

Agenda Setting, Cross-cutting Effects, and Political Expression on Social Media: The Gun Violence Case

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Abstract

Focusing on a polarized issue—U.S. gun violence—this study examines agenda setting as an antecedent of political expression on social media. A state-of-the-art machine-learning model was used to analyze news coverage from 25 media outlets—mainstream and partisan. Those results were paired with a two-wave panel survey conducted during the 2018 U.S. midterm elections. Findings show mainstream media shape public opinion about gun violence, which then stimulates expression about the issue on social media. The study also reveals that partisan media's gun violence coverage has significant cross-cutting effects. Notably, exposure to conservative media will decrease public salience of gun violence, pivot opinion in a more conservative direction, and discourage social media expression; and all of these effects are stronger among liberals.

Keywords

agenda setting, cross-cutting exposure, machine learning, deep learning, BERT, panel survey

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Around the world, social media serves as an emerging public platform for ordinary people to share information and thoughts and, accordingly, for communication researchers to gauge public opinion and sentiment (e.g., Colleoni et al., 2014; Himelboim et al., 2013). Scholars have shown that the news media can set the agenda of public conversation on social media in various contexts (e.g., Neuman et al., 2014; Vargo et al., 2014), extending the application of a classic theory—agenda setting—in this new information environment. While this line of research is important, we contend that conceptualizing social-media-based conversation as a proxy of “public agenda” deviates somewhat from the theory’s original assertion of the media’s effect at the cognitive and affective level (McCombs & Valenzuela, 2021). That is, the news media determine what the public think about and how to think about a certain object. Engaging in conversation on social media, however, represents a behavioral effect: what people *do*. In light of this conceptual discrepancy, this study’s goal is to explicate the news media’s agenda-setting effect as an antecedent of political expression on social media.

The issue of gun violence in the United States provides a compelling case for this study. Mass shootings have increased over the last several years, yet Congress has taken little action at the federal level, partly because gun regulation is a highly polarizing issue (Pew Research Center, 2018a). As such, Republicans and Democrats disagree on the extent to which gun violence is a pressing issue facing the country (Dam, 2018). Among other factors, it is important to consider the role that news media—mainstream and partisan—plays in influencing individuals’ perceptions of, and subsequent social media expression about, gun violence. If, by increasing the issue’s salience, the news media prompt citizens to discuss gun violence online, this may ultimately contribute to reaching a consensus about, or even a solution for, the issue. On the other hand, partisan media may further polarize public opinion about gun violence, resulting in political indifference and inactivity. Drawing from agenda setting and selective exposure literature, we examine (1) the extent to which the news media’s agenda-setting effect regarding gun violence predicts increased political expression of the issue on social media, and (2) how the media and individuals’ partisanship intervene in this process. Methodologically, a state-of-the-art machine learning model was used to content analyze news coverage of gun violence from 25 media outlets, and then a matching strategy paired the content analysis results with a two-wave panel survey conducted during the 2018 U.S. midterm elections.

Agenda Setting and Its Behavioral Consequences

Agenda-setting theory’s core assertion is the transfer of salience from the news media to the public’s mind (McCombs & Valenzuela, 2021), providing a cognitive shortcut for people to efficiently process information and make decisions (Lang, 2000). When someone is exposed to a large amount of news coverage about a particular issue (first-level agenda setting) or its attribute (second-level), the issue or attribute will be perceived as more important than others. Further, the Network Agenda Setting Model suggests the salience of network relationships between issues and attributes can also

be transferred from the media to the public agenda, constituting third-level agenda setting (Guo & McCombs, 2016).

Psychologically, agenda setting's first level considers the media's cognitive effect: what to think about. The theory's second and third levels involve both cognitive and affective elements. For example, the media's emphasis on political candidates' personal traits (e.g., leadership, experience) or affective tones (e.g., positive, negative) can determine how voters perceive them (McCombs et al., 1997) or feel about them (Coleman & Wu, 2010). As such, agenda setting's three levels address the cognitive and affective stages of the traditional hierarchy-of-effects model (see Jeffres & Perloff, 1997). A natural expansion is to examine behavioral effects: whether agenda setting influences subsequent actions in response to prominent issues or attributes, which is this study's focus.

Examining agenda-setting's behavioral consequences helps to evaluate the media's power in an evolving information environment. Dearing and Rogers (1996) earlier suggested that the news media, by focusing public attention and attitude on certain issues, could influence public policy. Empirically, research has linked news coverage and behaviors. For example, the media agenda's issue and attribute salience has been associated with voting behaviors (e.g., Weaver, 1991). More pertinent to this analysis, news coverage of public affairs predicts public discussion on social media such as Twitter, a new arena for civic engagement (Guo et al., 2019; Neuman et al., 2014; Vargo et al., 2014).

Although media salience has been connected to behavioral outcomes, what happens *in between*—the mediating impact of public salience—is less examined. Among the few studies that consider mediating effects, Moon (2013) and Camaj (2014) reveal that the agenda-setting effect mediates media use and political participation. Notably, while these studies address agenda setting's consequences, their outcome variables are generic political behaviors without referring to a specific issue. Thus, they do not consider the influence of the theory's fundamental mechanism—the transfer of salience—on behavior. Theoretically, the news media transfer issue and attribute salience to the public's mind; the public, in turn, shapes opinions and attitudes and takes action on those particular issues and attributes. As such, the news media would prompt civic engagement focused on a specific agenda. Kioussis and McDevitt (2008), for instance, investigated the extent to which a contemporary prominent issue—the Iraq War—affected voter turnout among adolescents. More strictly adhering to the transfer of salience, our study examines a single agenda item—gun violence—and investigates whether the issue *and* attribute salience influence a specific behavior: political expression about gun violence on social media.

Three points are noteworthy here. First, previous research has examined media influence through multiple causal chains, suggesting that the shaping of opinions and attitudes mediates agenda setting and behavioral outcomes (Camaj, 2014; Kioussis & McDevitt, 2008). This study examines the direct linkage between agenda setting and a certain behavior: online political expression, leaving the exploration of other indirect paths an area for future research. Second, many studies have examined the role interpersonal communication plays in agenda setting, mostly considering it as a predictor

or moderator of the media effect (e.g., Kioussis & McDevitt, 2008; Yang & Stone, 2003). This study considers online political expression—a modern version of interpersonal communication—as an *outcome* of agenda setting. Third, different from in-person communication, online political expression can take many forms such as two-way discussion and broadcasting views to unspecified others (Cho et al., 2018). Online political expression can entail discussion between individuals who disagree, or echo chambers, wherein only like-minded people converse (e.g., Chen & Lin, 2021; Matthes et al., 2019). These different types of political expression may have varying implications for participatory democracy, though this study examines the effect on online political expression in general. The next section explains the theoretical rationale for agenda setting's impact on online political expression.

Agenda Setting as an Antecedent of Political Expression

Political communication literature consistently shows that news consumption is associated with different types of political participation, including political expression on social media (e.g., Gil de Zúñiga et al., 2012; Strömbäck et al., 2018). News media expose citizens to diverse and conflicting viewpoints, prompting them to make connections between new information and their existing beliefs (Eveland, 2001, 2002) and participate in political discussions that might not otherwise occur (Mutz, 2001). On social media, political expression can take the form of creating posts to express views on a political issue, or sharing or commenting on others' posts. This represents a complex cognitive process during which individuals elaborate on and articulate their thinking to themselves and others.

According to agenda-setting theory, establishing issue or attribute salience can be a necessary step between media exposure and political expression: someone may first have to believe an issue is important before choosing to elaborate on it. Put differently, media exposure may not always lead to political expression; if someone does not believe an issue is any more urgent than before after exposure, then they would not bother to share their views on it, especially on a public forum like social media. Research on political priming provides additional insight into this process. Continued media coverage of an issue increases the chronic salience of the issue on the receiver's brain, which will trigger relevant behavior later (Roskos-Ewoldsen & Roskos-Ewoldsen, 2009). For example, when encountering a stimulus on social media (e.g., a story about a politician), the individual may comment on the issue that is top of mind.

Second-level agenda setting should also have a significant impact on political expression. When people's opinions toward an issue experience some change (e.g., increased attribute salience), they are more likely to discuss the issue. This is because opinionated individuals as a result of media agenda setting are more motivated to resolve the problem, which can be manifested by an increased level of political participation (Moon, 2013). Considering the gun coverage, if certain media consistently emphasize shooters' mental illness as the main cause of gun violence, those who agree with this aspect's pertinence may be more motivated to discuss it online, possibly comparing mental health programs' expansion with other solutions. Taken together,

we expect individuals with the same amount of media exposure would not behave the same; only those who give more thought to the target issue or certain aspects of the issue would discuss the issue more frequently online. Therefore, we hypothesize:

H1: Individuals who have more exposure to gun violence in the mainstream news media will perceive the issue as more important, which in turn will encourage them to express their viewpoints about the issue more on social media.

H2: Individuals who have more exposure to a certain attribute of the gun violence issue in the mainstream media will perceive the attribute as more important, which in turn will encourage them to express their viewpoints more about the issue on social media.

Here, it is important to mention previous research has also documented an agenda-deflating effect (e.g., Schoenbach & Semetko, 1992), wherein media exposure may decrease public salience. In addition, the “compelling arguments” hypothesis (Ghanem, 1996) suggests that certain attributes may be more influential than others on public perception because of their resonance. Both should be accounted for when interpreting the results.

Partisan Media, Agenda Setting, and Political Expression

We also consider partisan media’s impact in this fragmented and polarized media environment. According to selective exposure, people actively look for media channels with content that reinforces their existing views (Stroud, 2011) because they prefer messages that align with their own beliefs and avoid challenging information (Festinger, 1962). Therefore, people are more likely to gravitate toward partisan media that aligns with their political stance (Wicks et al., 2014). However, they do not avoid opinion-challenging political information to the same extent that they seek out opinion-reinforcing information (Garrett, 2009). Despite today’s political polarization in the United States, most Republicans and Democrats have similar media diets, which are still mostly comprised of mainstream news outlets (Weeks et al., 2016).

Regardless of media diet, partisan media’s influence seems to be significant. Pro-attitudinal partisan media exposure affects political attitudes, ultimately contributing to political polarization (Levendusky, 2013; Stroud, 2010). Further, those who are exposed to counter-attitudinal media are also more influenced by pro-attitudinal partisan media than by other media (Garrett et al., 2016). This can be explained by selective perception, by which people interpret information based on their partisan preferences (Schmitt et al., 2004).

Therefore, partisan media may threaten a unified sense of community. Agenda setting speaks to the process by which people pay attention to important issues and form opinions. If partisan media is more powerful, the increasingly polarized media environment could further divide public opinion. Indeed, conservative and liberal media can determine conservatives’ and liberals’ issue priorities (Stroud, 2011) and can influence perceptions of a particular issue (Hyun & Moon, 2016; Muddiman et al., 2014).

For clarity, we term the agenda-setting effect of pro-attitudinal partisan media on partisans as “selective agenda setting.”

Building on this line of research, we further posit that the selective agenda-setting effect can influence behavior, such as online political expression. Studies have shown that consuming news from pro-attitudinal partisan media influences political information sharing online indirectly by provoking emotional responses (Hasell & Weeks, 2016) or ensuring partisans that others share their opinions (Wang et al., 2017). The association between partisan media use and political expression might also be established through constructing issue or attribute salience. That is, partisan media tell their followers an issue or aspect(s) of the issue are important, in turn, political expression about the issue increases among partisan groups. Another explanatory mechanism may be the Spiral of Silence theory (Noelle-Neumann, 1974): through selective agenda-setting, one believes their party’s prioritized issues and perspectives reflect the majority opinion and are therefore more likely to publicly discuss them.

On the other hand, there may be a participation divide along partisan lines for polarized issues such as gun violence. In U.S. politics, gun violence is primarily a progressive issue. Liberals want to take action to change the status quo to “solve” the problem, whereas conservatives remain more defensive in their stance. Therefore, liberal media’s agenda-setting effect may lead to political expression about gun violence on social media, while conservative media exposure may be associated with political inactivity around gun violence, by minimizing its importance or changing public opinion in a certain way. Still, given the lack of empirical evidence about the behavioral consequences of selective agenda setting on both levels, we ask:

RQ1: Will exposure to the gun violence issue in one’s *pro-attitudinal* partisan media lead to increased political expression about the issue on social media through increasing the perceived issue importance in the person’s mind?

RQ2: Will exposure to a certain attribute of the gun violence issue in one’s *pro-attitudinal* partisan media lead to increased political expression about the issue on social media through increasing the perceived attribute importance in the person’s mind?

Our last set of research questions concerns cross-cutting media exposure. Many scholars have theorized that encountering counter-attitudinal information should be beneficial for democratic citizens. Specifically, exposure to dissimilar political views promotes greater awareness of oppositional views, increases one’s capability to form an opinion, and can lead to greater interpersonal deliberation that is essential to a public sphere (Gutmann & Thompson, 1996; Habermas, 1989; Min & Wohn, 2018; Mutz, 2002b; Schneider & Weinmann, 2021). However, scholars have also found the opposite effect, reasoning that encountering counter-attitudinal information makes people feel uncertain about their political standpoints or worried that they may threaten social relationships (Lu et al., 2016; Mutz, 2002a). In a meta-analysis of 48 empirical studies, Matthes et al. (2019) found neither positive nor negative significant associations between cross-cutting exposure and political participation.

Little research has been conducted to understand the agenda-setting effect of cross-cutting exposure. Theoretically, the same rationale to predict selective agenda setting may also suggest that individuals should resist counter-attitudinal perspectives because they tend to process media messages based on their partisan preferences (Schmitt et al., 2004). That said, scholars have argued that cross-cutting exposure promotes representative thinking and reflection (Gutmann & Thompson, 1996; Habermas, 1989), which may influence one's issue priority and/or how one perceives an issue. Empirically, Chen et al. (2020) show that exposure to counter-attitudinal media influenced one partisan group's opinions but not the other. Given the underdeveloped literature, we propose the following research questions:

RQ3: Will exposure to the gun violence issue in one's *counter-attitudinal* partisan media lead to increased political expression about the issue on social media through increasing the perceived issue importance in the person's mind?

RQ4: Will exposure to a certain attribute of the gun violence issue in one's *counter-attitudinal* partisan media lead to increased political expression about the issue on social media through increasing the perceived attribute importance in the person's mind?

Method

This study pairs content analysis of media messages and a two-wave panel survey to examine the news media's agenda-setting effect and political expression on social media (Rössler, 1999; Shehata & Strömbäck, 2013). This "matching strategy" method is advantageous because, first, it accounts for each respondent's specific media diet and exposure. Second, the amount of behavioral change can be captured between the first and second survey waves. The use of panel data, therefore, provides more evidence for causal inference.

For the individual-level analysis, each participant was asked to report the frequency of consuming news from a particular media source (e.g., NPR) regardless of platform (e.g., NPR through its news website, social media, and radio). Individual use of different media platforms was included as a control variable. To match media content with the survey data, we examined news coverage from each media outlet's website. This approach assumes that news media provide similar content across their platforms (Zhang, 2021) and news websites should most comprehensively archive their content, therefore best representing the media's overall agenda. Our use of a computational approach enables a large-scale analysis across outlets. This diversity of content better reflects audiences' media consumption in today's fragmented environment.

For the data analysis, we examine whether media exposure to the gun violence issue *before* Wave 1 of the survey (Time 0; T0) will increase perceived issue importance, or change participants' opinion at Wave 1 (Time 1; T1), which in turn will lead to expression about the issue on social media at Wave 2 (Time 2; T2).

Media Agenda: A Computational Analysis

The content analysis results are from a larger project, which examines gun violence coverage throughout 2018 (Guo et al., 2021). A list of 25 news media outlets was created from a synthesis of many sources (Alexa, 2018; Pew Research Center, 2018b; Statista, 2018) and contains both mainstream and partisan media, as well as traditional and emerging media outlets (see Supplemental Appendix A). News articles were retrieved using Crimson Hexagon's Foresight media analytics platform (now Brandwatch). To locate relevant news stories, an initial list of keywords was created based on the literature review and a preliminary review of a data sample. Several rounds of testing were conducted to examine the search results' precision and recall; final keywords are: gun OR firearm OR nra OR "2nd amendment" OR "second amendment" OR AR15 OR "assault weapon" OR rifle OR "brady act" OR "brady bill" OR "shooting." This combination of keywords reached a precision score of 94.7% and a recall score of 87.0% based on a formal test of 1,000 news headlines. The search returned 42,917 articles in 2018.

To conduct the computational text analysis, a random sample of news headlines ($N=2,392$) was analyzed by human coders; these annotations were used to train a machine-learning model. The unit of analysis is a news headline, oft-used to identify attributes or frames because headlines are seen by the audience first and can determine the perception of the text that follows (e.g., Liu et al., 2019; Tankard, 2001). Two variables were coded for in the headline: whether the news article is about gun violence, and up to two attributes of gun violence. Of the numerous gun-related attributes in U.S. media coverage, this analysis focuses on the four most prominent: (1) gun regulation (Birkland & Lawrence, 2009), (2) the individual right to access guns (Haider-Markel & Joslyn, 2001), (3) public safety (Haider-Markel & Joslyn, 2001; Lawrence & Birkland, 2004), and (4) mental health (McGinty et al., 2013, 2014). Two communication students were trained and reached acceptable intercoder reliability on a random sample of 200 news headlines (0.97 Krippendorff's α for relevance, .90 α and .82 α for attribute coding). They then coded the remaining data.

With the human-labeled data, a deep learning model—Bidirectional Encoder Representation from Transformations Transformers (BERT; Davlin et al., 2018)—was used to predict relevance and attributes for the remaining news headlines. The BERT model employs a pre-training of a deep neural network on a large text corpus (i.e., Wikipedia pages and books) to produce embeddings (i.e., vectors of numbers) that represent the meaning of sentences. While other text models process each word separately, BERT considers relationships between words and communication context. Computer scientists have fine-tuned BERT by adding prediction schemes to continue supervised machine learning on specific tasks (Davlin et al., 2018; Metz, 2018). That is, the machine first learns from BERT how to classify texts, then learns from the human annotations, which improves the classification accuracy.

In this study, we input the news headlines to BERT and then fine-tuned the model by adding two prediction schemes (1, relevance; 2, attributes) on neural network classification on top of each model respectively. Based on 10-fold cross-validation, the

model to predict relevance reached 0.93 precision and 0.95 recall. We then trained four binary classifiers to determine whether each attribute is present in the headline. The initial models did not achieve robust performance in part because the data was imbalanced and there were not enough “positive” headlines for each attribute (i.e., headline that mentions the given attribute). Therefore, we augmented the data by content analyzing more headlines, yielding 175, 151, 156, and 163 positive headlines for the attributes *gun rights*, *gun regulations*, *mental health*, and *public safety* respectively. Following the same order of attributes, the precision scores were .96, .91, .88, and .87; and the recall scores were .95, .81, .95, and .81, all based on 5-fold cross-validation. The models were used to predict the relevance and attributes of the remaining news headlines.

Public Agenda: A Panel Survey

A two-wave national panel study was conducted during the 2018 U.S. midterm elections. Both waves of the survey were administered via Qualtrics, a U.S.-based international firm that provides a survey technology platform and partners with over 20 online panel providers to supply a network of diverse, quality participants. Sample quotas on gender and age were specified to match those demographic distributions in the U.S. population. The first wave of data was collected between October 2nd and 19th when 2,017 participants completed the survey questionnaire. The second wave was conducted between November 14th and December 4th. Over half of the first-wave participants returned, resulting in a 51.5% response rate ($N=1,039$) for the second wave. According to the 2017 census data, the final sample’s demographics closely match that of the general U.S. population (United States Census Bureau, 2017).

Dependent Variable (T2)

The study’s outcome variable is political expression about gun violence on social media. To measure this variable’s change over time, participants in both waves indicated how often they posted or shared thoughts about gun violence on social media. Political expression about gun violence recorded in the second wave (T2) was the dependent variable for each model, while the response in the first wave (T1) was used as a control. The variable was measured on a five-point scale (1 = Never, 5 = Always; T1: $M=2.40$, $SD=1.25$; T2: $M=2.59$, $SD=1.27$).

Mediating Variables (T1)

Perceived Issue Importance. Participants were asked to evaluate the importance of the “guns/gun control” issue based on a seven-point scale (1 = “Not important at all,” 7 = “Extremely important”) ($M=5.59$, $SD=1.63$).

Attribute Perception. Like previous research (Muddiman et al., 2014), we asked four questions tapping into individuals’ thoughts to match the four attributes examined in

the content analysis.¹ Participants were asked how much they agreed with the following statements using a seven-point Likert scale (1 = Strongly disagree, 7 = Strongly agree): (1) “I am concerned that the government will not do enough to regulate access to firearms” (*gun regulation*; $M=4.73$, $SD=2.05$); (2) “I think it is important to protect the rights of Americans to own guns than to control gun ownership” (*gun rights*; $M=3.93$, $SD=2.14$); (3) “There aren’t enough security measures in place to prevent gun violence” (*public safety*; $M=5.10$, $SD=1.77$); and (4) “When it comes to curbing gun violence, I think it is more important to improve mental health care than restrict access to guns” (*mental health*; $M=4.64$, $SD=1.83$).

Independent Variables (T0)

The study’s two independent variables are issue and attribute exposure indices. Drawing upon the matching procedure to measure individual-level agenda-setting effects (Rössler, 1999; Shehata & Strömbäck, 2013), these indices were created for participants by taking into account each person’s specific media use. Participants were asked to report their frequency of news consumption for each of the 25 media outlets on a five-point scale (1 = Never, 5 = Always).

The issue exposure index was calculated per participant for each media outlet and then aggregated based on the three media types (mainstream, conservative, and liberal). Specifically, gun violence salience in each news outlet—measured as the number of gun violence articles published 40 days before the survey’s first wave—was multiplied by the participant’s reported frequency using that media outlet in W1 (0 = Never, 0.25 = Rarely, 0.50 = Sometimes, 0.75 = Often, 1 = Always). The 40-day window was chosen because agenda setting is a cumulative effect and the time lag for the effect usually ranges between 4 and 8 weeks (McCombs & Valenzuela, 2020). The specific date range for news exposure is different across participants because each completed the survey’s first wave on different dates. For example, if a participant completed the first wave on October 2nd, their media exposure between August 23rd and October 1st would be analyzed. These 25 products, each representing a specific media outlet (e.g., number of gun violence articles from *The New York Times* \times frequency of reading *The New York Times*), were added based on the three media types and then averaged. The issue exposure index captures participants’ likely exposure to the gun violence issue in the mainstream, conservative, and liberal media during the 40-day time period prior to survey participation. The attribute exposure indices were created similarly.² Supplemental Appendix B shows the descriptive statistics.

Control Variables (T1)

Media Use. News consumption patterns were included as control variables. Participants were asked how frequently they consumed news from traditional sources including printed newspapers ($M=2.56$, $SD=1.31$), printed news magazines ($M=2.19$, $SD=1.13$), television news ($M=3.83$, $SD=1.16$), and radio ($M=2.90$, $SD=1.20$), and from online news websites ($M=3.25$, $SD=1.17$) and news apps ($M=2.35$, $SD=1.37$).

Informational use of social media was constructed based on participants' use of Facebook, Twitter, Reddit, YouTube, Snapchat, and Instagram for news ($\alpha=0.85$). The six items were averaged to construct one index ($M=1.78$, $SD=0.86$). All measurements were based on a 5-point Likert scale (1 = Never, 5 = Always).

Political Orientation. Participants' political orientation was measured by asking, "when it comes to politics and public affairs, where would you place yourself on a scale of 0 to 10, where 0 = Strong liberal (left-leaning) and 10 = Strong conservative (right-leaning)?" ($M=5.33$, $SD=2.81$). Political orientation was analyzed as a continuous moderator variable.

Other. The analysis controls the effect of political interest by averaging two items based on a five-point Likert scale (1 = Strongly disagree, 5 = Strongly agree): "I'm interested in information about what's going on in politics and public affairs" and "I pay close attention to information about what's going on in politics and public affairs" ($M=4.80$, $SD=1.63$). Given the study's focus, gun ownership was also controlled (28.7% of participants own a gun).³ Finally, demographic variables include gender (female = 50.5%), age ($M=49.08$, $SD=15.85$), education (mode = some college), race/ethnicity (mode = white), and income (mode = \$50,000 to \$74,999).

Data Analysis

The hypotheses were tested with two-wave panel data. To test H1 and H2, we conducted a mediation analysis using Hayes' PROCESS macro (version 3.5) on SPSS (model 4). The results are reported in Supplemental Appendix C (H1) and Supplemental Appendix D (H2). As shown in Supplemental Appendix C, Model 1 examines the relationship between the three types of media exposure indices (T0) and the perceived importance of gun violence (T1). Model 2 investigates the direct effect of media exposure (T0) on social media expression about gun violence (T2) while controlling for the effect of the variable on T1. Finally, Model 3 tests the indirect relationship between media exposure and social media expression using perceived issue importance as a mediator.⁴ The mediation effect is significant if zero is not in between the bootstrap lower bound (BootLLCI) and upper bound (BootULCI) of the completely standardized indirect effect, with 5,000 bootstrap samples and 95% confidence intervals (CIs). The same approach was used to test H2.

To answer RQ1 and RQ3, we examined the overall moderated mediation models using Hayes' PROCESS macro model 8 to investigate if the direct and indirect effects of issue exposure on conservative and liberal media differed by political orientation. Model 8 assumes that the relationships between (1) the independent variable and mediator and (2) the independent and dependent variables are conditional on the moderator. As for RQ2 and RQ4, two similar sets of moderated mediation models were constructed, with each set containing four models corresponding to the four attributes. Following Hayes (2017), we decide the conditional effects based on two criteria: (1) the moderated mediation effect is statistically significant, and (2) the conditional

effects of liberals, neutrals, and conservatives observed using the “Pick-A-Point” approach ($M \pm 1SD$) show the expected patterns. The specific political orientation scores are different across different models, depending on the mean and standard deviation. Similar to H1.2, an index of each moderated mediation model is statistically significant ($p < .05$) when its confidence interval does not contain zero. All the models meet the linear regression assumptions.

Results

The Effect of Mainstream Media

In testing H1, Supplemental Appendix C presents both the direct and indirect effects of mainstream media exposure on social media expression. Model 2 (see Supplemental Appendix C) shows a positive direct relationship between gun violence exposure from mainstream media (T0) and social media expression about the issue (T2), controlling for the effect of social media expression on T1 ($\beta = .166, p < .05$). As for the indirect effect, an increase of one’s exposure to gun violence coverage on mainstream media (T0) will lead to an increase of perceived issue importance (T1; $\beta = .173, p < .05$), which in turn boosts social media expression about the issue (T2; $\beta = .139, p < .01$) (See Models 1 and 3 in Supplemental Appendix C). The bootstrapping result reveals a significant partial mediation effect (Indirect effect: $\beta = .024, SE = .013, 95\% CI [0.003, 0.055]$). H1 is supported.

H2 examines the relationship between mainstream media’s attribute agenda setting and social media expression about gun violence. Media effects for the four attributes show different patterns (see Supplemental Appendix D). A mediating effect is only found for *gun regulation*: exposure to mainstream media’s coverage of *gun regulation* (T0) and social media expression (T2) is completely mediated by perceived attribute salience (T1; Indirect effect: $\beta = .021, SE = .013, 95\% CI [0.001, 0.052]$). That is, individuals more frequently exposed to mainstream media’s gun regulation coverage (T0) are more likely to believe that the government should do more to regulate guns (T1; $\beta = .175, p < .05$; Model 4b), which in turn leads to more expression about gun violence on social media (T2; $\beta = .117, p < .05$; see Model 6b). No direct relationship between gun regulation exposure (T0) and social media expression (T2) is present after controlling for the mediator (T1; $\beta = .087, p = .211$; see Model 6b).

In contrast, exposure to mainstream media’s *gun rights* discussion (T0) will decrease belief in the importance of protecting Americans’ rights to own guns (T1; $\beta = -.144, p < .01$; see Model 4a). Attribute exposure (T0), however, directly prompts more social media discussion about the gun violence issue (T2; $\beta = .127, p < .05$; see Model 6a). Additionally, there is no correlation between the mediator (T1) and the dependent variable (T2; $\beta = -.100, p = .053$; see Model 6a), and therefore no significant mediation effect. Likewise, exposure to mainstream media’s *mental health* coverage (T0) decreases belief in the importance of improving mental health care to curb gun violence (T1; $\beta = -.136, p < .05$; see Model 4c), but it directly leads to more social media expression (T2; $\beta = .259, p < .001$; see Model 6c). No significant mediation

relationship is found. Regarding the *public safety* attribute, no significant relationship is found between the three focal variables. H2 is partially supported for the *gun regulation* attribute only.

The Effects of Partisan Media

RQ1 and RQ2 ask about selective agenda-setting effects and social media expression. For conservative and liberal media, no selective effects at either level—or the direct or indirect impact on social media expression among their respective followers—are observed.

In addressing RQ3, several significant cross-cutting effects are found. First, while political orientation does not significantly moderate the mediation model for conservative media, some conditional effects are significant. As Figure 1a shows, liberals and neutrals exposed to more conservative media (T0) perceive gun violence as less important (T1), which will in turn dampen their social media expression (T2; Liberals-Indirect effect: $B = -.002$, $SE = .001$, 95% CI $[-0.005, -0.001]$; Neutrals-Indirect effect: $B = -0.002$, $SE = .001$, 95% CI $[-0.004, -0.001]$). For liberals, the direct, negative relationship between conservative media exposure (T0) and social media expression (T2) is also significant ($B = -.010$, $p < .05$).

Regarding liberal media's effect (see Figure 1b), a significant direct relationship between media exposure (T0) and social media expression (T2) is shown only among conservatives ($B = .045$, $p < .05$). No indirect effect is found among the three partisan groups.

Answering RQ4, cross-cutting exposure, again, appears to be more effective, while the media effect patterns vary across attributes. First, political orientation significantly moderates the relationship between *gun rights* attribute coverage (T0) and the attribute importance (T1) ($\Delta R^2 = .006$, $p < .05$). That is, more exposure to conservative media's gun rights coverage (T0), increases the attribute's importance (T1), and this effect is stronger among liberals than conservatives (see Figure 2a). Political orientation does not moderate the mediation model.

Second, the mediation model for media coverage of *gun regulation* (Figure 2b) is significantly moderated by political orientation (Index of moderated mediation = .009, $SE = .006$, 95% CI $[0.0003^5, 0.022]$). More exposure to conservative media's gun regulation coverage (T0) will decrease the attribute's importance (T1), which in turn dampens social media expression about gun violence (T2). This effect is stronger for liberals.

Third, the mediation model for the *mental health* attribute (see Figure 2c) shows that, while political orientation does not significantly moderate the entire mediation model, it moderates the direct path between conservative media attribute exposure (T0) and social media expression (T2) ($\Delta R^2 = .011$, $p < .01$). Exposure to conservative media's mental health coverage (T0) decreases one's social media expression (T2), and this effect is stronger among liberals.

Finally, in the mediation model for the *public safety* attribute (see Figure 2d), political orientation moderates the attribute agenda-deflating effect: the path from attribute

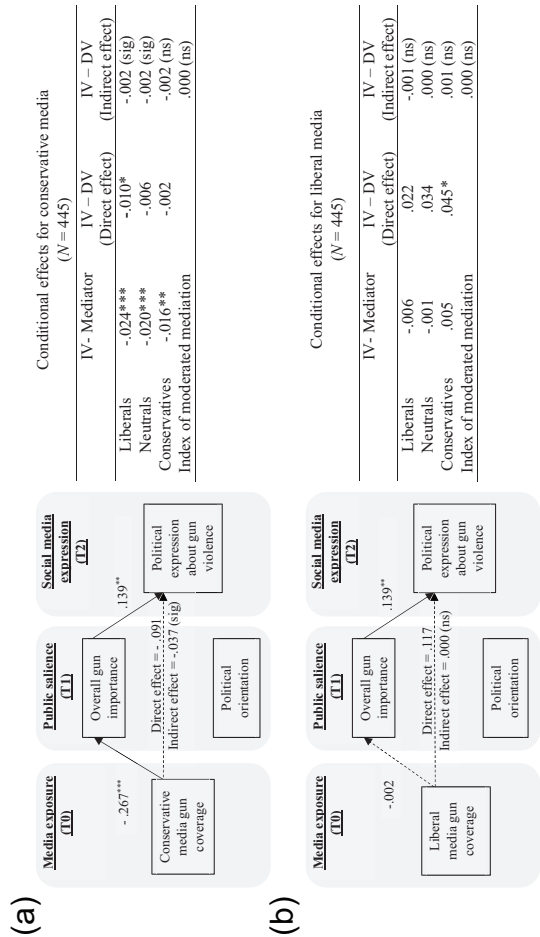


Figure 1. Moderated mediation models: Indirect and direct effect of conservatives (a) and liberal media (b) issue exposure on social media expression through the perceived issue importance, moderated by political orientation.

Note. All entries in the figures are standardized coefficients (β) of the mediation models (model 4 in PROCESS) and the moderated mediation models (model 8). The indirect effect coefficients are bootstrapping results and are completely standardized. The dashed lines indicate insignificant relationships. Insignificant moderating effects are omitted from the figures for succinctness. The tables show the conditional effects using the “Pick-A-Point” approach (liberals = $M - 1SD$, neutrals = M , conservatives = $M + 1SD$). All entries in the tables are unstandardized coefficients (B). Missing values are excluded listwise.

* $p < .05$. ** $p < .01$. *** $p < .001$.

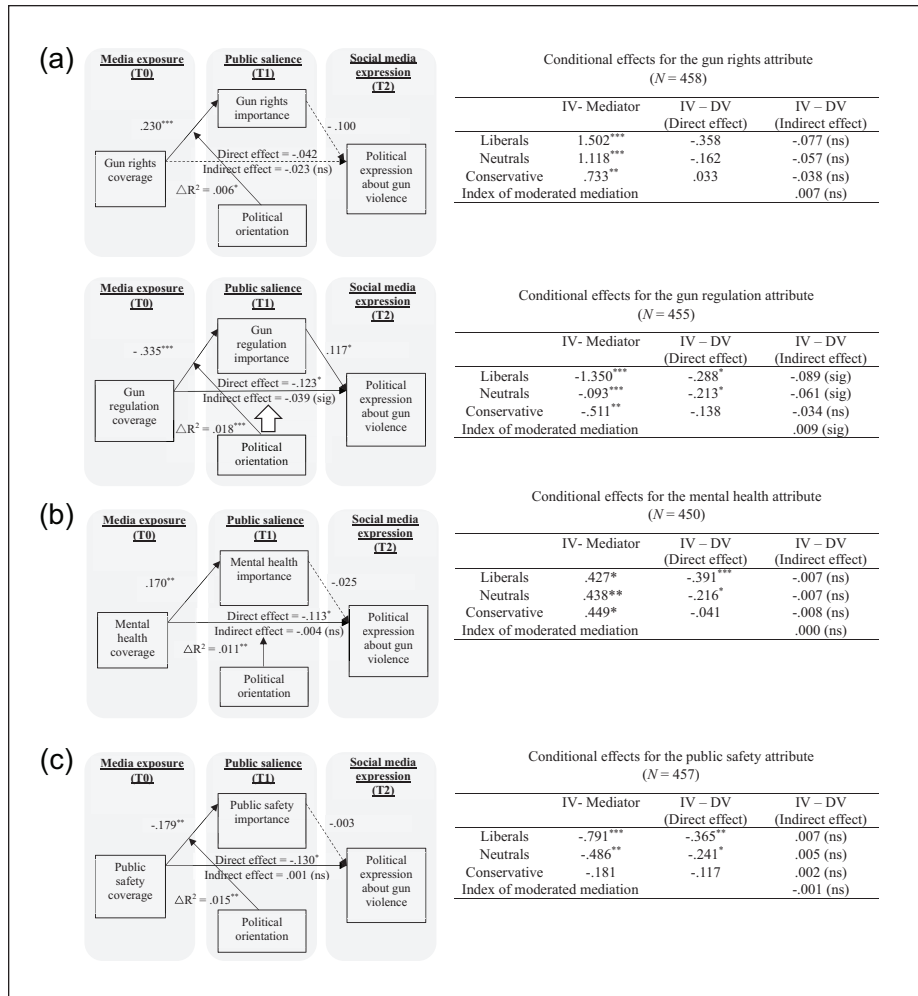


Figure 2. Moderated mediation models: Indirect and direct effect of conservative media attribute exposure on social media expression through the attribute perception variables, moderated by political orientation. The attributes include gun rights (a), gun regulation (b), mental health (c), and public safety (d).

exposure (T0) to perceived attribute importance (T1) ($\Delta R^2 = .015$, $p < .01$). Exposure to conservative media's public safety coverage (T0) decreases the public's belief that more security measures should be in place to prevent gun violence (T1), and this effect is stronger among liberals.

Figure 3 shows how political orientation moderates the mediation models for liberal media's effects. The moderated mediation model is only significant for liberal

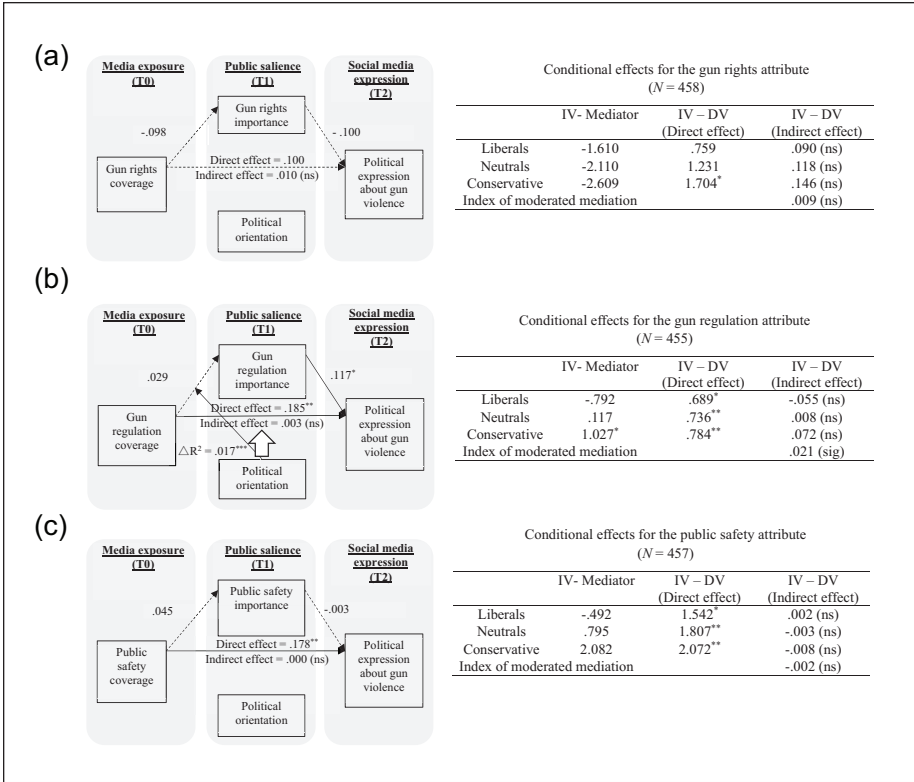


Figure 3. Moderated mediation models: indirect and direct effect of liberal media attribute exposure on social media expression through the attribute perception variables, moderated by political orientation. The attributes include gun rights (a), gun regulation (b), and public safety (c).

Note. See Note of Figure 1. The figure related to the mental health attribute is omitted due to the lack of data (i.e., liberal media did not cover this attribute in the sample).

media's *gun regulation* coverage (see Figure 3b; Index of moderated mediation = .021, $SE = .013$, 95% CI [0.001, 0.051]), which means that the mediation effect varied by political orientation. Both the relationships between (1) attribute exposure (T0) and attribute importance (T1; $B = 1.027$, $p < .05$) and (2) attribute exposure (T0) and social media expression (T2; $B = .784$, $p < .01$) are significant and/or stronger among conservatives. While no significant moderation effect is found for the other three attributes, the results show that exposure to liberal media's coverage of *gun rights* and *public safety* (T0), respectively, increases social media expression (T2) among conservatives: $B = 1.704$, $p < .01$; $B = 2.072$, $p < .01$. All results are summarized in Supplemental Appendix E. (Also see Supplemental Appendices F–I for additional information about the analysis.)

Discussion

Focusing on a controversial issue—gun violence in the United States—this study examines different news media’s agenda setting as an antecedent of political expression about the issue on social media. Overall, the results show that exposure to mainstream media’s gun violence coverage will significantly increase the public’s perceived issue importance, which in turn prompts people to express their viewpoints more about gun violence on social media. Additionally, partisan media’s gun violence coverage has a stronger effect on audiences with counter-attitudinal beliefs. Specific findings are discussed below.

In this article, we reason that the media’s agenda-setting effect precedes social media expression—a behavioral consequence of agenda setting. Findings about mainstream media’s effects, both at the first and second levels, provide considerable evidence for the proposition. The results show that while mainstream media exposure to gun violence will directly trigger social media expression, the indirect media effect—by transferring issue salience to the public’s mind—is also significant. Attribute agenda setting also precedes social media expression: there is a full mediating effect for media coverage of *gun regulation*. These findings contribute to the previous literature in two ways. First, the study advances agenda-setting theory by demonstrating a clear theoretical path in sequence: media exposure (T0)→public salience (T1)→public expression on social media (T2). Unlike previous research that examines the link between agenda setting and general political participation (Camaj, 2014; Moon, 2013), our study focuses on the salience transfer of one particular issue—gun violence—from the media to the public and ultimately to the social media agenda. We argue that this three-step transfer of salience better explicates news media’s effect from the theoretical perspective of agenda setting.

Second, the research contributes to the political communication literature by explicating the association between news consumption and political expression. Scholars have reasoned and tested the association between news exposure and political discussions (e.g., Mutz, 2001). This study provides more nuance to this general pattern. Before someone expresses their opinion about an issue they were exposed to on mainstream media, that person must first believe that the issue and/or certain aspects are important. That is, exposure to mainstream media’s gun violence coverage does not always directly predict social media expression; sometimes, to have an impact on behavior, media messages must first influence perception. Together, our research builds a theoretical link between agenda setting and this political communication research. Put simply, the news media tell us what to think about and how to think about an issue, which in turn determines what we talk about on social media.

There are, notably, nuanced variations in the effects of mainstream news coverage of different gun violence attributes. There is a mediating effect for only one of the four attributes—*gun regulation*. Exposure to mainstream media’s *gun rights* and *mental health* coverage will decrease these attributes’ salience, though exposure increases social media expression directly.⁶ The results may imply a zero-sum process at the

attribute level where *gun regulation* as a policy solution for gun violence compared to others has “won the day.”

Our study shows no evidence for partisan media’s selective agenda setting but reveals significant cross-cutting effects. Exposure to conservative media decreases public salience of gun violence, pivots opinion in a more conservative direction (e.g., prioritizing gun rights over gun control), and discourages social media expression; all of these effects are stronger among liberals. Considering conservatives’ defensive position toward gun violence, these findings suggest that conservative media has a remarkable agenda-deflating effect. Extending previous research (Schoenbach & Semetko, 1992), our study shows that some partisan media can not only deflate the agenda but also serve to further “deactivate” the public. That is, partisan media are capable of *discouraging* political expression about an issue. The conservative media’s cross-cutting effects may be attributed to the “ceiling effect.” Conservatives may already be familiar with the points raised by conservative media, and so they have less runway than liberals for opinion or behavior change. Or, they already have developed a stable set of opinions and expressions about gun violence thanks to the tightly integrated conservative media ecosystem (Benkler et al., 2018) so further exposure to their like-minded media would not result in any major change. The significant, negative association between conservative media exposure and liberals’ political expression also lends support to Mutz’s (2002a) arguments: after exposure to counter-attitudinal information, liberals possibly feel more ambivalent about their views or are concerned that social media expression could threaten their social relationships.

A similar cross-cutting dynamic occurs with liberal media, but the effect is in the opposite direction. Conservatives with greater exposure to liberal media’s gun violence coverage will discuss the issue more frequently on social media. Regarding attribute agenda setting specifically, conservatives with more exposure to liberal media’s *gun regulation* coverage will believe the attribute is more important, which increases their social media expression. Given liberals’ progressive position on gun violence, cross-cutting exposure might be a catalyst for conservatives to recognize the urgency of strengthening gun laws and thus engage in the social media conversation. However, our analysis does not examine the actual content of political expression. It is likely that exposure to counter-attitudinal information triggers conservatives to defend their viewpoints (Mutz, 2002b; Zhang et al., 2022). Considering the different findings regarding the two partisan groups, our research provides additional nuance to our understanding of cross-cutting exposure and political participation. The impact of cross-cutting exposure also depends on the issue under consideration and the given partisan group’s stance.

Reviewing the effects of attribute agenda setting, media exposure to different attributes leads to divergent outcomes, depending on the specific nature of the attribute, the type of media, as well as the participant’s political orientation. Theoretically, these findings speak to the compelling arguments hypothesis (Ghanem, 1996; Kioussis, 2005), which suggests not all attributes are equally powerful in changing an issue’s public salience and some may even deflate the agenda. Political communication research identifies a similar pattern in how media exposure encourages or

discourages political participation (Eveland, 2001; Matthes et al., 2019; Mutz, 2001, 2002b). While some studies suggested that exposure to diverse information led to elaboration and reflection (Eveland, 2001; Mutz, 2001), others argued that exposure to counter-attitudinal information would result in inaction due to ambivalence or threat to social relationships (Matthes et al., 2019; Mutz, 2002a). Considering these different lines of research and this study, the compelling arguments hypothesis may be especially useful for understanding partisan media's cognitive and behavioral effects, in both positive and negative directions. A fruitful area for future research would further explore relationships between attribute exposure, public salience, and political outcomes, advancing agenda-setting theory, and shedding light on the unsettled question of cross-cutting media exposure and political participation (Matthes et al., 2019).

In sum, our study suggests, somewhat optimistically, that mainstream media are more powerful than partisan media in shaping audience opinions and encouraging action, thus potentially contributing to a more informed and active public. In line with previous research (Weeks et al., 2016), our findings show that mainstream media still play a significant role in this polarized media environment. This research also makes important theoretical contributions to agenda-setting and political communication literature. Methodologically, the combination of computational analysis of media content and a two-wave panel survey makes it possible to (1) examine media effects at the individual level, (2) consider a large variety of media agendas, and (3) make a causal inference. The findings also have practical implications. Given the agenda-deflating effect of conservative media, policymakers should reassess the nature of public conversation on social media and use it carefully for formulating policies. Anti-violence activists could leverage our findings to develop attribute-specific messages targeting different audiences.

Despite the importance of the research, it is limited in the following aspects. First, all of the study's findings are limited to one issue. Agenda-setting effects regarding other polarized or less polarized issues may show different patterns. Second, the outcome variable—political expression on social media—was measured based on a self-reported survey, which may suffer from recall error. Relatedly, the outcome variable for attribute agenda setting was operationalized as social media expression in general rather than expression about a specific attribute. Future research could consider combining survey and digital trace data to better measure what people actually express on social media. Third, while the two-wave panel survey accounts for the change in political expression on social media, it does not consider opinion change (the mediating variable). Future research could consider a three-wave panel survey for conducting a stricter analysis of mediating effects. Fourth, we calculated the issue exposure indices based on the number of gun-related news items. Some media outlets might publish more items than others daily, and thus have a higher sheer number of gun-related items. While we believe that those media's readers would indeed have a higher chance of being exposed to the gun violence issue, we encourage future research to consider the total number of articles published by each source to account for cross-media variations. Finally, as the study focuses on the first and second levels of agenda setting,

researchers may also consider examining the behavioral consequences of the Network Agenda Setting Model.

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Supplemental Material

Supplemental material for this article is available online.

Notes

1. We used survey questions adapted from polls and acknowledge that this is not the best way to measure attribute salience, which refers to the importance of an attribute.
2. We developed our approach to estimating gun-related news exposure based on the previous literature (Rössler, 1999; Shehata & Strömbäck, 2013). This is an estimation, which may not reflect the participants' actual news exposure. Also, news exposure is not equal to attention. Future research may use biometric technologies for a more accurate measurement.
3. Gun ownership indicates the importance of the gun issue to a person individually, which is controlled in this study. Future research could consider examining how an issue's personal importance moderates the effect. Individuals who are intensely concerned about particular issues, or issue publics, may exhibit a unique pattern of media use and political behavior (Kim, 2009).
4. When examining the relationship between T0 news exposure and T1 perceived issue importance, we cannot control the effect of T0 issue importance because the data were not collected. In another study (Guo et al., 2021), we analyzed the association between T1 news exposure and T2 perceived issue importance while controlling for the effect of T1 issue importance and the relationship is positive and statistically significant.
5. We keep four decimal points here because otherwise, this number will be rounded to 0 and we will not be able to tell if this range includes 0.
6. We measured the public salience of mental health by asking how the participants perceived the importance of improving mental health compared with gun regulations. That is, exposure to the media coverage of the mental health aspect of the issue decreases the attribute's *relative* importance among the participants as compared with gun regulations.

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