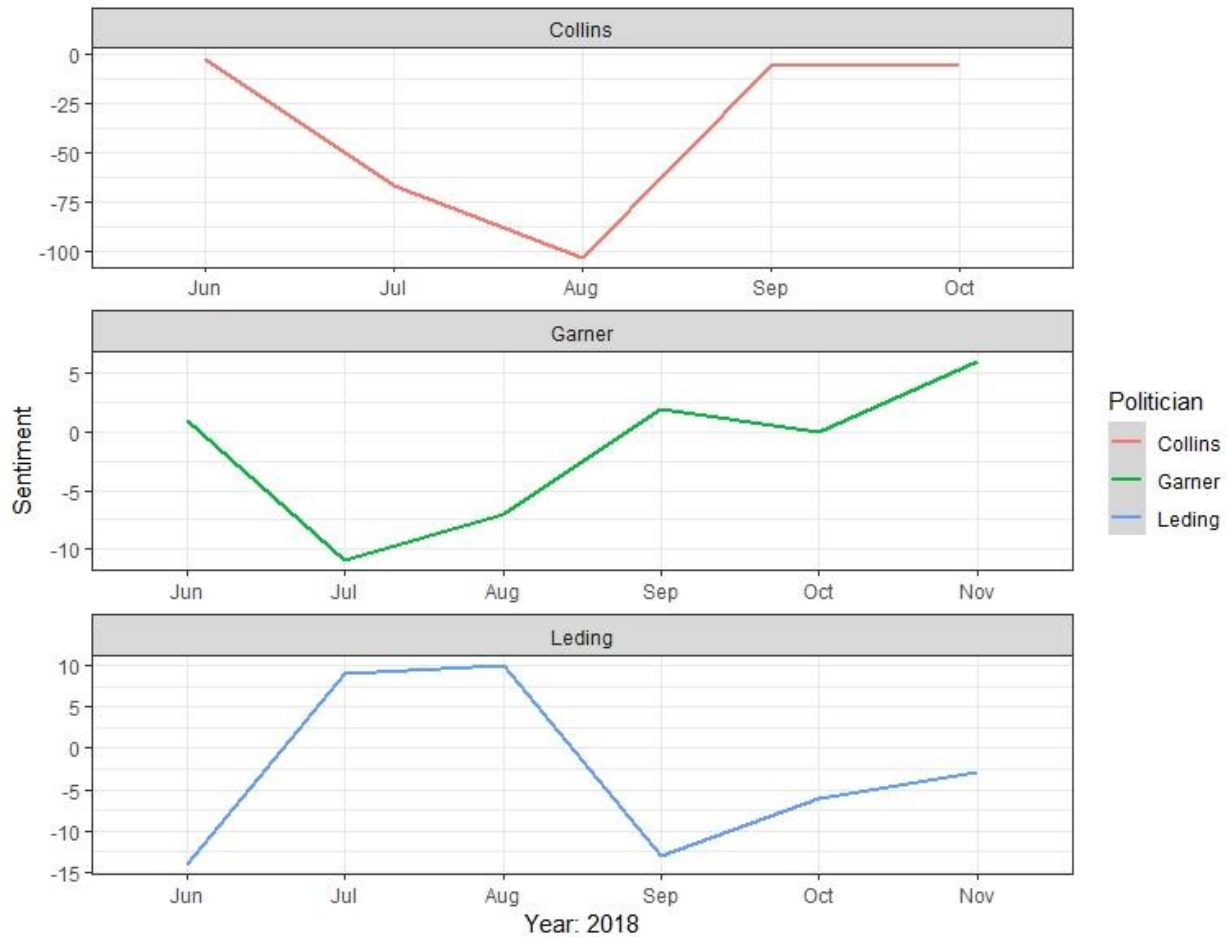


Figure 9. Political sentiment over time.

Note: The chart indicates how politicians changed their sentiment over the period from June 2018 to November 2018. The sentiment values that are below (0) indicate negative sentiment, while those over (0) represent positive sentiment. Note that Collins’s time ends in October because he did not have gun-related tweets in November unlike Garner and Leding.

Figure (9) shows how the sentiment of Collins, Garner, and Leding changes over time.

Each politician expressed both negative and positive sentiment at various stages in their

discourses, except for Collins whose rhetoric about guns remained negative all the time although at times he became extremely negative. In one of his extremely negative tweets, based on the Bing Lexicon Dictionary, Collins says, *“I don't know on suicide. On gangs & other violent murder I'm for extremely harsh punishment. I will focus on repeat offenders to make room for mistaken identity, rehab, & "I bad decision." Capital murder (2nd conviction) should see expeditious death penalty implementation”* (Collins, 2018a).

Figure (9) demonstrates, Garner starts her gun tweets with a positive sentiment, but immediately plunged into negativity during June through August, only in late August when she adopted and maintained a positive discourse. She states in one of her most positive tweets based on Bing, *“Universal background checks would be a great start but I also support @gregleding push for Red Flag laws. Arkansas doesn't have Child Access Prevention (CAP) laws. Act562 doesn't even have a holster requirement. Gun access is one thing but proper usage/storage is still important”* (Garner, 2018a). Leding, on the other hand, initiated his gun rhetoric on Twitter with a negative sentiment in June, and then expressed a positive sentiment throughout July until mid-August when his sentiment became and remained negative.

#### *IV.4.2 News Media's Sentiment*

The news media articles (n=40) in this thesis were collected from three local newspapers: *Northwest Arkansas Democrat-Gazette*, *Jonesboro Sun*, and *Malvern Daily Record*. I measured sentiment in the news articles based on the Bing Lexicon Dictionary. Figure (10) indicates that newspapers, unlike politicians, had an overall neutral sentiment in their coverage of the gun policy in Arkansas, except for the *Malvern Daily Record*, averaging a slightly positive sentiment of .002.

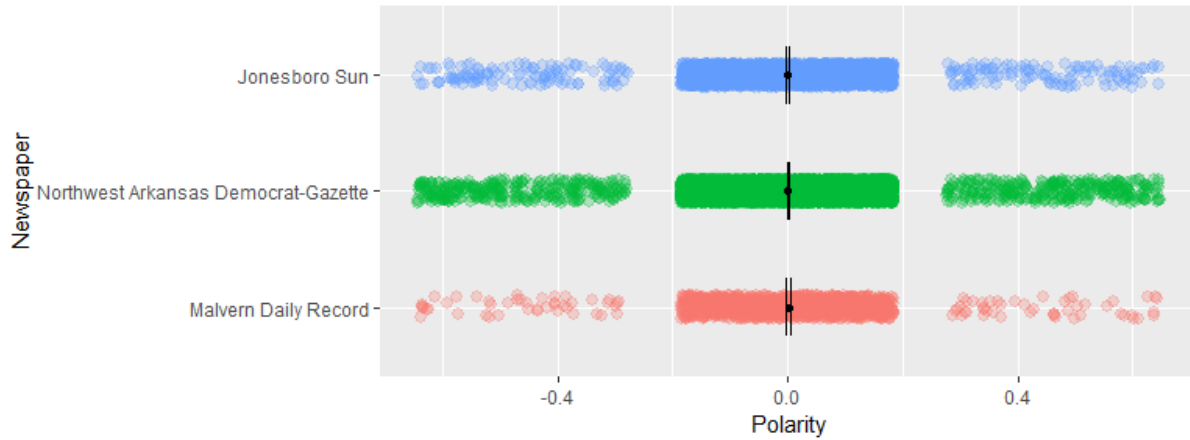


Figure 10. Average sentiment in news media.

Note: The plot shows the average polarity of the whole articles of each newspaper based on the number of negative vs positive words used by the newspapers. Whereas (-) represents negative sentiment, and (+) indicates positive sentiment.

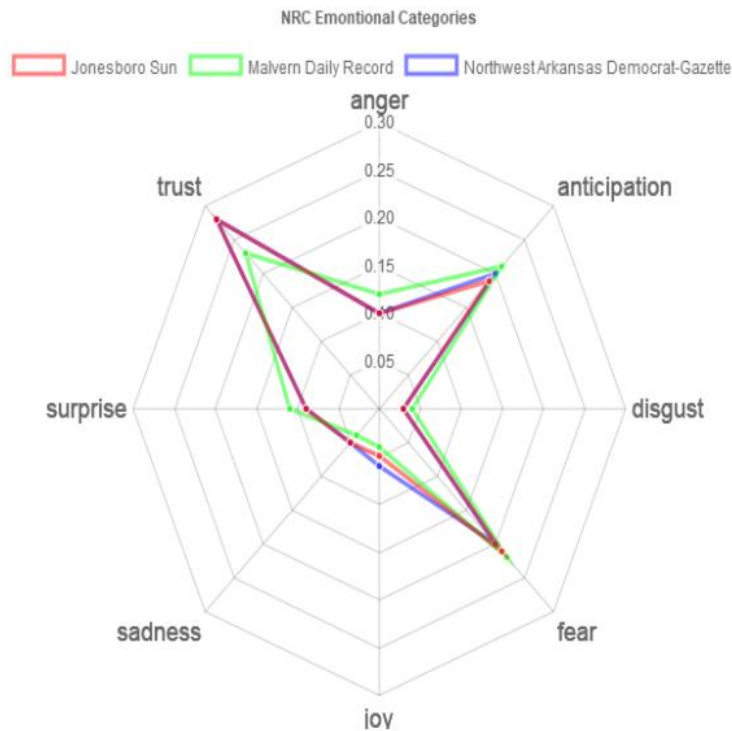


Figure 11. A Radar chart of emotional valence in the news media.

Note: numbers 0.5 to 0.30 on the vertical line indicate a percentage (%) scale for emotions' distribution.

Figure (11) represents the emotional valence distribution in the newspapers' coverage of the gun policy, which shows that these newspapers had overall mixed feelings in their narratives. For instance, the newspapers expressed "trust" higher than any other emotion in their news coverage of the gun policy. *Northwest Arkansas Democrat-Gazette* and *Jonesboro Sun*, for example, expressed "trust" in 28 percent of their news stories, while *Malvern Daily Record* expressed it at a lower rate 23%. "Fear" was the second most significantly present emotion in these newspapers' narrative. The *Malvern Daily Record* was the most fearful 22%, compared to the *Northwest Arkansas Democrat-Gazette* 20% and the *Jonesboro Sun* 21%. These newspapers also had high feeling of "anticipation," scoring 21% for the *Malvern Daily Record*, 19% for the *Jonesboro Sun*, and 20% for the *Northwest Arkansas Democrat-Gazette*.

Figure (13) shows how the sentiment of news media changes over time. It indicates that the *Jonesboro Sun* newspaper had mostly a negative sentiment throughout 2017; only until mid-November when its sentiment became more positive though the beginning of 2018. The *Malvern Daily Record*, on the other hand, had a negative sentiment at the beginning of its coverage of the gun policy in April 2017, and then adopted a high positive sentiment from August 2017 until the end of its coverage in March 2018.



Figure 12. News media's sentiment over time

Note: The plot indicates how news media's sentiment changed over time. The period for each newspaper is different based on number of articles aggregated. Sentiment values that are below (0) indicate negative sentiment, while those over (0) represent positive sentiment.

The *Northwest Arkansas Democrat-Gazette* newspaper, which had the highest coverage of the gun policy, had a fluctuating sentiment, starting very negative in March 2017 and ending with a positive sentiment in October 2018. In one of its most negative articles, entitled, “*Gun law crops up at fiscal session - Two lawmakers want tweak; two others want ban in dorm rooms,*” (see appendix, Moritz, 2018) the newspaper talks about how some lawmakers expressed concerns about the concealed carry permit and its potential impact on public safety, allowing guns in places such as college dormitories. In another positive example, entitled, “*Bills filed to expand concealed carry law*” by the *Jonesboro Sun*, the newspaper interviews people with



different opinions, but mostly agreeing, on the concealed carry training license (see appendix, Morris, 2018). As figure (12) shows, all the newspapers expressed a very negative sentiment in March 2017, the month when the Concealed Carry Law was enacted, and as time passed, their sentiment became more positive.

## V. Discussion and Conclusion

### V.1 Discussion

Analyzing political tweets and news media articles regarding gun policy in Arkansas, this thesis sought to provide insights into the structure of political discourse on social media and news coverage. Research questions examined (a) how political discourse on Twitter frames gun policy compared to news media, (b) word usage and its effect on political narrative on Twitter, and finally, (c) the political sentiment on Twitter compared to that of news media coverage.

The Concealed Carry Law of 2017 has been a point of contention among local politicians, particularly on social media. Former state Rep. Charlie Collins was a significant sponsor and steadfast advocate for Act 562, especially on Twitter. State Senator Greg Leding is a pro-gun control Democrat who has been relentlessly trying to hold Rep. Collins and the Republicans accountable on Act 562. Similarly, Rep. Denise Garner, who ran against and unseated Rep. Collins in the general election of November 2018, presented herself as a common-sense candidate, using an anti- Acts 562 rhetoric and offering a centrist view on the gun issue.

Findings in this thesis show that text mining analysis is useful in revealing frames latent in the gun-related tweets of these politicians, as well as the news media. These frames indicate how each politician defined problem and solution in the gun debate based on their ideological views, as they tweeted about it. Collins, for instance, used a couple of frames to establish a conservative political argument against the “gun control” rhetoric, claiming that “public safety,” a problem, is endangered by “mass shooters” and “crazy killers,” and that this concealed carry law, a solution, helps “protect our loved ones by deterring some crazy mass killers from attacking campus” (Collins, 2018b). He adds in another tweet, “I am extremely concerned about murderers at schools, a horrific & sad state of affairs & my heart goes out to all who have lost

loved ones & suffered. Beyond just caring, I passed Act562 to improve Public Safety” (Collins, 2018c). On the other hand, Leding’s frames of the gun policy stem from an anti-gun liberal culture, positing that “gun violence” is a problem that “is happening in our homes, schools, workplaces, theaters, bars, hospitals, places of worship, military bases—everywhere” (Leding, 2018a). For Leding red “flag laws” serve as a solution to this problem instead of Act 562, which, he argues, brings more gun violence. He wrote on Twitter, “[we] can take a bipartisan, broadly supported, common-sense step to reduce gun violence and save lives in Arkansas by passing a ‘red flag’ law” (Leding, 2018b). Garner, in turn, agrees with Leding on “gun violence” as a problem and presents herself as a middle ground “common sense’ and “sense candidate” solution, as she states, “[politics] should be about ppl. My opponent (Collins) didn’t listen to ppl directly affected by his guns-everywhere law. Let’s get back to what Arkansans are best at-- common sense, & leading from the reasonable middle” (Garner, 2018b).

This thesis’s findings are indicative in terms of the dynamics of the gun debate. Previous research has indicated that frames like “Feel-Good Laws,” “constitutional rights,” were prominent within the pro-gun political ideology, while “Sensible Legislation and “Culture of Violence” prevailed within the anti-gun political sphere (Callaghan & Schnell, 2001). This study, however, indicates that politicians in the state of Arkansas have shifted the discourse from these traditional frames into more local and personalized ones like “public safety,” “sense candidate,” and “gun violence.” This shift is perhaps because these politicians were running for election, which forced them to adapt and localize their discourses to resonate with their local constituents. This suggests a new opportunity for a future research to understand how political debates about policy shift from national to local environment and vice versa, especially during elections.

While political frames were very opinionated and polarized, newspapers' frames were neutral and free from ideological views such as those in the political tweets. This is perhaps indicative of Twitter's power as a tool for polarization and issue framing, allowing, "the ability of political actors to convey their preferred framing of policy issues to a greater extent than they are able in other media" (Merry, 2016a p. 387). Previous research indicates that news media frames of the gun policy could be supportive or abhorring, (McGinty et al, 2016) and that they (media) could even intervene in the framing process of the gun debate to construct an overall tone (Callaghan & Schnell, 2001). However, this thesis's findings suggest that local newspapers in Arkansas did not use emotion laden discourse.

Framing theory suggests that individual frames could be influential and could even set the agenda for the news media, as "public opinion is part of the process by which journalists (...) develop and crystallize meaning in public discourse" (Gamson & Modigliani, 1987, p. 2). Yet, this study's findings indicate that local newspapers in Arkansas did not adopt the emotional rhetoric used by politicians on Twitter.

Sentiment analysis in this study offers insights into the emotional tone in which both politicians and newspapers convey their narratives regarding the gun policy. The findings indicate that political sentiment was very negative, especially during the few months prior to the midterm elections. The findings suggest that the political discourse about gun policy on Twitter is one that is very emotional—full of fear and anger. It seems that local politicians in Arkansas capitalize on fear more than any other strategy in their online rhetoric about gun policy not only because they view it through different lenses, but also, perhaps, due to the fact that they were appealing to the core values on gun policy of their electoral bases. How politicians from opposing political spectrums express fear can be a pertinent subject for future research.

Newspapers, unlike politicians, expressed an overall neutral sentiment regarding the local gun policy, suggesting, as mentioned earlier, that news coverage of the gun policy lacked the emotional rhetoric unlike politicians. This result should be considered important because it opens new venues for researchers and journalists to investigate ways in which news coverage and tone intersect with political sentiment about specific issues, especially in times of elections. This finding also suggests an important implication of automated sentiment analysis in discussing existing assumptions about negativity in news media coverage of politics.

In terms of words' usage and its impact on the overall political discourse about gun policy on Twitter, automated text analysis is insightful in understanding the structure of political narrative. The findings indicate that words used by state politicians tended to be similar, but with variant weight. For instance, words that are core to the rhetoric like "gun" and "law" were expected to have significantly a higher weight in Collins's discourse due to his higher number of tweets and overall engagement, but they had significantly higher percentage in Leding's and Garner's discourses. This is an empirical evidence suggesting that both Leding and Garner were more concerned about gun issues than Collins, who sponsored and defended Act 562. Also, the fact that Garner used "public," "sense," and "listen" more than any other words surely had an impact on her overall rhetoric, making it relatable to her constituents and may have been key to her success against Collins, who focused on "murder" and "mass" "killer" in his discourse during the midterm election, perhaps lacking resonance with his local voters. Garner states in one of her tweets prior to election, *"Charlie, you didn't listen to a single AR college/university that voted to prohibit guns on campus b/c of safety concerns, but now that a commission of like-minded ppl agree w/ your agenda you listen? I've listened to countless constituents & teachers who all say no guns in K-12"* (Garner, 2018b).

It should be noted that, like any other research, this thesis had some limitations. Perhaps, the most pressing limitation was the overall size of the data samples. It was expected that these politicians would have relatively a high number of gun-related tweets due to their high presence on Twitter. Collins, for instance, in his more than 3,000 tweets set has only 7% of which oriented towards gun policy, compared to 4% for Leding and 20% for Garner. Sentiment analysis can be more insightful when applied on big data, which improves the comprehensiveness of a study and, thus, its ability to make generalizations that are more reliable. It should also be considered that despite the great opportunities sentiment analysis offers for the study of news media coverage, its usage in this domain is still experimental, which makes its application in this thesis a challenging task. Further, dictionary-based sentiment analysis, as shown in this study, seems to be promising in detecting emotions and overall sentiment. However, the fact that these dictionaries constitute of limited sets of pre-annotated words, limits their ability to detect sentiment accurately if words in the sample data are not already included in the dictionary.

## **V.2 Conclusion**

Findings in this thesis have shown the power of automated content analysis in discovering information latent in fragmented political text messages posted on Twitter (n=354) or long news articles(n=40). Extracting this kind of information, numbers and types of words and frames, would not be achieved quickly and inexpensively without automation. Thanks to automated content analysis, it could be determined that state politicians' discourse on Twitter constitutes of a variety of extremely polarized words and frames pertaining and appealing to the core values of their local constituents, and that local newspapers' frames were very unbiased.

Further, this thesis employed sentiment analysis as a method to gauge and compare sentiment and emotional valence in both political discourse on Twitter and news coverage of gun policy. The results showed that state politicians' discourse was extremely negative and agitated, while the news coverage was very factual and emotionally neutral.

However, the results of this study should be taken as exploratory and illustrative of the capacity and potential for automated sentiment analysis techniques to analyze political discourse on social media, as well as news coverage, and capture emotion in large bodies of textual data. I believe that this work points to new avenues for future research, with the potential to deepen current understanding of the effects of political discourse in social media on news coverage and more importantly, on policy process.

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## VII. Appendix

### *R Code and Data:*

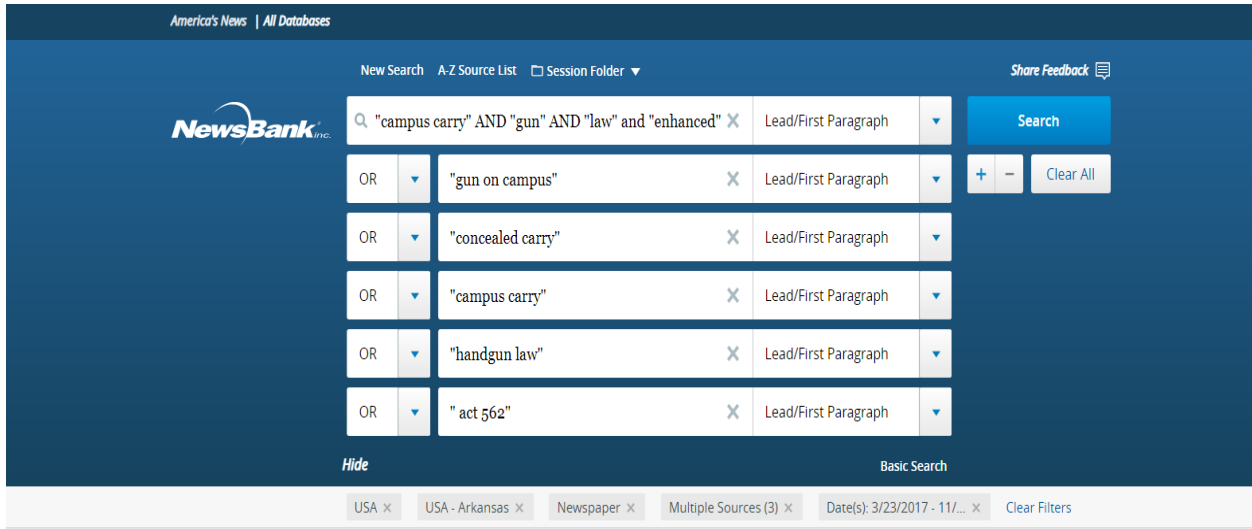
Here is a link to my GitHub repository page where I have stored both the data and the R code for this thesis (<https://github.com/Mbareck/Sentiment-Analysis-of-Political-Tweets>). The R code shows the steps I followed in order to calculate the common words and frames in the political tweets. It also demonstrates the sentiment measurement method in both the political tweets and the news media coverage, which includes emotions and polarity, as well as sentiment over time. This repository includes the original data utilized in this project as well as images of the results visualizations.

The screenshot shows the GitHub repository page for 'Mbareck / Sentiment-Analysis-of-Political-Tweets'. At the top, there are statistics for Watch (0), Star (1), and Fork (0). Below this, navigation tabs include Code, Issues (0), Pull requests (0), Projects (0), Wiki, Insights, and Settings. A message states 'No description, website, or topics provided.' with an 'Edit' button. Below that, repository statistics show 15 commits, 1 branch, 0 releases, and 1 contributor. A toolbar contains buttons for 'Branch: master', 'New pull request', 'Create new file', 'Upload files', 'Find File', and 'Clone or download'. The file list includes folders 'Data' and 'Images', and files '.gitignore', 'License', 'R code for News.R', 'R code for Tweets.R', 'README.md', and 'Sentiment-Analysis-of-Political-Tweets.Rproj'. The commit history shows the latest commit '5b9ee3d' from 'Mbareck' merging the 'master' branch, with a timestamp of 'an hour ago'.

File/Folder	Commit Message	Time Ago
Data	first	18 days ago
Images	updating the image file	an hour ago
.gitignore	first	18 days ago
License	Create License	an hour ago
R code for News.R	third	18 days ago
R code for Tweets.R	v	18 days ago
README.md	Update README.md	2 hours ago
Sentiment-Analysis-of-Political-Tweets.Rproj	first	18 days ago

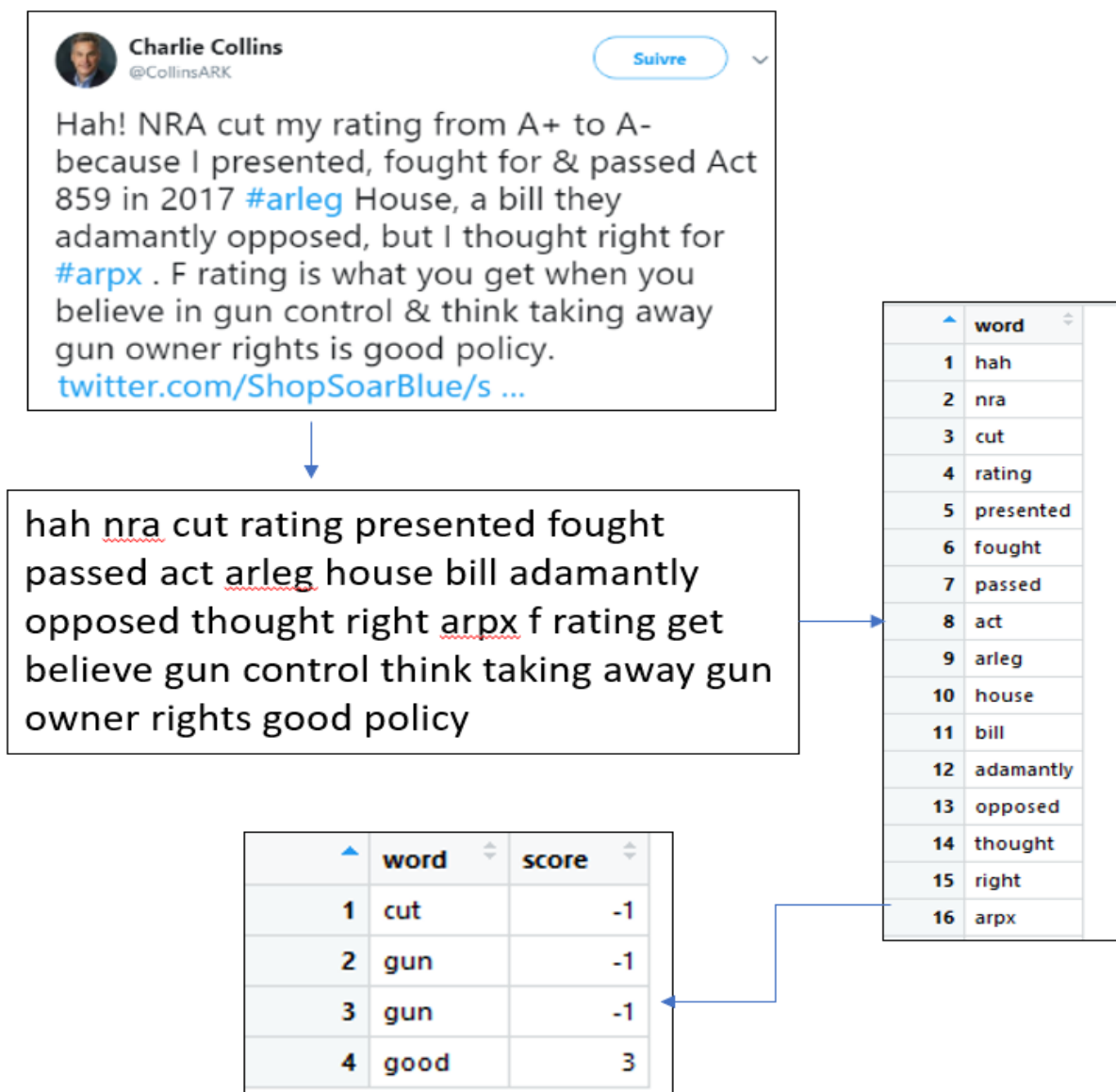
*Method for the News Data Collection:*

News articles A snapshot of the news articles search method, using America’s News database and including a complete list of the search keywords. As shown in the figure bellow, words in the main search line are searched as a combination, while words in the bars bellow substitute the previous ones in case the search engine does not find them. The search, as the figure indicates, was limited to three sources, including *Northwest Arkansas Democrat-Gazette*, *Jonesboro Sun*, and *Malvern Daily Record*.



*Dictionary-based Sentiment Analysis:*

An example of a dictionary-based sentiment analysis of a gun-related tweet. As shown in the figure below, the preprocessing returns the tweet in a plain text format after omitting stop-words, numbers, URLs...etc. Then, the tokenization returns a document matrix of the tweet wherein every row represents a single word. In the last stage, the sentiment dictionary joins the document matrix and associates scores to the opinionated words that match the dictionary.



*Tokenization of Political Tweets:*

An Example of political tweets after tokenization into words. This process includes removing punctuation, URLs, numbers, and stop-words (the, a, at, in, etc.) The result is a count of words used by each politician on Twitter.

	▲ Politician ▼	word ▼	n ▼
1	Collins	#arpx	158
2	Collins	gun	83
3	Leding	gun	51
4	Collins	#arleg	43
5	Collins	mass	43
6	Garner	gun	41
7	Collins	ccl	40
8	Collins	law	38
9	Collins	carry	36
10	Collins	loved	34
11	Collins	chcl	33
12	Collins	killers	33
13	Leding	violence	33
14	Collins	murder	31
15	Collins	deter	30
16	Collins	guns	29
17	Collins	safety	29
18	Garner	@momsdemand	29
19	Collins	control	28
20	Collins	murderers	28
21	Garner	guns	26

Showing 1 to 22 of 2,611 entries

*Bing Lexicon Sentiment Scores Applied on Political Tweets:*

An example of sentiment analysis applied on Charlie Collins Tweets using the Bing Lexicon in R. The net sentiment score results from the difference between total negative words and total positive words in each tweet.

	Collins_gun_Tweets	sentiment
1	All of America is in mourning over the mass murder of Je...	1
2	It is heart breaking that any synagogue is targeted for a...	-1
3	I was heartbroken and appalled by the murderous attac...	-3
4	As someone who has encountered threats of violence fir...	-2
5	Hah! NRA cut my rating from A+ to A- because I present...	1
6	MT @USNavyEurope: #US6thFleet's #USSRoss fires its M...	0
7	Great contrast @nwademgaz @ArkansasOnline today: 1...	1
8	My ~25% number includes unarmed. There were VASTLY ...	-1
9	This morning on @CapitolViewAR: - @RepFrenchHill on ...	0
10	#arpx chl has been in effect for 25+ years & we ha...	1
11	Visiting with my daughter @mollhendren during fa...	0
12	That was a no ChCL zone as well, I believe. Those rules &...	1
13	Because some people may be carrying can deter some m...	-2
14	Must be 21 to qualify for #arpx ChCL, also many other re...	2
15	Please let the women who tell me they feel safer now sp...	1
16	Huge congratulations to newly minted Dr. @lindseymbu...	3
17	The only parts of your tweet I understand are the insults...	0
18	Really? So exactly how do you think we should keep our...	0
19	I do not think I retweeted that. As a numbers guy, I'm su...	-1
20	We talked about Collins working with others to turn #a...	4
21	Cadets carry an American flag Tuesday while running thr...	-1
22	True. Would an anti-2A suddenly support open carry be...	2
23	We are breaking all Jobs and Economic Records but, im...	-1
24	So you stand by your assertion that you expect unarmed...	2
25	1. So you agree there are exceptions to the "more guns ...	1
26	But doesn't that violate your iron law-- More guns equal...	-1
27	I believe mass shooters are the problem & I will act ...	-1
28	I don't recall our conversation, but of course it is possibl...	0
29	I am extremely concerned about murderers at schools, a ...	-5
30	Rising number mass shooter deaths major concern to m...	-1

*Negative News:*

An excerpt of Moritz's (2018) article in *Northwest Arkansas Democrat-Gazette*, which was very negative according to the Bing Lexicon Dictionary.



**Gun law crops up - Northwest Arkansas Democrat-Gazette (AR) - February 14, 2018 - page 5**

February 14, 2018 | Northwest Arkansas Democrat-Gazette (AR) | JOHN MORITZARKANSAS DEMOCRAT-GAZETTE | Page 5

**Lawmakers** unhappy with some aspects of a 2017 **law** to create "enhanced" concealed-carry permits are planning to use the ongoing **fiscal session** to adopt the changes they say are needed.

The permits will allow **gun** owners to take their weapons into many public places, including college campuses.

On one side of the debate, supporters of the "campus carry" **law**, Act 562 of 2017, say the **law** just needs to be tweaked; some **gun** instructors spoke out against being required to teach "enhanced" courses or else lose their instructors' licenses.

Meanwhile, a pair of Democrats have signaled their intent to add language that would prohibit concealed weapons in college dormitories, which they said was the original intent of Act 562.

To even consider non-appropriation bills during the **fiscal session** will require approval of **two-thirds** of both chambers of the Legislature.

The first pair of resolutions filed separately in the House and the Senate would allow consideration of a bill to let concealed carry instructors opt out of offering the "enhanced" permit course, which includes **up** to eight hours of additional training for permit holders. It also would replace the word "nominal" when describing the cost of the course with the word "reasonable."

*Positive News:*

An excerpt of Morris's (2018) article for the *Jonesboro Sun*. This article was very positive according to the Bing Lexicon Dictionary.



**Bills filed to - Jonesboro Sun, The (AR) - February 15, 2018**

February 15, 2018 | Jonesboro Sun, The (AR) | Sarah Morris

JONESBORO — Firearms instructor Scott Vaughn is already teaching the course people with **concealed carry** licenses need for an enhanced license that would allow for the carrying of a gun on a college campus.

He said some now have that license in hand.

"As an instructor and a Second Amendment rights person, I think it is fine," he said of the enhanced license. "I think it is good. I think the more places we can **carry**, the less target-enriched areas we will have for bad people."

Still, Vaughn, who operates Vaughn's Firearms Training in Brookland, said he is in favor of a proposed amendment **to** not require **concealed carry** instructors **to** offer both regular and enhanced license training under the expanded **concealed handgun law** approved last year.

By making it a requirement, Vaughn said it puts some instructors in situations where they must offer the enhanced training even if they do not feel comfortable doing so.

The proposed amendment was **filed** Monday by Rep. Bob Ballinger, R-Berryville, and Sen. Trent Garner, R-El Dorado. With Arkansans now able **to** lawfully **carry** guns on a college campus, the amendment was one of two **filed to** tweak the state **law** that made it possible.

A second amendment from State Sen. Will Bond, D-Little Rock, and State Rep. Greg Leding, D-Fayetteville, would make it illegal **to carry** or possess a **concealed** gun in a college- or university-operated student dorm or residence hall.

Two-thirds of the House and Senate must approve taking up the measures during the fiscal session since the resolutions are not budget-related.

Act 562 allows **concealed carry** permit holders **to** take up **to** eight hours of enhanced training **to carry concealed** guns at public sites like college campuses and state buildings.