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Media Coverage of Mass shootings and Attitudes Towards Muslims

DISSERTATION

To be submitted in partial satisfaction of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

In Psychological Science
by
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Publications

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ABSTRACT OF THE DISSERTATION

Media Coverage of Mass shootings and Attitudes Towards Muslims

By

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DOCTOR OF PHILOSOPHY
In Psychological Science
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Using television news coverage of American mass shootings, I examine how Muslim perpetrators of violence are covered differently in liberal and conservative media. Furthermore, I examine the consequences of this coverage, including its effects on prejudice towards Muslims and beliefs about the extent to which Muslims are responsible for acts of violence. In Study 1, I show that between 2010 and 2020, television news networks allocated more coverage to Muslim than non-Muslim mass shooters, even when statistically controlling for other factors influencing coverage (e.g. fatalities, location). The increase in coverage for Muslim shooters was larger for more politically conservative news networks. In Study 2, I test whether news coverage of Muslim mass shootings can increase negative attitudes towards Muslims. Across five different experiments with a total of 3331 participants, I did not find evidence that this is the case. The remaining studies examine whether media coverage can impact beliefs about the role Muslims play in mass shootings. In Study 3, I find that public beliefs about mass shootings mirror the picture presented in television news: people overestimate the percentage of mass shooters who are Muslim, and this overestimation is largest among frequent viewers of news networks that allocate more coverage to Muslim shooters. Study 4 used an experiment to demonstrate that exposure to news coverage of a Muslim mass shooter increases the extent to which people overestimate the percentage of mass shooters who are Muslim. Study 5 replicates this finding by comparing responses to media coverage of the 2021 shootings in Boulder, Colorado and Atlanta, Georgia, two contemporaneous mass shootings with Muslim and Christian perpetrators. Finally, Study 6A and 6B find that, because many people assume an unidentified mass shooter is likely to be Muslim, exposure to news coverage of an unidentified shooter also increases the extent to which people overestimate of the percentage of mass shooters who are Muslim. Overall, I demonstrate that major news networks provide systematically different media coverage

of mass shootings when the perpetrator is Muslim. This coverage fuels misperceptions about the role Muslims play in causing mass shootings and may misdirect efforts to effectively address mass violence.

INTRODUCTION

Despite accounting for only a small fraction of gun deaths, mass shootings are one of Americans' biggest fears (Chapman University, 2018a). The outsized fear of mass shootings, and of the groups scapegoated as responsible for them, is likely heavily influenced by decisions media organizations make when covering these events. To investigate this process, this dissertation examines news coverage of mass shootings committed by Muslims, a group often stereotyped as committing religious violence (Sides & Gross, 2013).

I begin by reviewing the existing research on prejudice towards Muslims. I then review research on media coverage and public attitudes, including research on how media coverage can affect prejudice. Finally, I describe past research on mass shootings and argue that news coverage of mass shootings presents an ideal context to study how news media cover Muslims.

After reviewing the literature, I attempt to answer several unresolved questions about Muslims and media coverage. In Study 1, I test whether liberal and conservative media cover Muslim perpetrators differently than non-Muslim perpetrators. In Study 2, I examine how this coverage might affect prejudice towards Muslims, a minority religious group which frequently faces discrimination in the United States. Although Study 2 is not the first study to test whether media coverage increases prejudice towards Muslims, it provides (to my knowledge) the most comprehensive experimental test of this question to date. Studies 3-5 test whether news coverage can contribute to the belief that Muslims commit acts of violence, a common negative stereotype about Muslims. Finally, Studies 6A and 6B examine whether changing the information presented in news coverage of mass shootings is an effective way to reduce the extent to which media coverage contributes to negative beliefs about Muslims.

Attitudes Towards Muslims

Muslims are the most disliked religious group in America (Pew Research Center, 2017a). More than half of Americans hold an unfavorable view of Muslims (Pew Research Center, 2007), and a third of Americans say they would not vote for a Muslim presidential candidate, even if the candidate was a qualified member of their preferred political party (Gallup, 2020; Mercier et al., 2021). One in seven Americans say they would refuse to accept a Muslim into their family (Pew Research Center, 2019b).

Americans' dislike of Muslims appears to be centered around the belief that Islam is a violent religion which inspires terrorism. Many Americans believe Islam is more likely to inspire violence than other religions and believe there is considerable support for terrorism among American Muslims (Pew Research Center, 2010). For example, one survey found that a third of Americans believe there is at least a "fair amount" of support for extremism among Muslims living in the United States (Pew Research Center, 2017c). Additionally, although Muslims are frequently associated with terrorism, they are typically not seen negatively in other ways. As an illustration of this, one national survey found that Americans believe Muslims are violent and untrustworthy, but do not think they are lazy or unintelligent (Sides & Gross, 2013).

Stereotypes about Islam and terrorism are probably why roughly half of Americans support anti-terrorism policies that specifically target Muslims, such as banning Muslims from entering the United States (Mathis-Lilley, 2017), increasing law enforcement presence in Muslim neighborhoods (Easley, 2016), and requiring that Muslims receive extra screening at airports (Chapman University, 2018b).

The belief that Islam is a uniquely violent religion may be caused, at least in part, by media coverage which frequently portrays Muslims as perpetrators of violence, especially violence connected to terrorism. Before discussing media portrayals of Muslims, I first review the past research examining how media coverage is allocated across different events, and how this media coverage can affect public attitudes.

Media Coverage

Political communications research indicates that one of the main ways the media can influence public discourse is by selecting the events and issues people consider important, a phenomenon referred to as "agenda setting" (McCombs & Shaw, 1972). Research on agenda setting has found a strong correlation between the amount of media coverage a topic receives and the importance that members of the public place on this topic (McCombs, 2018; McCombs & Donald, 1993). For example, during the 1990 presidential election, the amount of television news coverage devoted to a political issue (e.g. "drug abuse") predicted public perceptions of the importance of that topic a week later (Wanta & Hu, 1994).

Early research on media argued that agenda setting was the primary method by which the media influenced the public, and the media had limited ability to change public attitudes. That is, a common

assumption was that media "may not be successful much of the time in telling people what to think, but it is stunningly successful in telling its readers what to think about" (Cohen, 1963). However, in contrast to the these initial assumptions, subsequent research demonstrated that media coverage can have a significant influence on public attitudes and beliefs (R. J. Harris & Sanborn, 2013). For example, the frequency with which an event is portrayed in the media can have influence public beliefs about the frequency with which that event occurs (Busselle & Shrum, 2003; Eisenman, 1993). Researchers argue that this occurs because people judge the frequency of events by the ease with which they can be recalled, a tendency referred to as the "availability heuristic" (Tversky & Kahneman, 1973). When events are frequently portrayed in the media, consumers find it easy to recall these events, causing them to believe these events are more common (Busselle & Shrum, 2003; Slater & Rasinski, 2005). This process is especially likely to occur when someone lacks other sources of information about the frequency of an event, such as personal experience (Busselle & Shrum, 2003).

An important issue where media coverage can shift public attitudes is crime. Most Americans have little firsthand experience with crime, making news coverage their primary source of information about it (Alderman, 1994; Schildkraut & Elsass, 2016). This is problematic for several reasons. First, news media spend a lot of time covering crime (Baranauskas, 2020; Graber & Dunaway, 2015), with some researchers estimating that as much as 25% of all news coverage is crime related (Gilliam et al., 1996). The large amount of media coverage allocated to crime causes the public to overestimate the prevalence of crime and increases public fears of victimization (Larsen, 2020; Velásquez et al., 2020). As one demonstration of this, longitudinal research has found that the amount of news coverage allocated to crime is a better predictor of public fear of crime than crime rates (Lowry et al., 2003).

The fact that media provides the main source of public information about crime is also problematic because news media do not cover all crimes equally. Instead, certain crimes receive more coverage than others, presenting the public with a distorted picture of crime. Rare crimes, including violent crimes and homicides, receive significantly more coverage than more common, non-violent crimes like theft (Chermak, 1995; Dixon et al., 2003). This is likely why members of the public misunderstand the rates at which different crimes occur and overestimate the rates of violent crimes, like homicides (Hough & Joberts, 2005; Miller et al., 2004; O'Connell & Whelan, 1996; Vandiver & Giacopassi, 1997). Increased

media coverage of violent crime may also lead the public to overestimate the likelihood that criminal activities involve violence (Gregg & Posner, 1990). Consistent with this, members of the public overestimate the percentage of robberies which result injury to the victims (Stalans, 1993). This overestimation is largest among people who report receiving information about robberies primarily through mass media (rather than from both the media and from friends or family; Stalans, 1993).

In sum, a large amount of news coverage is allocated to crime, causing the public to overestimate the frequency with which crime occurs. News coverage of crime disproportionately focuses on rare crimes, like homicides, leading the public to misunderstand the rates at which different crimes occur.

In addition to these issues, media coverage also frequently misrepresents the types of people who are likely to commit crimes. In the next section, I review research on how these media misrepresentations can distort public beliefs about the rate at which crimes are committed by different racial groups.

Media Coverage of Minority Groups

In many countries, news media portray the racial dynamics of crime in a way that significantly departs from reality (Dowler, 2004; Gilchrist, 2010; Im et al., 2017). For example, in the United States, criminal perpetrators who are racial minorities are overrepresented in news coverage of crime relative to the rates at which they commit crimes (as measured by official crime statistics; Dixon, 2019; Dixon & Williams, 2015; Gruenewald et al., 2009). Similarly, racial minorities are underrepresented as victims of crime (Dixon & Linz, 2000a; Dixon & Williams, 2015; Sorenson et al., 1998). Caucasians, on the other hand, tend to be underrepresented as perpetrators of crime, overrepresented as victims of crime, and overrepresented as police officers (Dixon & Linz, 2000; Oliver, 1994).

Although American crime news misrepresents a number of different racial groups, including Latinos (Gruenewald et al., 2009), Asians (Sorenson et al., 1998), and Native Americans (Poindexter et al., 2003), media distortion research in the United States has most frequently focused on the representation of African Americans as criminal preparators (Dixon, 2019). This research indicates that African Americans are overrepresented as criminals in a number of different media sources, including newspapers, magazines, local television news, and cable television news (Barlow, 1998; Bjornstrom et al., 2010; Dixon & Linz, 2000a; Gilliam & Iyengar, 2000; Romer et al., 1998). This research also spans a

number of decades, with studies examining coverage as far back as 1946 (Barlow, 1998). Recent studies have suggested that the overrepresentation of African Americans as criminals may be declining (Dixon, 2017). Indeed, one study finds that between 2008 and 2012, African Americans were *underrepresented* as criminal perpetrators on cable news (Dixon & Williams, 2015).

Building these findings, researchers have also examined how exposure to news coverage can affect attitudes, especially towards race and the criminal justice system. For example, a large body of experimental research has examined the consequences of exposure to crime news with African American perpetrators. These studies have found that news coverage of African American perpetrators can cause a variety of attitude changes, such as increasing: modern racism (Gilliam & Iyengar, 2000), negative implicit associations with African Americans (Mastro et al., 2009), support for harmful treatment of African Americans by police (Johnson et al., 2008), the belief that African Americans are violent and likely to commit crimes (Peffley et al., 1996), fear of crime (Gilliam et al., 1996; Gilliam & Iyengar, 2000; although see also Holt, 2013), support for punitive criminal justice policies (Dixon, 2006a; Gilliam & Iyengar, 2000; although see also Dixon, 2008; Dixon & Maddox, 2005; Gilliam et al., 1996; Mastro et al., 2009), dispositional attributions for crime (Gilliam & Iyengar, 2000; although see also Holt, 2013), group-based explanations for crime (Gilliam et al., 1996), disapproval of a Democratic president (Valentino, 1999), emotional discomfort (Dixon & Maddox, 2005), perceptions that criminal perpetrators are likely to reoffend (Mastro et al., 2009), perceptions that the world is a dangerous place (Dixon, 2006a), perceptions that criminal defendants are often guilty (Dixon, 2006b; Dixon & Azocar, 2007; Hurley et al., 2015), and support for the police (Hurley et al., 2015). Experiments have also found that exposure to news coverage of African American perpetrators can change behaviors towards African Americans, such as increasing the likelihood that people will shoot an unarmed black perpetrator in a laboratory task (Correll et al., 2007).

Despite the large number of published studies examining the consequences of media coverage of African Americans perpetrators, it is unclear what conclusions can be drawn from this research. This is partially because many studies on this topic have produced conflicting results. For example, although some studies find that exposure to news coverage of African American perpetrators increases punitive

attitudes towards criminals (Dixon, 2006a; Gilliam & Iyengar, 2000), other studies have failed to find evidence for this effect (Dixon, 2008; Dixon & Maddox, 2005; Gilliam et al., 1996; Mastro et al., 2009).

In addition, many of the studies on media coverage and prejudice use research practices which have been shown to increase the chance of spurious findings (Button et al., 2013; Ioannidis, 2005; Simmons et al., 2011), raising doubts about the veracity of their results. To elaborate on one of the most common issues, most of the studies which examine news coverage of African American perpetrators use small samples (e.g. $n < 20$ per cell), providing low statistical power and increasing the chance that a statistically significant result will be a false positive (Button et al., 2013). In the few cases where studies do have large samples, these samples appear to be obtained in methodologically questionable ways. For example, in a frequently cited paper, Gilliam and Iyengar (2000) use a large sample ($n = 2331$) to test the consequences of news coverage of African American perpetrators. However, this sample is acquired by combining data from five separate studies. Although pooling data from multiple studies can be a useful method of increasing sample size (Mcshane & Böckenholt, 2017), when the decision to pool data is made after viewing the study results (as appears to be true in this case) pooling data can significantly increase the rate of false positives (Vosgerau et al., 2019). Additionally, when data is pooled across samples, researchers need to statistically adjust the standard errors to account for between sample variation (Curran & Hussong, 2009). Gilliam and Iyengar (2000) do not do this. As most of their effects are only slightly below the $p = .05$ threshold for statistical significance, it is likely that a re-analysis of their data which correctly adjusts for between sample variance would not find statistically significant effects.

Another frequent issue in the research on news coverage and prejudice is an inconsistent, and likely post-hoc, use of moderating variables. Although the use of moderators is not itself problematic, the inconsistent use of moderators in the research on news coverage suggests that moderation analyses are likely being conducted post-hoc after researchers fail to observe a significant effect without the moderator. This practice has been shown to significantly increase the chances of false positive research findings (Simmons et al., 2011). For example, the effects of exposure to news coverage of an African American perpetrator are sometimes found only when prior frequency of news viewing is included as a moderator (Dixon, 2006a, 2006b, 2007; Dixon & Maddox, 2005; Hurley et al., 2015) and sometimes found regardless of prior news viewing (Dixon, 2006a, 2007; Hurley et al., 2015). Effects are also sometimes

moderated by endorsement of negative stereotypes of African Americans (Dixon, 2006a, 2008; Gilliam et al., 1996; Gilliam & Iyengar, 2000; Valentino, 1999) and are sometimes found regardless of stereotype endorsement (Dixon, 2006a, 2008; Dixon & Azocar, 2007; Hurley et al., 2015; Oliver, 2003). Other variables which inconsistently moderate the effects of news coverage include participants' gender (Mastro et al., 2009) and ethnicity (Gilliam & Iyengar, 2000; Hurley et al., 2015).

In sum, racial minorities, particularly African Americans, are often overrepresented as criminal perpetrators in American news coverage. Although many studies have examined the consequences of this coverage, inconsistent findings and methodological issues make it difficult to draw clear conclusions from this research. In the next section, I review research that looks specifically at media coverage of Muslims.

Media Coverage of Muslims

In western countries, media coverage of Muslims tends to be negative in tone and frequently portrays Islam as a violent religion (Ahmed & Matthes, 2017). Although the media has a bias towards negativity when covering most topics coverage of Muslims is more negative than coverage focusing on otherwise similar content, such as coverage of other ethic minorities or religions (Trussler & Soroka, 2014). For example, text analysis of American newspapers from 1996 to 2015 found that coverage of Muslims used more negative words than coverage of Hindus, Catholics, or Jews (Bleich & van der Veen, 2018). Similarly, articles about terrorism used more negative language when they mentioned Muslims than when they did not mention Muslims (Bleich & van der Veen, 2018).

In addition to presenting Muslims in a negative light, media sources tend to frame coverage of Muslims in a way that is consistent with stereotypes about Muslims and religious violence. When political violence is committed by Muslims, news articles are more likely to call this violence terrorism and are more likely to discuss potential links between the perpetrator and larger terrorist organizations (Betus et al., 2019; Mitnik et al., 2020; Nagar, 2010; Powell, 2011).

As news coverage often frames Muslim perpetrators in the context of terrorism, many members of the media have claimed that alternative explanations for violence, such as mental illness, are mentioned less frequently in news coverage when a perpetrator is Muslim (Arva et al., 2017; Butler, 2015; Vedantam, 2017). However, contrary to this media narrative, empirical research on news coverage of

terrorist attacks has not found evidence that mental illness is less likely to be mentioned in articles about Muslim perpetrators (Betus et al., 2019).

In addition to examining how the content of news coverage differs between Muslim and non-Muslim perpetrators, research has also compared the magnitude of coverage. This research demonstrates that terrorist attacks committed by Muslims receive significantly more media coverage than terrorist attacks committed by non-Muslims (Dixon & Williams, 2015; Kearns et al., 2019; Mitnik et al., 2020). For example, Kearns, Betus, and Lemieux (2019) find that between 2006 and 2015, terrorist attacks with Muslim perpetrators received more news coverage than terrorist attacks with non-Muslim perpetrators.

Partisan Media Coverage

Although many studies have examined news coverage of Muslim perpetrators, research has not studied whether this coverage differs based on the political leaning of news organizations. This is surprising, as members of the popular press (Butler, 2015; Fox News Staff, 2021) and academic researchers (Kearns et al., 2019; Silva, 2019) frequently speculate about how Muslim perpetrators are being covered differently in liberal and conservative media.

Past research has found that liberal and conservative media sources present different news coverage on a range of politically relevant topics, including climate change (Bohr, 2020), gay marriage (Pan et al., 2010), political scandals (Puglisi & Snyder, 2011), protests (Weaver & Scacco, 2013), and economic conditions (Larcinese et al., 2011). As one example of these differences, newspapers that endorse Democratic presidential candidates tend to allocate more news coverage to high unemployment when the sitting president is a Republican, whereas newspapers that endorse Republican presidential candidates devote more coverage to unemployment when the president is a Democrat (Larcinese et al., 2011).

Media sources tend to present information consistent with the views of their audience (Baum et al., 2015), and in the United States, conservative political attitudes are associated with prejudice towards Muslims (Pew Research Center, 2017b). Thus, in America, media with a conservative audience will likely present a more negative picture of Muslims than media with a liberal audience. However, this expected difference in coverage could manifest in different ways. For example, conservative media could provide

more coverage to acts of violence with Muslim perpetrators than liberal media do. Alternatively, liberal and conservative media could allocate the same amount of coverage to Muslim perpetrators but frame this coverage in different ways.

Understanding how Muslim perpetrators are covered differently in liberal and conservative media could contribute to a better understanding of why bias against Muslims occurs. As one example, individuals who are prejudiced towards Muslims perceive Muslim (vs non-Muslim) perpetrators of violence as less mentally ill and more motivated by religion (Mercier et al., 2018; Noor et al., 2019). Understanding whether conservative media is more likely to discuss religion and less likely to discuss mental illness when a perpetrator is Muslim could help determine whether these attributions are caused by media coverage (Mercier et al., 2018).

In Study 1, I examine how the political leaning of a news network affects their coverage of Muslim perpetrators of violence. To do this, I examine news coverage of mass shootings, a specific type of mass violence. Below, I explain why coverage of mass shootings are an appropriate context to study media coverage of Muslims.

Mass Shootings

Why Study News Coverage of Mass Shootings?

There are several reasons why mass shootings are an ideal context to study media representations of Muslims. First, the classification of mass shootings is more objective than classification of other mass violence events. This means that it is reasonable to compare different mass shootings to each other, as mass shootings are reasonably similar events that share a common set of characteristics. Second, mass shootings receive a large amount of media coverage. This coverage tends to focus on the perpetrator of the shooting and their motivation. As a result, if the media treats Muslim perpetrators differently, coverage of mass shootings is a context in which these differences are likely to emerge. Finally, mass shootings have been shown to shift public attitudes on other political issues (e.g. gun control; Newman & Hartman, 2019). Thus, if news coverage does change attitudes towards Muslims, coverage of mass shootings is a case where this change is likely to be observed. Below, I review each of these reasons in detail.

Definition of a Mass Shooting

There is no legal definition of the term “mass shooting” (Bagalman et al. 2013; Nichols 2017), leaving researchers and organizations to develop their own working definitions (Booty et al., 2019). Although many of definitions of a mass shooting exist, almost all definitions require that at least 4 people are killed or injured by firearms in a single incident (or occasionally at least 3 people, see Stanford Mass Shootings in America, 2012). Although a few definitions use only the number of deaths by firearms to determine whether an event is a mass shooting (e.g. Gun Violence Archive, 2020), most definitions include further requirements. The most common additional requirements are that a shooting must have occurred in a public place (Follman et al., 2020), must not be connected to other criminal activity (e.g. gang activity or drug trafficking; Peterson & Densley, 2019), and must not be committed by state-sponsored actors (e.g. police officers; Peterson & Densley, 2019).

The classification of mass shootings is more objective than the classification of other mass violence events, such as terrorism (Weinberg et al., 2004), making mass shootings a useful way to compare similar preparators. Determining whether an act of violence should be classified as terrorism requires a subjective assessment of whether the perpetrators of the event had political objectives (FBI.gov, 2021), which may introduce bias. Consistent with this, past research has found that members of the media and the public are more likely to classify violent events as terrorism when they have Muslim perpetrators (Betus et al., 2019; West & Lloyd, 2017). As the threshold for classifying an event as terrorism is lower when a perpetrator is Muslim, comparing news coverage of Muslim and non-Muslim “terrorists” would likely be a comparison of individuals who have committed acts of different severity. In contrast to this, most definitions of mass shooting events require significantly less subjectivity. For example, the Congressional Research Service defines a mass shooting as “a multiple homicide incident in which four or more victims are murdered with firearms… and the murders are not attributable to any other underlying criminal activity or commonplace circumstance” (Congressional Research Service, 2015, p. 10). This type of objective definition means that all mass shootings have met a specific criterion, making them similar events that are appropriate to compare to each other.

Media Coverage of Mass Shootings

Despite accounting for only a small percentage of firearms deaths, mass shootings receive significantly more coverage than other types of gun violence (Bjelopera et al., 2013). This is likely because news media tend to focus on negative events, especially sensational violence and tragedy (Trussler & Soroka, 2014). Consistent with this, the number of fatalities caused by a mass shooting is a strong predictor of the amount of news coverage it will receive (Chermak & Gruenewald, 2006; Duwe, 2000; Schildkraut et al., 2018). News coverage of mass shootings also tends to specifically focus on the perpetrator of the shooting rather than other information about the incident. For example, news coverage is more likely to frame mass shootings as the result of "dangerous people" than as the result of "dangerous weapons" (McGinty et al., 2014). This focus on the perpetrator distinguishes coverage of mass shootings from coverage of single victim homicides, which tends to focus on the victim (Gruenewald et al., 2009), or the details of the relationship between the victim and the perpetrator (Taylor & Sorenson, 2002). Because coverage of mass shootings centers around the shooter, if Muslim perpetrators do receive different media coverage, mass shootings are a context where these differences are likely to occur.

Effect of Mass Shootings on Public Attitudes

Past research has found that public attitudes on political issues can shift following major mass shootings. For example, support for gun control increases following mass shootings, although this support quickly fades (Newman & Hartman, 2019). Gun sales also increase following mass shootings, suggesting that gun owners are afraid that the increased support for gun control will cause governments to pass gun control legislation (Porfiri et al., 2019; although the feared changes to gun laws almost never occur, see Luca et al., 2020; Newman & Hartman, 2019).

Mass shootings also have the potential to increase stigma towards marginalized groups, such as people with mental illness. In an experimental demonstration of this, McGinty, Webster, and Barry (2013) presented people with a news story about a mass shooting. When this story was accompanied by a proposal to ban people with mental illness from purchasing guns, it increased the belief that people with mental illness are dangerous, relative to when the story was presented alone.

Because mass shootings have been shown to shift public attitudes in other domains, if media coverage does impact attitudes towards Muslims, mass shootings are a situation where these effects are likely to be observed.

Overview of Studies

In this dissertation, I examine media coverage of Muslim mass shooters and its consequences. Study 1 focuses on television coverage of Muslim and non-Muslim mass shootings between 2010-2020, and tests whether this coverage differs based on the political leaning of the news source. In Study 2, I examine whether exposure to information about Muslim mass shooters increases prejudice towards Muslims. In the remaining studies, I examine whether media coverage can cause people to overestimate the share of mass shootings with Muslim perpetrators. Study 3 demonstrates that public perceptions about mass shootings, and the extent to which they are caused by Muslims, match the patterns in news coverage. Specifically, the more time someone spends watching a news network, the more closely their beliefs about Muslim mass shooters correspond with the patterns in that networks' coverage of Muslims. In Studies 4 and 5, I use experiments to show that media coverage of Muslim mass shooters has a causal impact on the extent to which mass shootings are attributed to Muslims. Finally, Studies 6A and 6B expand on these findings by examining how people respond to media coverage which does not mention a shooter's religion.

STUDY 1: Do Muslim Mass Shooters get more Media Coverage?

Study 1 used news transcripts to estimate the time that Fox News, CNN, and MSNBC—three major news networks from across the political spectrum in the United States—spent covering each of the mass shootings in the Violence Project's database of mass shootings (Peterson & Densley, 2020) between 2010 and 2020. Specifically, Study 1 compared the volume of coverage Muslim and non-Muslim shooters received, as well as the time coverage spend discussing terrorism, mental illness, and religion. Study 1 also tested whether each of these effects were larger for news networks that were more politically conservative (relative to networks that were more liberal). Study 1 was not pre-registered.

Methods

Violence Project Database of Mass Shootings in the United States

Information on mass shootings was obtained from the Violence Project database of mass shootings in the United States (Peterson & Densley, 2020). This database adopts the following definition of a mass shooting from the Congressional Research Service (Congressional Research Service, 2015, p. 10):

> a multiple homicide incident in which four or more victims are murdered with firearms—not including the offender(s)—within one event, and at least some of the murders occurred in a public location or locations in close geographical proximity (e.g., a workplace, school, restaurant, or other public settings), and the murders are not attributable to any other underlying criminal activity or commonplace circumstance (armed robbery, criminal competition, insurance fraud, argument, or romantic triangle).

This definition is similar to many other common definitions of a mass shooting in that it requires four more victims and excludes events attributable to other criminal activity. As a result, the shootings included in the Violence Project database significantly overlap with most other mass shooting databases (Booty et al., 2019). A notable exception is the Gun Violence Archive, which includes more shootings than other databases because it uses a broad definition of a mass shooting (any event where four or more people are shot, regardless of motive or number of deaths). I chose not to use the Gun Violence Archive database, even though it is larger and would provide a bigger sample size than the Violence Project database. I made this decision because the Violence Project database is more closely aligned with expert consensus on the definition of mass shooting (Booty et al., 2019). Additionally, the Violence Project database has more information about mass shooters than other databases, and the information it

contains is collected by trained researchers rather than through open source journalism. Specifically, the Violence Project uses trained research assistants to collect information about shootings based on secondary sources, including media reports, court transcripts, and medical records (Peterson & Densley, 2020). Each shooting is coded by two independent coders, with discrepancies resolved by one of the primary investigators of the Violence Project. More details on the methodology used to create the database can be found at https://www.theviolenceproject.org/.

Based on the availability of news data (see below), I chose to examine mass shootings that occurred in the United States between January 1st, 2010 and January 1st, 2020. Within this period, the Violence Project database contains 56 mass shootings with 58 different mass shooters. Descriptive information about these shootings is shown in Table 1.

Table 1

Information About Mass Shooters Included in Study 1

Shooting Characteristic	Number and Percentage Included in Study 1 (n = 58)
Shooters' Race	27 (46.5%) White 11 (19.0%) Black 6 (10.3%) Latinx 6 (10.3%) Middle Eastern 4 (6.9%) Asian 2 (3.4%) Other 2 (3.4%) Unknown
Shooters' Religion	31 (53.4%) Unknown 9 (15.5%) Christian 5 (8.6%) Muslim 5 (8.6%) None 4 (6.9%) Other 3 (5.2%) Atheist 1 (1.7%) Buddhist
Shooters' Sex	54 (93.1%) Male 2 (3.4%) Female 2 (3.4%) Unknown
Location of Shooting	12 (20.7%) Retail 11 (19%) Bar 10 (17.2%) Workplace 8 (13.8%) Other 4 (6.9%) School 4 (6.9%) University 4 (6.9%) Religious 4 (6%) Outdoors 2 (3.5%) Civic Place
Age of Shooter at Time of Shooting	M = 33.52, SD = 11.63
Number Killed	M = 9.17, SD = 10.05

Year Shooting Occurred	5 (8.6%) 2010 4 (6.9%) 2011 6 (10.3%) 2012 5 (8.6%) 2013 3 (5.2%) 2014 6 (10.3%) 2015 5 (8.6%) 2016 7 (12.1%) 2017 9 (15.5%) 2018 8 (12.8%) 2019

Note. Two shootings had multiple offenders (the San Bernardino Shooting and the Wilkinsburg Shooting). In these cases, both shooters are counted separately in Table 1. The complete mass shooting database used in Study 1 is available at: https://www.theviolenceproject.org/mass-shooter-database/ .

Television News Coverage

I used the *Television Explorer* API (Global Database of Events Language and Tone, 2020) to collect news coverage stored in the Internet Archive's *Television News Archive* (Internet Archive, 2020). The *Television Explorer* allows users to search the text of closed captioning from three major television networks (CNN, FOX, and MSNBC). It returns the number of 15 second clips per day which contain a requested search term, providing a measure of the volume of news coverage per day dedicated to a topic. The *Television News Archive* contains data starting on July 2nd, 2009. I collected coverage from January 1st, 2010 to January 1st, 2020, the first 10-year period for which the archive has complete data from all years. I used a discrete 10-year period because participants in subsequent studies were asked to make estimates about mass shooters that are compared to news coverage. I assumed it would be easier for participants to make estimates about a discrete time-period.

To identify the total amount of coverage each mass shooting received, I measured the amount of time each news network spent using the terms "mass shooting", "mass shooter", "terrorism", or "terrorist" in the seven days following each shooting. These search terms are similar to terms used by previous research to identify coverage of mass shootings (e.g. Jetter & Walker, 2018) with the addition of terms related to terrorism. Past research has found that terrorism is frequently mentioned when describing violence committed by Muslims (Betus et al., 2019), meaning that a measure of total coverage should include search terms related to terrorism to avoid missing coverage of Muslim mass shootings.

I also broke down the total coverage into coverage using terms related to mass shootings ("mass shooting", "mass shooter") and coverage using terms related to terrorism ("terrorism" or "terrorist"). To measure coverage of mental illness, I used the amount of time spent using terms "mental illness" or "mentally ill". Finally, I measured religion coverage by using the terms "Islam" and "Muslim" to measure coverage of Islam, and "Christian" and "Christianity" to measure coverage of Christianity.

I classified the political leaning of news networks based on the political views of their audience (Pew Research Center, 2020) and based on past research which used text-analytic methods to measure media bias (Holtzman et al., 2011). Both approaches indicate that Fox News is the most conservative network, MSNBC is the most liberal, and CNN falls in between the other two networks. To operationalize this political leaning in my data, I created variable ranging from -1 (most liberal; MSNBC) to 1 (most conservative, FOX News), with CNN occupying the midpoint (0).

Covariate Justification

I selected the covariates for the statistical analysis of news coverage using a causal justification approach (Pearl & Mackenzie, 2018; Wysocki et al., 2012). Specifically, I controlled for the number of days since the shooting occurred, the location of the shooting, and the year the shooting occurred. Past research has found that these factors explain a significant amount of the variance in news coverage of mass shootings (Schildkraut et al., 2018; Silva, 2019), meaning controlling for them will improve the precision of estimates. I did not control for a variable if I believed it could mediate the relationship between shooter religion and news coverage, as doing so would bias the estimate of the relationship between religion and media coverage (Pearl & Mackenzie, 2018). For example, I did not control for whether a shooter was classified as having a terrorism motive. Past research indicates that Muslim perpetrators are more likely to be classified as terrorists than otherwise similar perpetrators who are not Muslim (Nagar, 2010). If this classification is the reason why Muslims receive more terrorism related media coverage, then controlling for this mediating variable would mask the relationship between shooter religion and amount of terrorism coverage.

Similarly, I did not control for a variable if I believed it could serve as a proxy for shooter religion, as doing so would attenuate the estimate of the relationship between religion and media coverage (Pearl

& Mackenzie, 2018). For example, I did not control for perpetrator race, as all but one of the Muslim shooters in my dataset are middle eastern, making race a proxy for religion in my analysis.

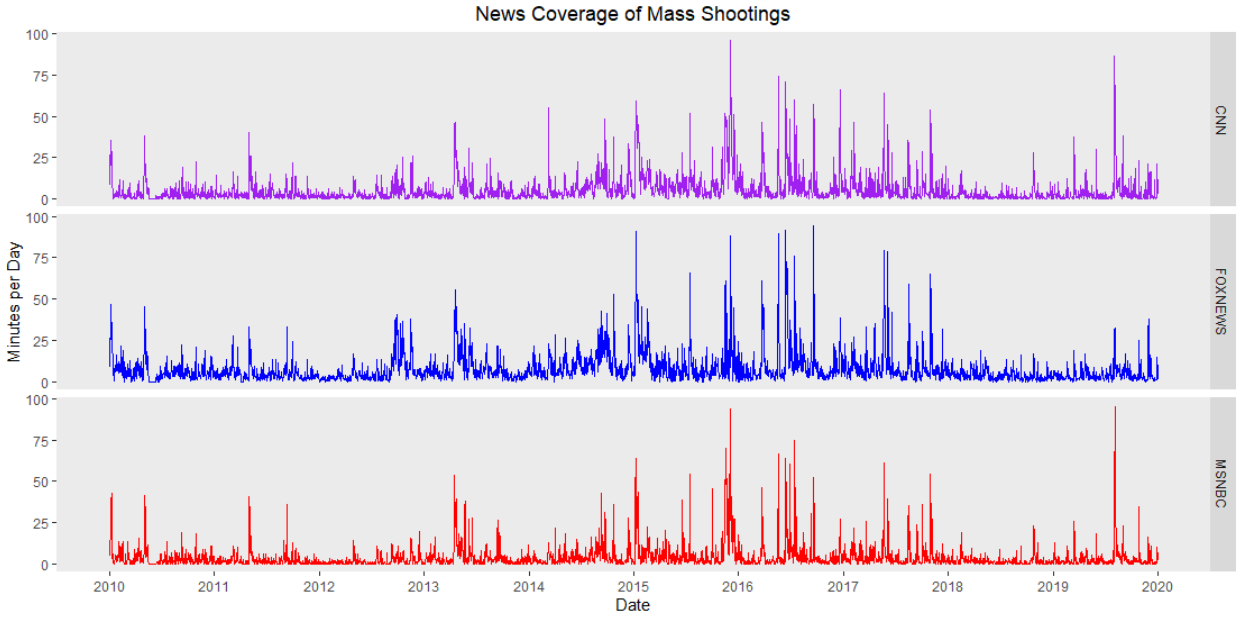
Results

Descriptive Analyses of Total Coverage

On the average day within the data, CNN spent 5.5 minutes (*SD* = 8.56) covering mass shootings, MSNBC spent 4.07 minutes (SD = 7.58), and Fox spent 7.59 minutes (*SD* = 9.75; see Figure 1). Coverage of mass shootings ranged from 0 minutes (561 days) to 95.5 minutes (CNN on December 4th, 2015, following the San Bernardino shooting).

Figure 1

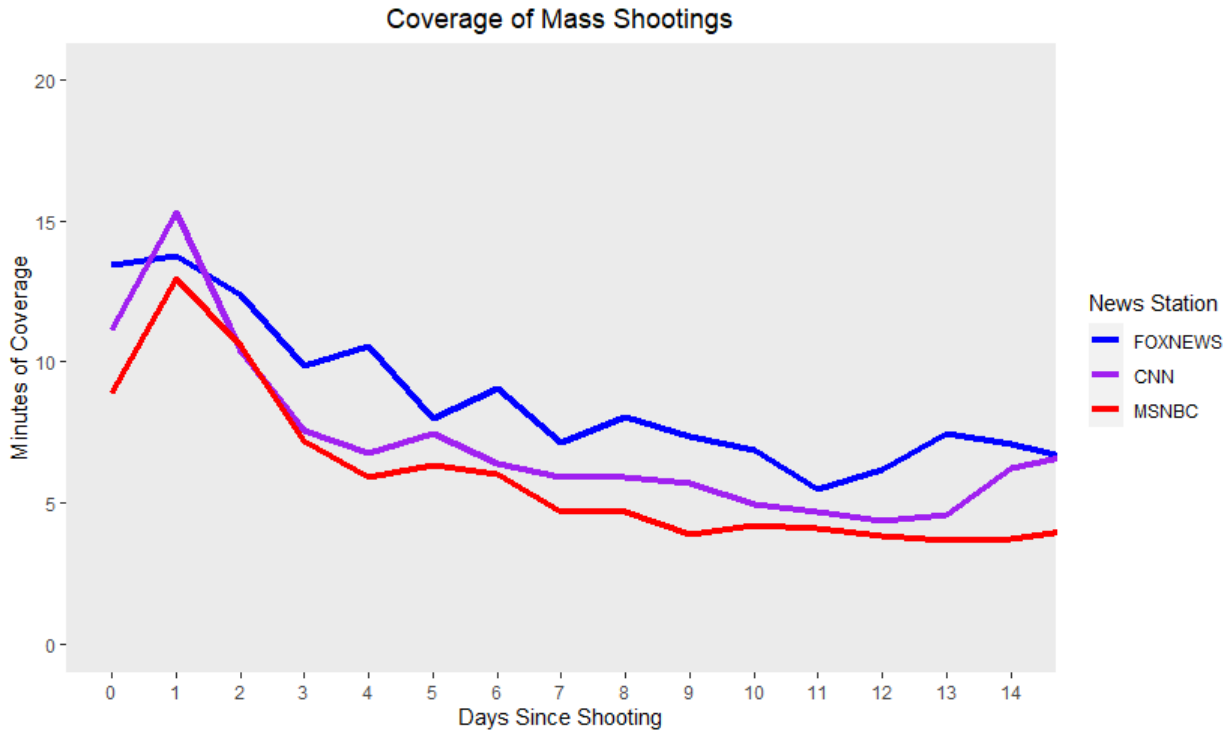
Television Coverage of Mass Shootings between 2010 and 2020



The average daily coverage following a mass shooting is shown in Figure 2. Coverage peaks the day after a mass shooting, then declines for the next week. This pattern of coverage exists across all three stations.

Figure 2

Average Coverage in the 14 Days Following a Shooting



Do Muslim Mass Shooters Get More Coverage?

To simplify analyses and increase sample size per religious group, I coded the religion variable into three categories, Muslim (n = 4), Christian (n = 9), and all other shooters (n = 44). Using the lmertest package (Kuznetsova et al., 2017) in R (R Core Team, 2019), I used a linear mixed-effect model to estimate minutes of coverage per day as a function of the number of days since the most recent shooting, fatalities from the most recent shooting, religion of the most recent shooter, year of shooting, political lean of the network, and the interaction between political lean and shooter religion. The intercept was allowed to vary across shootings.

This model revealed that with seven days of a mass shooting, Muslim mass shooters received significantly more media coverage (see Table 2). This effect interacted with political lean, such that more conservative networks provided more coverage of Muslim shooters relative to more liberal networks.

Table 2

Estimated Minutes of Coverage per Day (Seven Days After a Mass Shooting)

Fixed Effects (Intercept, slopes)	*B*	(SE)	df	*t*	*p*
Intercept	-320.73	923.71	43.19	-0.35	.730
Days from most recent shooting	-1.03	0.13	1100.31	-8.02	< .001

Fatalities	0.21	0.15	43.81	1.44	.158
Year	0.18	0.46	43.19	0.39	.698
Location: University	3.48	6.92	42.96	0.50	.618
Location: Civic	-4.45	9.01	43.03	-0.49	.624
Location: Religious	0.20	6.74	42.92	0.03	.976
Location: Retail	-2.13	5.65	43.47	-0.38	.708
Location: Bar	5.41	5.64	42.96	0.96	.342
Location: Workplace	4.30	5.92	42.95	0.73	.471
Location: Outdoors	9.58	6.81	42.93	1.41	.167
Location: Other	4.46	6.42	42.98	0.70	.491
Network Political Lean	-4.99	1.16	1098.25	-4.29	< .001
Other Religion (vs Muslim)	-31.94	6.14	60.77	-5.20	< .001
Christian (vs Muslim)	-32.37	7.34	58.88	4.41	< .001
Political Lean * Other Religion (vs Muslim)	3.53	1.22	1098.25	2.90	.004
Political Lean * Christian (vs Muslim)	5.69	1.40	1098.25	4.07	< .001

Random effects	Variance	SD
Intercept (Shooting)	85.22	9.23
Residual	75.89	8.71

Note. B refers to an unstandardized Beta coefficient. Network political lean ranges from -1 (most liberal; MSNBC) to 1 (most conservative; Fox News). Muslim is the reference category for the religion variable. School (K-12) is the reference category for the location variable.

A robustness check indicated that these effects persisted when using data from 14 days after the shooting (see Table 3).

Table 3

Estimated Minutes of Coverage per Day (14 Days After a Mass Shooting)

Fixed Effects (Intercept, slopes)	*B*	(SE)	Df	*t*	*p*
Intercept	-103.23	618.51	43.14	-0.17	.868
Days from most recent shooting	-0.61	0.04	2219.11	-13.8	< .001
Fatalities	0.11	0.10	44.06	1.11	.272
Year	0.07	0.31	43.13	0.22	.826
Location: University	3.46	4.63	42.77	0.75	.459
Location: Civic	-3.99	6.03	42.84	-0.66	.511
Location: Religious	0.24	4.51	43.09	0.05	.958
Location: Retail	-1.26	3.79	43.59	-0.33	.741
Location: Bar	3.51	3.77	42.80	0.93	.357
Location: Workplace	3.22	3.96	42.82	0.81	.421
Location: Outdoors	9.96	4.55	42.72	2.19	.034
Location: Other	5.12	4.29	42.82	1.19	.240
Network Political Lean	-4.54	0.80	2214.33	-5.69	< .001
Other Religion (vs Muslim)	-24.33	4.13	61.61	-5.90	< .001
Christian (vs Muslim)	-24.15	4.93	59.66	-4.90	< .001
Political Lean * Other Religion (vs Muslim)	3.16	0.84	2214.33	3.78	< .001
Political Lean * Christian (vs Muslim)	4.66	0.96	2214.33	4.84	< .001

Random effects	Variance	SD
Intercept (Shooting)	37.96	6.16
Residual	71.35	8.45

Note. B refers to an unstandardized Beta coefficient. Network political lean ranges from -1 (most liberal; MSNBC) to 1 (most conservative; Fox News). Muslim is the reference category for the religion variable. School (K-12) is the reference category for the location variable.

Similarly, the effects persisted when I excluded shootings (n = 4) that occurred at the same time as other shootings or newsworthy terrorist attacks outside of the United States (e.g. the 2015 Paris attacks; See Table 4).

Table 4

Estimated Minutes of Coverage per Day (Excluding Four Mass Shootings)

Fixed Effects (Intercept, slopes)	*B*	(SE)	Df	*t*	*p*
Intercept	135.19	742.15	39.01	0.18	.86
Days from most recent shooting	-0.95	0.12	1036	-7.95	< .001
Fatalities	0.32	0.13	39	2.46	.02
Year	-0.05	0.37	39.01	-0.13	.90
Location: University	3.29	5.34	39	0.62	.54
Location: Civic	-3.82	7.00	39	-0.55	.59
Location: Religious	0.94	5.20	39	0.18	.86
Location: Retail	-1.58	4.46	39	-0.35	.73
Location: Bar	3.01	4.44	39	0.68	.50
Location: Workplace	4.55	4.56	39	1.00	.32
Location: Outdoors	-0.20	6.83	39	-0.03	.98
Location: Other	4.39	4.96	39	0.88	.38
Network Political Lean	-4.99	1.05	1036	-4.74	< .001
Other Religion (vs Muslim)	-30.37	5.00	59.96	-6.07	< .001
Christian (vs Muslim)	-32.54	5.89	60.93	-5.53	< .001
Political Lean * Other Religion (vs Muslim)	3.10	1.10	1036	2.81	.01
Political Lean * Christian (vs Muslim)	5.02	1.32	1036	3.80	< .001

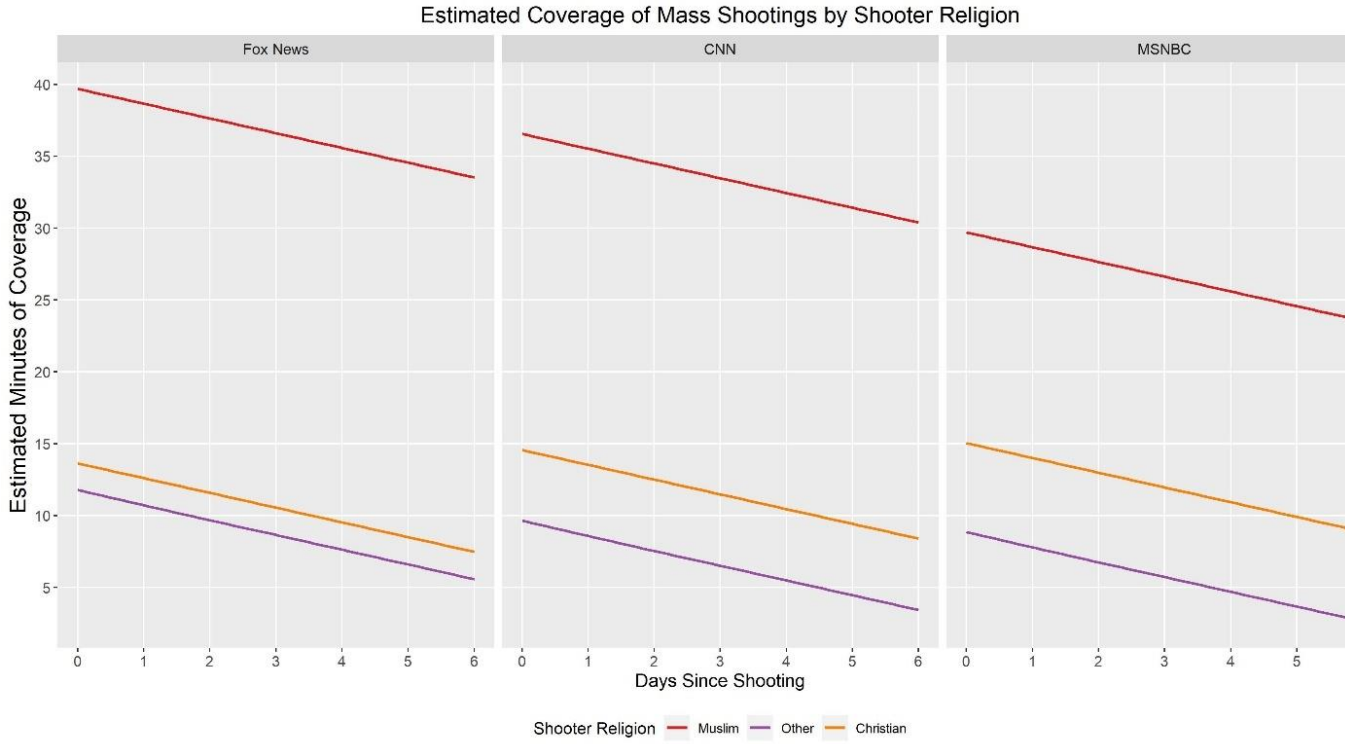
Random effects	Variance	SD
Intercept (Shooting)	49.65	7.05
Residual	62.07	7.88

Note. B refers to an unstandardized Beta coefficient. Network political lean ranges from -1 (most liberal; MSNBC) to 1 (most conservative; Fox News). Muslim is the reference category for the religion variable. School (K-12) is the reference category for the location variable. This analysis excludes the following four mass shootings: the Palestine, Texas shooting on 2015/11/14 (concurrent with the Paris terror attack on 2015/11/13-14), the Dallas, Texas shooting on 2016/07/07 (concurrent with the Iraq mausoleum attack on 2016/07/07), the El Paso, Texas shooting on 2019/8/3 (concurrent with the Dayton shooting on 2019/8/4), and the Dayton, Ohio shooting on 2019/8/4 (concurrent with the El Paso shooting on 2019/8/3)

In addition to analyzing the networks' political lean, I also ran a model (with the same covariates as earlier) comparing Fox News to CNN and MSNBC (see Figure 3 and Table 5). This analysis revealed that the increase in coverage for Muslim shooters was significantly larger for Fox News than for MSNBC. Fox News also spent more time covering Muslim shooters than CNN, although this difference was not statistically significant. Additionally, a model comparing MSNBC to the other networks revealed that CNN spent significantly more time covering Muslim shooters than MSNBC (CNN vs MSNBC * Christian vs Muslim: B = -7.33, p = .009; CNN vs MSNBC * Other religion vs Muslim: B = -6.06, p = .013).

Figure 3

Estimated Coverage of Mass Shootings



Note. Lines depict the predicted values from a linear mixed-effects model estimating the amount of coverage networks allocated to shooters of different religions, controlling for the number of fatalities in the shooting, and year the shooting occurred.

Table 5

Parameter Estimates from Model Comparing Each News Network

Fixed Effects (Intercept, slopes)	*B*	(SE)	Df	*t*	*p*
Intercept	-326.33	923.71	43.09	-0.35	.726
Days from most recent shooting	-1.03	0.13	1097.31	-8.01	< .001
Fatalities	0.21	0.15	43.81	1.43	.158
Year	0.18	0.46	43.09	0.39	.698
Location: University	3.48	6.92	42.96	0.50	.612
Location: Civic	-4.45	9.01	43.03	-0.49	.624
Location: Religious	0.20	6.74	42.92	0.03	.977
Location: Retail	-2.13	5.65	43.47	-0.38	.708
Location: Bar	5.41	5.64	42.96	0.96	.342
Location: Workplace	4.30	5.92	42.95	0.73	.471
Location: Outdoors	9.58	6.81	42.93	1.41	.167
Location: Other	4.46	6.42	42.98	0.70	.491
CNN (vs Fox)	-3.13	2.33	1095.25	-1.35	.179
MSNBC (vs Fox)	-9.98	2.33	1095.25	-4.29	<.001
Christian (vs Muslim)	-26.13	6.98	48.09	-3.74	<.001
Other Religion (vs Muslim)	-27.57	4.81	48.74	-4.75	<.001
CNN (vs Fox) *Christian (vs Muslim)	4.06	2.80	1095.25	1.45	.147
MSNBC (vs Fox) *Christian (vs Muslim)	11.39	2.80	1095.25	1.45	< .001
CNN (vs Fox) * Other Religion (vs Muslim)	0.99	2.44	1095.25	0.41	.683
MSNBC (vs Fox) * Other Religion (vs Muslim)	7.05	2.44	1095.25	2.89	.004

Random effects	Variance	SD
Intercept (Shooting)	85.22	9.23
Residual	75.89	8.71

Note. B refers to an unstandardized Beta coefficient. Fox news is the reference category for the news station variable. Muslim is the reference category for the religion variable. School (K-12) is the reference category for the location variable.

Next, I split the total coverage of Muslim mass shooters into the time networks spent using words related to terrorism (i.e. using the terms “terrorist” or “terrorism”) and the time spent using other words related to mass shootings (terms: “mass shooting” or “mass shooter”). Terrorism language was used more often in the week following a mass shooting (M = 8.00 minutes per day, SD = 13.17) than other words related to mass shootings (M = 1.67 minutes per day, SD = 4.06). Additionally, a statistical model with the same covariates as the total coverage model revealed that Muslim mass shooters received more coverage using terrorism language (Christian vs Muslim: B = -33.34, p < .001; Other Religion vs Muslim: B = -33.48, p < .001), especially from more conservative news networks (Network lean * Christian vs Muslim: B = 6.63, p < .001; Network lean * Other Religion vs Muslim: B = 4.44, p < .001). In contrast, a similar analysis did not find evidence that use of mass shooting language differed across Muslim and

non-Muslim shooters (Christian vs Muslim: $B = 0.92$, $p = .591$; Other Religion vs Muslim: $B = 1.37$, $p = .343$). This finding was qualified by a significant interaction with political lean, whereby more conservative news networks used *less* mass shooting language following Muslim mass shootings (Network lean * Christian vs Muslim: $B = -1.08$, $p = .029$; Network lean * Other Religion vs Muslim: $B = -1.00$, $p = .020$). This indicates that more conservative news networks shift the content of their coverage when a mass shooter is Muslim, spending more time using words related to terrorism and less time using words related to mass shootings. The increase in time spent discussing terrorism is larger than the decrease in time using mass shooting words, leading to an overall increase in the amount of coverage Muslim shooters receive. In sum, I find that Muslim mass shooters receive more media coverage than non-Muslim shooters, an effect which is larger for more conservative news networks and is the result of an increase in terrorism language, rather than other mass shooting language.

Content Differences Between Muslim and Non-Muslim Mass Shooters

I also compared the time spent discussing the shooters' religion following a mass shooting. News networks spent more time discussing Islam (using the terms "Islam" or "Muslim") following mass shootings with Muslim perpetrators than they did following mass shootings with Christian perpetrators ($B = -17.72$, $p < .001$) or following shootings with perpetrators of other religious affiliations ($B = -17.33$, $p < .001$). These effects were larger for more conservative news networks (Network lean * Christian vs Muslim: $B = 2.37$, $p = .012$; Network lean * Other Religion vs Muslim: $B = 1.74$, $p = .035$).

In contrast, networks did not spend more time discussing Christianity (terms: "Christian" or "Christianity") following mass shootings with Christian perpetrators than they did following mass shootings with Muslim perpetrators ($B = -0.46$, $p = 0.597$) or shootings with perpetrators of other religious affiliations ($B = 0.15$, $p = .837$), nor did any interaction with network political lean emerge (p's > .598).

Lastly, I also tested whether media coverage spends more time covering mental illness (terms: "mental illness" or "mentally ill") following Muslim mass shooters. For this analysis, I added a covariate measuring each shooters' mental health into the model. To simplify output and increase sample size per group, I coded the Violence Project's information about mental illness into three categories: mass shooters who had been diagnosed with a mental illness (n = 23), mass shooters with signs of mental illness but no diagnosis (n = 13), and mass shooters with no signs of mental illness (n = 19).

This analysis revealed that shooters who had a mental illness diagnosis received significantly more mental illness coverage (see Table 6). However, I did not find that mental illness coverage differed between Muslim and non-Muslim shooters, nor did this finding interact with the political lean of a news network.

Table 6

Estimated Minutes of Mental Illness Coverage per Day (Seven Days After a Mass Shooting)

Fixed Effects (Intercept, slopes)	*B*	(SE)	df	*t*	*p*
Intercept	-151.61	158.93	40.24	-0.95	.346
Days from most recent shooting	-0.08	0.03	1081	-2.97	.003
Fatalities	0.04	0.02	41.43	1.78	.083
Year	0.08	0.08	40.24	0.96	.343
Location: University	1.89	1.17	40.13	-1.61	.114
Location: Civic	-2.13	1.46	40.04	-1.47	.151
Location: Religious	-2.54	1.09	39.85	-2.33	.025
Location: Retail	-2.12	0.92	40.76	-2.30	.027
Location: Bar	-2.19	0.93	40.00	-2.34	.024
Location: Workplace	-1.92	0.98	39.97	-1.97	.056
Location: Outdoors	-4.30	1.12	39.85	-3.84	< .001
Location: Other	-1.65	1.22	40.16	-1.36	.183
Mental Illness Diagnosis (vs No Symptoms of Mental Illness)	2.26	0.57	40.41	3.98	< .001
Symptoms of Mental Illness (vs No Symptoms of Mental Illness)	-0.22	0.64	40.63	-0.34	.737
Network Political Lean	0.25	0.24	1078.33	1.05	.293
Other Religion (vs Muslim)	1.50	1.04	68.38	1.43	.156
Christian (vs Muslim)	1.27	1.25	64.93	1.02	.314
Political Lean * Other Religion (vs Muslim)	-0.29	0.25	1078.33	-1.15	.252
Political Lean * Christian (vs Muslim)	-0.36	0.29	1078.33	-1.25	.211

Random effects	Variance	SD
Intercept (Shooting)	2.16	1.47
Residual	3.27	1.81

Note. B refers to an unstandardized Beta coefficient. Network political lean ranges from -1 (most liberal; MSNBC) to 1 (most conservative; Fox News). Muslim is the reference category for the religion variable. School (K-12) is the reference category for the location variable. No symptoms of mental illness is the reference category for the mental illness variable.

As a robustness check, I found similar results when comparing Muslim and non-Muslim shooters when mental health was not included as a covariate in the model. Specifically, this model did not find evidence that mental illness was less likely to be mentioned for Muslim shooters than for Christian shooters (B = 2.04, p = .154) or for shooters of other religious affiliations (B = 1.15, p = .335), nor did I

find evidence for an interaction with network political lean (p's > .207). Thus, despite speculation that coverage is less likely to discuss mental illness when a shooter is Muslim (Butler, 2015), I did not find evidence that this is the case.

Discussion

Study 1 demonstrated that television news networks spent more time covering mass shootings with Muslim perpetrators. Although this effect occurred for all news networks in Study 1 (Fox News, CNN, and MSNBC), it was larger for more the politically conservative network (e.g. Fox News) and smaller for the more liberal network (e.g. MSNBC). Study 1 also found that when more conservative networks cover mass shootings with Muslim perpetrators, they shift from using language about mass shootings to using language related to terrorism.

I do not find evidence that Muslim mass shooters receive less coverage related to mental illness than non-Muslim mass shooters. Interpreting null findings can be difficult, and an absence of evidence for a difference in mental illness coverage between Muslim and non-Muslim shooters does not prove that no such difference exists. However, it is notable that my findings are consistent with past research which has also failed to find differences in mental illness coverage between Muslim and non-Muslim shooters (Betus et al., 2019). Furthermore, in contrast to the null effect of shooter religion, I did find that mass shooters with a mental health diagnosis received more mental illness coverage. This indicates that the words I used to measure news coverage of mental illness are appropriate, as they detect differences in how mental illness is discussed for shooters with a documented history of mental illness.

However, a limitation of my approach is that the Television Explorer API restricts searches to keywords and does not provide a complete transcript of news coverage. As a result, Study 1 only measured the total amount of time news coverage spends talking about mental illness and does not measure how mental illness is discussed. It is possible that coverage of non-Muslim shooters frames the discussion of mental illness by talking about how the shooter probably *was* mentally ill, while coverage of Muslim shooters discusses evidence that the shooter probably *was not* mentally ill. Future research should test for a bias in how broadcast media discuss mental illness by analyzing the complete text of broadcast transcripts.

How Does Media Coverage Affect Public Attitudes Towards Muslims?

Having demonstrated that Muslim mass shooters are covered differently than shooters of other religions, the remainder of this dissertation examines how this coverage affects public attitudes towards Muslims. I start by examining whether media coverage can affect overall evaluations of Muslims as a group. To test this, Study 2 tested whether informing people about a Muslim (vs non-Muslim) mass shooter increases negative attitudes towards Muslims.

In addition to overall evaluations of Muslims, news coverage could also affect more specific beliefs about Muslims. Because news media are primary source of information about mass shootings for members of the public (Schildkraut & Elsass, 2016), the increased media coverage Muslim shooters receive could cause the public to overestimate the proportion of mass shootings with Muslim perpetrators. That is, because Muslim mass shooters receive a disproportion amount of the news coverage allocated to mass shootings, the public may believe that Muslims are responsible for a greater share of mass shootings than is actually the case. If the public does overestimate the proportion of mass shootings committed by Muslims, this could lead the public to believe that that security policies which specifically target Muslims (e.g. extra screening for Muslims at airports) will be an effective way to prevent mass shootings. Studies 3 -6 will test whether news coverage affects perceptions of the percentage of mass shootings committed by Muslims, and whether these perceptions affect support for anti-Muslim policies.

STUDY 2: Does Exposure to a Muslim Mass Shooter Increase Prejudice Towards Muslims?

Study 1 demonstrated that Muslim mass shooters received more news coverage than non-Muslim shooters. In Study 2, I examine whether this coverage affects prejudice towards Muslims.

Why might news coverage increase prejudice? Psychologists have argued that news coverage can serve to prime different stereotypes, which can then lead the stereotyped group to be evaluated more negatively. According to spreading activation theory, information is stored in memory in an interrelated network of nodes, with each node representing a concept or schema (Collins & Loftus, 1975). When a node is activated by thinking about a concept, activation spreads through the network to other related nodes. The activation of these related nodes makes them more easily accessible for a brief period of time, increasing the extent to which they influence judgements and behaviors (Roskos-Ewoldsen et al., 2007). Additionally, repeatedly activating two associated nodes is argued to strengthen the association between them (Sherman et al., 2005). Researchers have argued that this process can lead media coverage to change attitudes, such as evaluations of racial minorities (Doyen et al., 2014). For example, news coverage which portrays African Americans as criminal perpetrators is argued to activate the node for African Americans and the node for crime, strengthening negative associations with African Americans (Dixon & Maddox, 2005).

As would be predicted by spreading activation theory, academic researchers and members of the media frequently assume that media coverage which portrays Muslims as violent perpetrators increases prejudice towards Muslims (Ogan et al., 2014; Rane et al., 2014; Shaheen, 2003; Wadley, 2019). Surprisingly, despite this common assumption, there is relatively little research examining whether news coverage can increase prejudice towards Muslims. Even more surprisingly, the research which does exist does not find evidence that this is the case.

Although negative views of Muslims are correlated with overall levels of media exposure (Shaver et al., 2017) and with exposure to media coverage which portrays Muslims negatively (Saleem et al., 2017), these correlations could easily be the result of prejudiced individuals seeking out media coverage consistent with their views. Research which attempts to measure the causal impact of news coverage on attitudes towards Muslims has done so in two main ways.

One way in which research has attempted to measure the effects of news coverage is by comparing prejudice towards Muslims before and after major news events involving acts of mass violence committed by Muslims. This research has not found evidence that prejudice towards Muslims increased following a number of different events, including the 2015 Paris terror attacks (Boydstun et al., 2018), the 2015 San Bernardino mass shooting (Boydstun et al., 2018), and the 2016 Orlando mass shooting (Perry, 2016). Additionally, this lack of change is consistent across both Democrats and Republicans, meaning there is no evidence that attacks with Muslim perpetrators polarize partisans' views of Muslims (Boydstun et al., 2018).

Perhaps most remarkably, attitudes towards Muslims also did not change following the 9-11 terrorist attacks. That is, even though 9-11 was a major geopolitical event that was followed by the largest increase in presidential approval in US history (Hetherington & Nelson, 2003), an increased trust in government (Ford et al., 2003), and an increase in stress and anxiety (Eisenberg & Silver, 2011), Americans' attitudes towards Muslims did not become more following 9-11 (Panagopoulos, 2006). If anything, the percentage of Americans' reporting a favorable view of Muslims increased slightly from 45% before 9-11 to 59% two months following 9-11 (although a year later attitudes returned to pre-attack levels; Panagopoulos, 2006).

However, a limitation of this research is that measuring attitudes before and after a major event does not specifically isolate the effect of the event in question. Other events, which happened at a similar time, could also influence attitudes. For instance, in the aftermath of 9-11 attacks, President Bush condemned discrimination against Muslims and described Islam as a peaceful religion (Office of the Press Secretary, 2001). This positive response from the American government might have counteracted an increase in negative attitudes towards Muslims that might have otherwise occurred, which could explain why Americans' attitudes towards Muslims did not become more negative. Supporting the idea that the governments' response may have shaped the public reaction to 9-11, surveys administered on 9-11 indicate that the increase in Bush's approval rating did not occur on the same morning as the attacks, but instead occurred after a public address he made later in the day (Schubert et al., 2002).

To avoid these issues, a second line of research examining news coverage and prejudice towards Muslims has used laboratory experiments which control the content of the news coverage

participants are exposed to. These experimental studies have also failed to find evidence that media coverage of Muslim perpetrators increases prejudice towards Muslims. For example, in one study on this topic, Saleem et al. (2017) presented participants with either a news clip describing Muslims plotting to commit a terrorist attack, no video clip, or one of several control videos about Muslims which did not involve terrorism. Although Saleem et al., (2017) do not report a statistical test directly comparing individual conditions, based on the condition means and standard errors, exposure to the terrorist attack video did not significantly change perceptions of Muslims as aggressive, support for civil restrictions on Muslim Americans, or support for military actions in Muslim countries (relative to participants who did not watch a video). Similarly, Das et al. (2009) randomly assigned participants to view news coverage of Islamic terrorism, or control news coverage. In two of three studies, Das et al. (2009) did not find evidence that explicit or implicit attitudes towards Muslims differed between conditions.

Notably, both of these experimental studies have only a limited sample size (Das et al.: *n*'s = 25-45 per condition, Saleem et al.: *n* = 100 per condition) meaning they do not have the statistical power to detect anything smaller that a medium effect size (i.e. *d* = 0.5). In Study 2, I test whether exposure to news coverage of mass shootings affects attitudes by reanalyzing data from five experiments with a combined sample of over 3000 participants. Thus, Study 2 represents the largest experimental test of the effects of news coverage on prejudice towards Muslims to date.

Research Questions

Study 2 tested whether encountering news coverage of a Muslim mass shooter increased negative attitudes towards Muslims. To do this, I reanalyzed data from a series of experiments which exposed participants to a mass shooting with a Muslim or a non-Muslim perpetrator, and subsequently measured attitudes towards Muslims. I did not have a prediction about whether exposure to a Muslim perpetrator would increase negative attitudes towards Muslims.

To test whether media coverage of Muslim perpetrators affects liberals and conservatives differently, I also tested for an interaction with participants' political ideology. Again, I did not have a prediction about whether this interaction would occur.

Methods

To reduce publication bias, I restricted my analysis to data from studies which I have conducted. Past research has found that null findings are less likely to be published (Meko et al., 2014), especially when research examines controversial topics like racial bias (Zigerell, 2018). By restricting the analysis to research data which I collected, I can be certain that the observed result is not affected any bias in the publication process. Additionally, analyzing my own research means I have access to the raw data from all the included studies, allowing the data to be analyzed using integrative data analysis (Curran & Hussong, 2009). Integrative data analysis is similar to a meta-analysis in that it tests for an overall effect across multiple studies. However, rather than combining aggregate effect sizes or summary statistics, integrative data analysis uses the raw data from each study to test for an effect. This increases statistical power and allows researchers to test participant-level research questions, such as whether exposure to a Muslim mass shooter has a different effect on liberal and conservative participants.

I identified five studies from my past research which are appropriate for testing the effect of media coverage on negative attitudes towards Muslims. These studies were originally conducted for a separate project examining whether Muslim mass shooters are perceived differently than non-Muslim shooters (Mercier et al., 2018). In this project, participants in several experiments were randomly assigned to read about either a Muslim or non-Muslim mass shooter, and subsequently completed questions about the shooting. Additionally, because the project tested whether people with positive and negative attitudes towards Muslims perceive Muslim mass shooters differently, a measure of attitudes towards Muslims was included near the end of every study. Thus, although these studies were not intentionally designed to study whether media coverage increases prejudice, each study randomly assigned participants to read about a Muslim or non-Muslim mass shooter and subsequently measured attitudes towards Muslims, making them an appropriate test of this research question.

The exact methodology used was different in each experiment (see Table 7 for a brief description). For example, in Study 1 from Mercier et al., (2018), participants read about a real mass shooting that occurred in the United States, while in Study 2 from Mercier et al., (2018) participants read an ostensibly real CNN article describing a mass shooting in France.

All studies were conducted on Amazon's Mechanical Turk between May 2016 and March 2018. A short attention check was included in each study (e.g. Because you're paying attention to this survey, please select 'Tends to be true' for this question."). Participants who failed the attention check were excluded from analysis. All studies included the same measures of negative attitudes towards Muslims and political identification, described below.

Measures

Negative Attitudes towards Muslims. Each study included a measure of negative attitudes towards Muslims developed by past research (Altareb, 1997). Participants responded to 25 Likert type items (e.g., "Muslims are friendly people") on a scale from 1 = "strongly disagree" to 5 = "strongly agree" (see Table 7 for scale statistics).

Political Identification. Each study included a face-valid measure of political identification. Participants were asked to indicate their political position on a 7-point Likert scale ranging from 1 = "Strongly Conservative" to 7 = "Strongly Liberal".

Table 7

Summary of Past Studies Analyzed in Study 2

					Attitudes Towards Muslims by Condition	
Study	Description	Date collected	N	α	Muslim *M* (± *SD*)	Non-Muslim *M* (± *SD*)
Mercier Norris and Shariff (2018); Study 1	Participants read a description of one of eight recent mass shooters in the United States (four of which were Muslim). The description included the name of the shooter, date of shooting, location, and number of casualties.	August 28-29, 2016	430	.96	2.73 (± 0.74)	2.74 (± 0.80)
Mercier Norris and Shariff (2018); Study 2	Participants were shown an ostensibly real news article describing a recent mass shooting in France. The shooter in the article was either described as either "Muhammed Ebrahim", a "devout Muslim", or "Adrian Blanc", a "devout Christian".	May 18-19, 2016	168	.96	2.86 (±0.64)	2.84 (± 0.64)
Mercier Norris and Shariff (2018); Study 3	Participants were shown an ostensibly real news article describing a recent mass shooting in France. The shooter was either	November 10-14, 2017	507	.96	2.88 (±0.89)	2.68 (± 0.81)

	described as Muslim, Christian, or no information about the shooter was provided.					
Mercier Norris and Shariff (2018); Study 4	Participants read about a hypothetical shooting that "was created based on the details of several real shootings which actually occurred in the United States." The shooter was described as either Muslim or Christian. The shooter was also described as having a past history of mental illness	March 12-14, 2018	1,538	.96	2.55 (± 0.75)	2.60 (± 0.78)
Mercier and Shariff (unpublished)	Participants read about a hypothetical shooting that "was created based on the details of several real shootings which actually occurred in the United States." The shooter was described as either Muslim or Christian, and as either having or not having symptoms of mental illness	January 2-3, 2017	688	.97	2.73 (±0.84)	2.56 (±0.83)

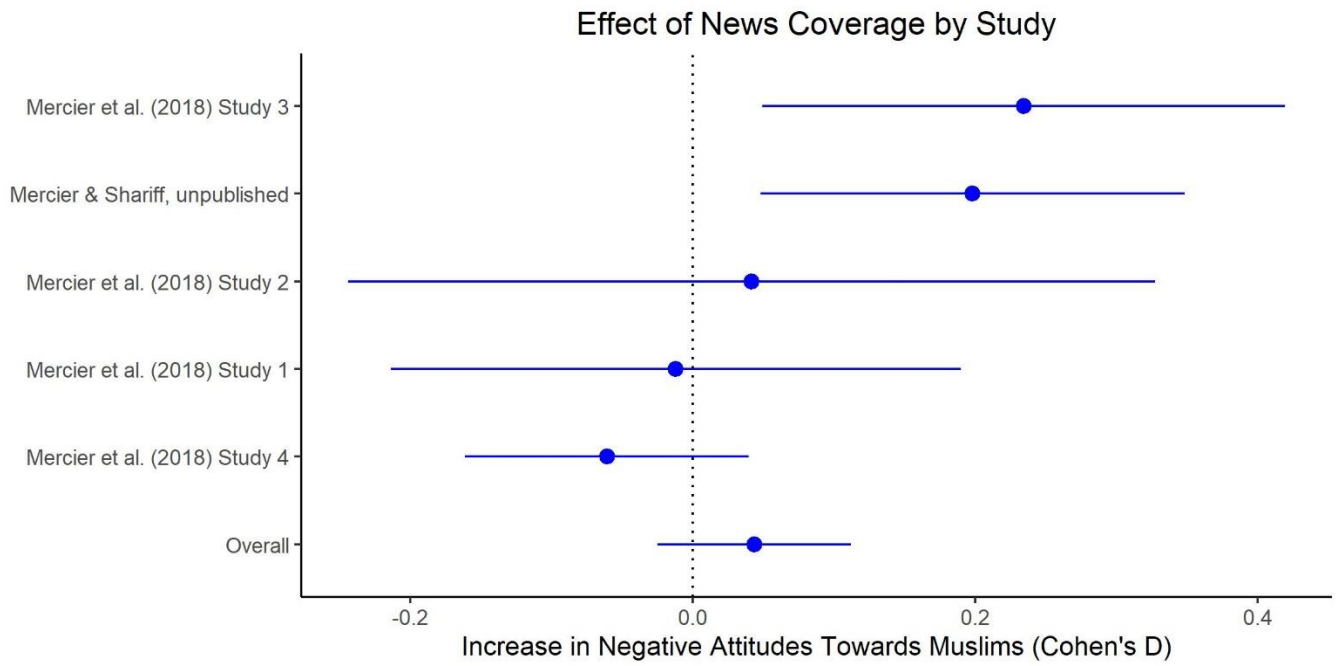
Note. N indicates the sample size after excluding participants who failed attention checks. The α column indicates Cronbach's alpha for the measure of negative attitudes towards Muslims.

Results

I used the lmer package (Kuznetsova et al., 2017) in R (R Core Team, 2019) to fit a random intercept model to the data, with participants nested within studies. This model had negative attitudes towards Muslims as a dependent variable and condition (Muslim shooter vs Non-Muslim shooter) as the predictor variable. The effect of condition was not statistically significant (B = .05, p = .134, 95% CI [-.02, .12]) meaning I did not find evidence that encountering a Muslim mass shooter increased negative attitudes towards Muslims (see Figure 4). To determine whether this effect was different for liberals and conservatives, I tested for an interaction between political ideology and condition. This interaction was not statistically significant (B = .00, p = .898, 95% CI [-.03, .03]), meaning I did not find evidence that exposure to a Muslim mass shooter had a different effect for participants with different political views.

Figure 4

Effect of News Coverage by Study



Note. Circles indicate the point estimate for the increase in negative attitudes towards Muslims among participants who encountered a Muslim mass shooter relative to participants who encountered non-Muslim mass shooter, measured as a Cohen's *d*. Lines indicate 95% confidence intervals around each effect size.

Discussion

Across five studies and 3331 participants, I did not find evidence that reading about a Muslim mass shooter increases negative attitudes towards Muslims, relative to reading about a non-Muslim mass shooter. Additionally, the lack of a change in negative attitudes towards Muslims was consistent among both liberals and conservatives. These findings are consistent with past experimental research, and with research which has not found changes in attitudes towards Muslims following major acts of mass violence committed by Muslims. They are however, inconsistent with past research on media priming and spreading activation theory, and add to a growing number of studies which fail to find priming effects (Cesario, 2014; Chartier et al., 2020; Harris et al., 2013).

In Study 2, I analyzed the results of experiments which used self-report measures to assess negative attitudes towards Muslims. These studies did not include measures of unconscious negative associations with Muslims, such as the Implicit Association Test (Greenwald et al., 2002). Thus, while I do

not find evidence that news coverage makes explicit attitudes towards Muslims more negative, my results do not provide evidence about whether or not news coverage can increase implicit attitudes towards Muslims. Although one study (Das et al., 2009) has failed to find evidence that news reports of terrorism increase negative implicit associations with Muslims, this is an area which future research might choose to examine further.

Additionally, because I analyzed self-report measures, I cannot rule out the possibility that news coverage did cause an increase in negative attitudes towards Muslims, but participants the experiments I analyzed did not truthfully report this increase because of social desirability bias. However, while possible, I believe this explanation is unlikely. As with any socially unacceptable attitude, there are probably people who hold negative attitudes towards Muslims and are unwilling to admit to these attitudes when asked in surveys. This is likely true both before and after people encounter news coverage of a Muslim mass shooter. For social desirability bias mask an increase in negative attitudes towards Muslims, this increase would need to occur only among people who are not willing to admit their true attitudes. That is, in the experiments I analyze news coverage would have needed to increase negative attitudes towards Muslims, but only among people who are unwilling to truthfully report negative views of Muslims. It seems unlikely that news coverage would only affect this specific group of individuals, and not also affect participants who are willing to admit holding negative views of Muslims (in my studies, roughly half of the total sample).

The results of Study 2 findings suggest that attitudes towards Muslims are relatively fixed and difficult to change. In hindsight, this makes sense. Attitudes towards Muslims have played an important role in American politics since at least 9-11 and were a central issue in the political campaign of former president Donald Trump. Members of the public are almost certainly aware of past acts of mass violence committed by Muslims and have probably decided whether they believe these acts are caused by the teachings of the Islamic religion, or whether they are the isolated actions of a few unrepresentative individuals. Members of the public also have many other sources of information about Muslims that could influence their attitudes towards Muslims. For example, they may have personal relationships and interactions with people who are Muslim (Cooper, 2017; Savelkoul et al., 2011), or they may have seen media depictions of Muslim celebrities, such as professional athletes (Alrababah et al., 2019). My findings

suggest that, in the context of all the information participants have about Muslims, new information about one additional Muslim mass shooter is not enough to change attitudes towards Muslims.

Although Study 2 finds that general attitudes towards Muslims are resistant to change, more specific beliefs about Muslims, such as the extent to which they commit mass shootings, may be more malleable. In Studies 3-6, I test whether news coverage of Muslim mass shooters influences more specific beliefs, including perceptions of the extent to which mass shootings are committed by Muslims.

STUDY 3: Beliefs About the Frequency of Muslim Mass Shooters

Study 1 demonstrates that television news media spend a disproportionate amount of time covering Muslim mass shooters. Study 2 does not find that news coverage affects attitudes toward Muslims, suggesting that overall evaluations of Muslims may be difficult to change. In Study 3, I examine whether news coverage can change specific beliefs about the extent to which Muslims commit mass shootings.

Although there are likely many factors influencing public attitudes towards Muslims, beliefs about crime, especially rare forms of crime like mass violence, are primarily the result of news coverage (Schildkraut & Elsass, 2016). As a result, beliefs about mass shootings, and role Muslims play in committing them, may be easier to change than attitudes towards Muslims. In particular, the disproportionate volume of coverage allocated to Muslims shooters may cause the public to overestimate the extent to which mass shootings are committed by Muslims. If this is the case, this could cause the public to believe that policies aimed at preventing mass shootings will be more effective if they specifically target Muslims.

To test this, I asked participants in Study 3 to estimate the percentage of mass shooters who are Muslims. I compared these estimates to the actual percentage in the Violence Project database (Peterson & Densley, 2020) to determine whether participants overestimated the percentage of Muslim shooters. Additionally, I compared these estimates to the news channels that participants reported watching, and to their support for anti-Muslim policies.

I measured beliefs about the percentage of mass shooters who are Muslim, rather than the total number of Muslims shooters, because pilot data indicated that people are poor judges of the overall frequency of mass shootings. Specifically, in a pilot study conducted in 2019, I asked participants to estimate the number of mass shootings which occurred in the previous year. Estimates ranged from 0 to over 10,000. As a result, asking participants to estimate the total number of Muslim mass shooters would conflate perceptions of the total number of shootings with perceptions of the relative frequency with which Muslims commit mass shootings.

Hypotheses

I predicted that participants would overestimate the percentage of mass shooters between 2010 and 2020 who were Muslim. Additionally, I predicted that the amount of time participants spent watching Fox News, the most conservative network in my analysis, would be associated with increased overestimation of Muslim mass shooters. Finally, I predicted that estimates of the percentage of Muslim mass shooters would be positively correlated with support for anti-Muslim policies.

Methods

Participants

In Study 3, I targeted a level of precision where the estimates of the percentage of mass shooters in each group have a 2.5% margin of error (at α = .05). Assuming the estimates will have a standard deviation of 25% (roughly the standard deviation observed on pilot data from similar measures included in Mercier et al., 2018; Study 4) I used the formula $n = \frac{Z * sd}{moe^2}$ (Lohr, 2010) to calculate that 370 participants would be required. Based on past experience with MTurk, I assumed that roughly 10% of participants would fail a comprehension check. Thus, I made the target sample size 412 participants. Target sample size, measures, hypotheses, and analysis plan were pre-registered prior to data collection (https://aspredicted.org/blind.php?x=9td5q2).

I recruited 413 participants through Prolific.co, seven (2%) of whom were excluded for failing to correctly answer more than one of three comprehension checks, leaving a final sample of 406. Participant demographics in Study 3 (and all remaining studies) are shown in Table 8.

Table 8

Demographic Information for Participants in Studies 3-6

Study	**Age (*M* ± *SD*)**	**Gender**	**Race**	**Religion**	**Religiosity (*M* ± *SD*)**	**Politics (*M* ± *SD*)**
Study 3	30.07 (± 10.89)	45.8% Male 51.2% Female 2.2% Other 0.7% Prefer not to say	64% White 8.4% African American 13.8% Hispanic 15.8% East Asian 4.7% South or West Asian 1.5% Native American 0.2% Pacific Islander	40.1% Christian 1.7% Jewish 0.7% Muslim 4.9% Other Religion 9.9% Spiritual but not religious 7.6% Unaffiliated 15.8% Atheist 19% Agnostic	2.83 (± 1.93)	4.81 (± 1.67)

Study 4	31.14 (± 12.06)	50.9% Male 46.5% Female 2.2% Other 0.1% Prefer not to say	67% White 8.5% African American 11.1% Hispanic 15.3% East Asian 4.7% South or West Asian 1.2% Native American 0.4% Pacific Islander	34.1% Christian 2.5% Jewish 1.1% Muslim 5.5% Other Religion 8.5% Spiritual but not religious 10.8% Unaffiliated 16.6% Atheist 20.9% Agnostic	2.70 (± 1.89)	5.07 (± 1.58)
Study 5	32.62 (± 11.56)	47.2% Male 50.9% Female 1.4% Other 0.4% Prefer not to say	65.2% White 11.2% African American 11.7% Hispanic 14.2% East Asian 4.0% South or West Asian 1.4% Native American 0.1% Pacific Islander	38.8% Christian 1.7% Jewish 1.8% Muslim 4.3% Other Religion 9.4% Spiritual but not religious 8.0% Unaffiliated 19.3% Atheist 16.6% Agnostic	2.84 (± 1.98)	5.00 (± 1.70)
Study 6A	38.15 (± 13.84)	55.5% Male 44.5% Female	83.3% White 8.9% African American 4.5% Hispanic 4.9% East Asian 0.9% South or West Asian 0.8% Native American 0.1% Pacific Islander	74.2% Christian 1.2% Jewish 1.1% Muslim 3.6% Other Religion 4.6% Spiritual but not religious 4.1% Unaffiliated 5.3% Atheist 5.9% Agnostic	4.5 (± 1.98)	2.24 (± 0.99)
Study 6B	33.25 (± 12.45)	50% Male 48.8% Female 0.8% Other 0.3% Prefer not to say	74% White 8.7% African American 6.1% Hispanic 10.3% East Asian 3.8% South or West Asian 0.8% Native American 0.8% Pacific Islander	49.8% Christian 1.6% Jewish 1.4% Muslim 2.9% Other Religion 7.4% Spiritual but not religious 8.4% Unaffiliated 14.3% Atheist 14.2% Agnostic	3.39 (± 2.09)	4.22 (± 1.88)

Note. Politics was measures on a scale from 1 = “very conservative” to 7 = “very liberal”. Religiosity was measured on a scale from 1 = “Not at all religious” to 7 = “very religious”.

Measures

Participants in Study 3 completed the measures below in the order they appear, then completed several additional measures and demographics questions.

Perceptions of Mass Shooters. Participants were asked to estimate the percentage of mass shooters in the last 10 years who were Black, White, Hispanic, Christian, Muslim, and Mentally ill. Participants were given detailed instructions about the estimations, including the exact definition of a mass shooting from Study 1 (for full question text, see Appendix A). Following the instructions, participants indicated the percentage of mass shooters between 2010 and 2020 who were from each group (presented in random order) on a sliding scale from 0% to 100%.

News Consumption. Participants were asked to indicate how often they receive news from several different sources, including Fox News, CNN, and MSNBC. For each source, participants were given the following options: 1= "I never get news from this source", 2 = "I sometimes get news from this source", 3 = "I often get news from this source", 4 = "I get most of my news from this source."

Attitudes towards Muslims. I measured attitudes towards Muslims using a 25 item scale validated in past research (Altareb, 1997). Participants indicated the extent of their agreement with Likert type items about Muslims (e.g. "Muslims are friendly people") on a scale from 1 = "Strongly Disagree" to 5 = "Strongly Agree" (M = 2.25, SD = 0.70, α = 0.96). Items were coded as necessary so higher numbers indicate attitudes towards Muslims that are more negative.

Support for Anti-Muslim Policies. Participants indicated the extent which they support eight security policies which explicitly target Muslims (e.g. "Muslims should receive extra screening when passing though airport security"), on a scale from 1 = "Strongly Disagree" to 7 = "Strongly Agree" (see Appendix B for items). The policies were develop based on past survey data (Dunwoody & McFarland, 2018). Using a principal components analysis and Item Response Theory models, I eliminated 3 items which conveyed poor information, had poorly defined item characteristic curves, or did not load well into a single factor. Using the lavaan package in R (Rosseel, 2012), I fit a SEM model with one latent factor to the remain 5 items. This model was a good fit for the data (CFI = 97.7, RMSEA = 15.5, SRMR = 0.02), and had good reliability (α = 0.94, M = 2.16, SD = 1.44). Thus, Study 3 and all future studies will use this 5-item version of the scale. Item reduction was preformed prior to testing study hypotheses.

Attention check. Participants completed an attention check adopted from Chmielewski and Kucker (2019). This method involves asking participants demographic questions and screening out those who provide highly improbable results. Participants were asked to indicate the number of children they

have in each of several 2-year age ranges. Prior to data collection, I intended to remove any participants who indicated they have more than 10 children or more than 4 children in the same 2-year age range will be removed, as less than 1% of the US population meets these criteria. However, no participants did so, so no one was removed.

English Language Comprehension Checks. Participants completed three questions designed to determine whether they can comprehend English. For example one question asked participants to identify the appropriate phrase in the sentence “Some foods, such as burgers and pizzas, _____ bad for my health”, from the following options: "oughtn't to be", "can be", "must have", and "should have been". I excluded seven participants (1.7% of total sample) who failed more than one of these questions.

Demographics. Participants will complete a demographics measure, which will include measures of political affiliation, religious affiliation, religiosity, age, gender, and ethnicity.

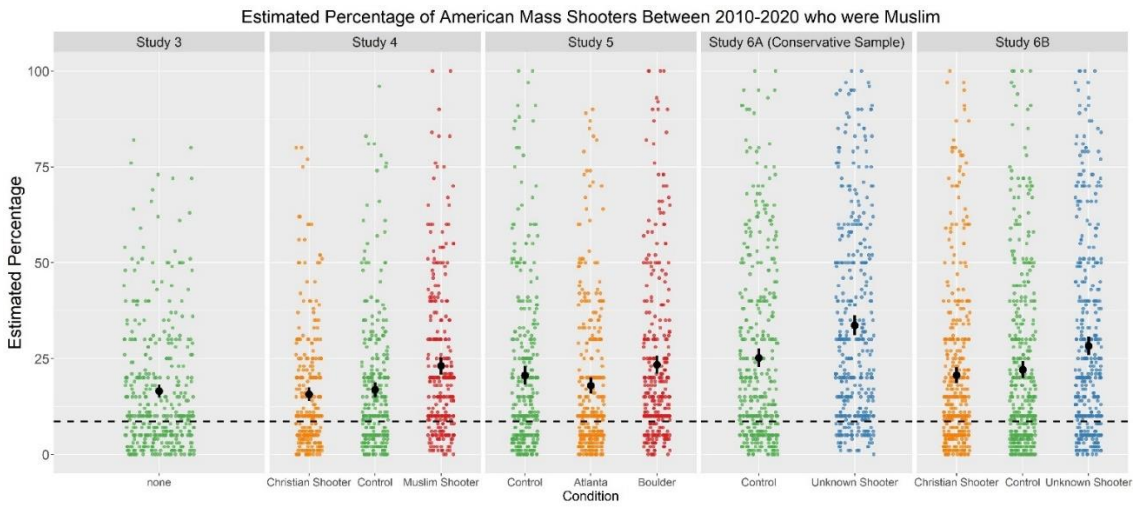
Results

Data and analysis code for Study 3, and all remaining studies can be found on the Open Science Framework (https://osf.io/m2gez/?view_only=d2c4c8e85f5444348eadce18ab125f94). Consistent with my pre-registered analysis plans, in Studies 3-6 I use one-tailed hypothesis tests whenever I had a pre-registered directional prediction. The use of one-tailed tests did not alter the statistical significance of any findings.

My main hypothesis was that participants would overestimate the percentage of mass shooters who are Muslim. Confirming this hypothesis, a one-sample t-test found that participants overestimated the percentage of mass shooters between 2010 and 2020 who were Muslim, relative to the percentage of Muslim shooters reported in the Violence Project’s database of mass shootings (Database: 8.6%; Participant estimates: M = 16.48%, SD = 16.52%, t(397) = 9.49, $p < .001$; see Figure 5). As specified in my pre-registered analysis plan, because there was a significant skew in the estimated percentages, I also tested for overestimation using a non-parametric Wilcox signed-rank test. This analysis indicated that the median estimated percentage of Muslim shooters (Mdn = 10) was higher than the percentage reported by the Violence Project (V = 54618, $p < .001$).

Figure 5

Estimated Percentage of Mass Shooters who are Muslim by Study



Note. Colored dots indicate individual data points. Within each condition, random noise has been added to the x-axis to increase the visibility of individual data points. Black dots indicate the mean estimate within each condition, with confidence bars indicating the 95% confidence interval around each mean. The dotted line indicates the percentage of mass shootings in the Violence Project's database of mass shootings (Peterson & Densley, 2020) with Muslim perpetrators between January 1st, 2010 and January 1st, 2020.

Next, I tested whether the magnitude of this overestimation would be associated with time spent watching FOX News, the television network that spent the most time covering Muslim shooters. As predicted, participants who watched greater amounts of Fox News overestimated the percentage of Muslim shooters by a greater amount ($r = 0.34$, $p < .001$). Furthermore, this relationship persisted when controlling for negative attitudes towards Muslims and political ideology ($B = 4.27$, $p < .001$).

Time spent watching CNN, the network which spent the second largest amount of time covering Muslim shooters, was also correlated with overestimation ($r = 0.13$, $p = .009$), although this correlation was significantly smaller than the correlation with watching Fox News (Meng, et al.'s test for difference in correlations; 41: $z = 3.37$, $p < .001$). The relationship between watching CNN and overestimation also persisted when controlling for negative attitudes towards Muslims and political attitudes ($B = 3.41$, $p < .001$).

Time spent watching MSNBC, the network which spent the least amount of time covering Muslim mass shooters, was not significantly associated with the degree which participants overestimated of the percentage of mass shooters who are Muslim (r = .07, p = .181). This (non-significant) correlation was significantly smaller than the correlation between watching Fox News and overestimation (z = 4.07, p < .001), but not significantly smaller than the correlation between watching CNN and overestimation (z = 1.13, p = .257).

Finally, my last hypothesis was that participants who overestimated the percentage of mass shooters who are Muslim would be more likely to support anti-Muslim security policies. As predicted, overestimation was correlated with increased support for anti-Muslim security policies (r = .41, p < .001). This relationship persisted when controlling for negative attitudes towards Muslims and political attitudes (B = 2.69, p = .003).

Discussion

Study 3 found that people overestimate the percentage of mass shooters who are Muslim. This overestimation was significantly associated with the frequency of watching Fox News, the most conservative network in my analysis, even when controlling for participants' attitudes towards Muslims and political ideology.

These results provide initial evidence that the disproportionate media coverage allocated to Muslim mass shooters leads people to overestimate their prevalence. However, the data in Study 3 are correlational, and do not necessarily indicate a causal link between media coverage and perceptions of Muslim mass shooters. To test for causal evidence, Study 4 used experimental methods.

STUDY 4: Effects of News Coverage of Mass Shootings with Muslim Perpetrators

The purpose of Study 4 was to test whether exposure to news coverage of a Muslim mass shooter causes people to believe that a greater percentage of mass shooters are Muslims. To do this, I randomly assigned participants to read a news article about a mass shooting with a Muslim perpetrator, a mass shooting with a Christian perpetrator, or to a control group with no article. I tested whether participants who read about the Muslim shooter would overestimate the percentage of Muslim shooters by a larger magnitude than participants in the other two conditions.

In addition, I also tested whether the effects of news coverage interacted with participants' attitudes towards Muslims. Past research has demonstrated a tendency for biased assimilation of knowledge, whereby people are more willing to accept information supporting their existing beliefs than information that conflicts with their beliefs (Ditto et al., 1998; Lord et al., 1979). For example, people uncritically accept information suggesting that they are healthy, while questioning or discounting information suggesting they are not (Ditto & Lopez, 1992). This research suggests that when people who are prejudiced towards Muslim are presented with media coverage of a Muslim who has committed an act of violence, they should be willing to accept this information, polarizing their initial beliefs about the extent to which violence is committed by Muslims. Conversely, when people with positive attitudes toward Muslims are presented with media coverage of a Muslim who has committed an act of violence, they should look for reasons to discount or ignore this information and resist updating their beliefs about the extent to which acts of violence are committed by Muslims. For example, they may view the coverage as biased or perceive the perpetrators as unrepresentative of Muslims as a group. Supporting the idea that prejudice can affect how interpret the actions of a Muslim perpetrator, past research has found that people with negative attitudes towards Muslims see Muslim mass shooters as less mentally ill than non-Muslim mass shooters (while those with positive attitudes do not show this difference; Mercier et al., 2018).

On the other hand, news consumers' responses to coverage of Muslims may not be influenced by their level of prejudice towards Muslims. Researchers have proposed that political beliefs are updated using a Bayesian learning process (Hill, 2017). According to this view, new information about a political topic is combined with one's prior beliefs and information. As a result, new information should produce a

small shift in beliefs in a uniform direction for everyone receiving it, regardless of initial views on the issue. This view would predict that news coverage of a Muslim perpetrator should cause a slight increase the extent to which people believe acts of violence are committed by Muslims, and this increase should occur regardless of an individual's initial levels of prejudice towards Muslims.

Hypotheses

I predicted that exposure to news coverage of a Muslim mass shooter would cause people to believe that a greater percentage of mass shooters are Muslims. I also tested whether this effect would interact with attitudes towards Muslims. Although past research has found that individuals with negative attitudes towards Muslims perceive the motivations of Muslim mass shooters differently that those with positive attitudes towards Muslims (Mercier et al., 2018), Study 4 focused on perceptions of the relative frequency of Muslim mass shootings, not perceptions of a shooter's motivation. Thus, I did not make a prediction about whether I would observe a significant interaction effect.

In addition, I tested several secondary research questions. Specifically, I tested whether exposure to news coverage of a Muslim mass shooter increases support for anti-Muslim policies, and whether this effect would interact with attitudes towards Muslims. I did not have a prediction about whether this would be the case. I also tested whether news coverage of a Christian mass shooter would cause participants to believe that a greater percentage of mass shooters are Christians, and whether this effect would interact with attitudes towards Christians. Again, I did not have a prediction about whether this would be the case.

Methods

Participants

In Study 4, I considered the smallest effect size of interest to be a conventionally small effect (d = 0.2). Obtaining 90% power to detect an effect of d = 0.2 or larger using a one-tailed t-test with two experimental conditions requires 310 participants in each condition. Because Study 4 has three conditions, I targeted a sample size of 930. As the rate of failing comprehension checks in Study 3 was low (<2%), I did not consider it necessary to account for this in the sample size calculation for Study 4. Target sample size, measures, hypotheses, and analysis plan were pre-registered prior to data collection (https://aspredicted.org/blind.php?x=pd7fi7).

I recruited 937 participants through Prolific.co, 7 (0.7%) of which were excluded for failing more than one of three comprehension checks. Thus, my final sample was n = 930.

Procedure

Participants were randomly assigned to one of three conditions. In the *Muslim Shooter* condition, participants were shown an ostensibly real news article which appear to have been published on the website for the New York Times in 2014. The article described a mass shooting in California and was written to be similar to past news coverage of mass shootings. The article reported that the shooter, "Abdullah Haseeb", was a "devout Muslim who frequently attended religious services at a local mosque". In the *Christian Shooter* condition, participants read an article identical to the *Muslim Shooter* article, except for the description of the shooter's religion. The *Christian Shooter* article reported that the shooter was named "Micah Sullivan" and was a "devout Christian who frequently attended religious services at a local church." In the *Control* Condition, participants did not read a news article.

Measures

Participants completed the measures of perceptions of mass shooters, news consumption, negative attitudes towards Muslims (M = 2.27, SD = 0.68, α = 0.96), and anti-Muslim policies (M = 2.29, SD = 1.44, α = 0.94) from Study 3. After this, participants completed the following measures:

Feeling Thermometers. Participants were asked to indicate their feelings towards different groups on a sliding scale ranging from 0 to 100. Participants were told that: "A rating of zero degrees means you feel as cold and negative as possible. A rating of 100 degrees means you feel as warm and positive as possible. You would rate the group at 50 degrees if you don't feel particularly positive or negative toward the group." Participants completed this scale for both Muslims (M = 58.11, SD = 23.63) and Christians (M = 56.48, SD = 25.74).

English Comprehension Check. Participants completed the English comprehension checks from Study 3. I excluded 7 participants (0.7% of total sample) who failed more than one question.

Manipulation Check. Participants who read a news article (i.e. those in the *Muslim Shooter* and *Christian Shooter* conditions) completed a manipulation check asking them to recall the religion of the shooter in the article from a list of several possible options (Muslim, Christian, Hindu, Buddhist). An analysis of this manipulation check confirmed that the manipulation was effective, as 93% of participants

in both the *Muslim Shooter* and *Christian Shooter* conditions correctly identified the religion of the shooter in their condition. Excluding participants who did not correctly identify the religion of the shooter did not affect the statistical significance of the results.

Results

Consistent with my pre-registered predictions, independent samples t-tests demonstrated that participants who were told the mass shooter was Muslim believed a greater percentage of mass shooters between 2010-2020 were Muslim (M = 23.36, SD = 20.61, Mdn = 18.5), relative to participants who were told the shooter was a Christian, M = 16.05, SD = 16.28, Mdn = 10, t(578.97) = 4.87, p < .001, d = 0.39, 95% CI [0.23, 0.55], and relative to participants who did not read an article, M = 16.89, SD = 17.5, Mdn = 10, t(594.93) = 4.18, p < .001, d = 0.34, 95% CI [0.18, 0.50]. As in Study 3, because the estimated percentages were not normally distributed, these findings were confirmed using non-parametric Wilcoxon rank-sum tests (Muslim vs Christian: W = 35953, p < .001; Muslim vs control: W = 36938, p < .001).

I also tested whether these effects interacted with participants' attitudes towards Muslims. Relative to news coverage of the Christian shooter, news coverage of the Muslim shooter had a larger effect on participants with negative attitudes towards Muslims (B = 5.79, p = .004). However, when compared to the control condition, the effect of news coverage of the Muslim shooter did not depend on attitudes towards Muslims (B = 2.99, p = 0.145).

After testing for an interaction with attitudes towards Muslims, I also compared attitudes towards Muslims across conditions. Unexpectedly, participants in the *Muslim Shooter* condition (M = 2.23, SD = 0.64) reported attitudes towards Muslims that were *less* negative than participants in the control condition, M = 2.33, SD = 0.71, t(614.92) = -2.02, p = .044, d = -0.16, 95% CI [0.00, -0.32], but not significantly different from participants in the *Christian Shooter* condition, M = 2.26, SD = 0.71, t(610.9) = -0.63, p = .527, d = -0.05, 95% CI [-0.21, 0.11].

I did not find evidence that reading about the Muslim mass shooter increased support for security policies targeting Muslims (p's >= .946), a finding which did not interact with attitudes towards Muslims (p's > .289).

In contrast to the change in beliefs about the percentage of Muslim shooters, I did not find evidence that beliefs about the percentage of mass shooters who are Christian varied across conditions

(p's > = .085), a finding which did not interact with attitudes towards Christians (p's > .442). Thus, I did not find evidence that news coverage of a Christian mass shooter changed beliefs about the extent to which Christians are responsible for mass shootings.

Discussion

Study 4 demonstrates that news coverage of a Muslim mass shooter can change beliefs about the extent to which Muslims are responsible for mass shootings. Specifically, participants who encountered news coverage of a Muslim mass shooter estimated that a greater percentage of mass shooters were Muslims, relative to participants in the other study conditions. I found mixed evidence that this effect interacted with attitudes towards Muslims, a finding which I explore further in future studies.

Surprisingly, participants who read about the Muslim mass shooter had more positive attitudes towards Muslims than participants who read about the Christian shooter. Because this effect was unexpected and only slightly less than the threshold for statistical significance (p = .044), I explore it further in future studies before providing an interpretation.

Finally, I did not find evidence that news coverage changed support for anti-Muslim policies or beliefs about Christian mass shooters.

Although Study 4 finds evidence that media coverage can change beliefs about Muslims and mass shootings, the news articles in Study 4 were fake articles created to maximize experimental control. I created the articles so that they were similar in content and appearance to past articles which have appeared in the New York Times, but it is still possible that real news coverage has different effects than these articles. To test whether similar effects would occur in response to real media coverage, Study 5 was a replication of Study 4 conducted in the wake of two major mass shootings in the United States.

STUDY 5: Replication of Study 4

Study 5 was a replication of Study 4 conducted in light of two nearly contemporaneous mass shootings featuring a Muslim and Christian shooter, respectively. On March 16th, 2021, a Christian perpetrator committed a mass shooting in Atlanta, Georgia. Less than a week later, on March 22nd a Muslim perpetrator committed a mass shooting in Boulder, Colorado. I conducted Study 5 the day after the Boulder shooting. Participants were randomly assigned to read a Fox News article that described the Atlanta shooter, to read a Fox News article with a similar format that described the Boulder shooter, or to a no-article control group.

Methods

Participants and Procedure

I recruited 1001 participants from Prolific.co (sample size was chosen to roughly match Study 4). I excluded 21 participants for failing more than one of the three comprehension checks from earlier studies, leaving a final sample of 980. In order to quickly collect data the day after the Boulder shooting, Study 5 was not pre-registered. Participants were randomly assigned to one of three conditions. In the *Boulder Shooter* condition, participants were shown a news article published on foxnews.com following the 2021 mass shooting in Boulder, Colorado (Pagones, 2021). The article, titled: *Boulder shooting suspect Ahmad Al Aliwi Alissa: What we know,* described the Boulder mass shooting and provided details about the shooter, who was Muslim. In the *Atlanta Shooter* condition, participants were shown a news article published on foxnews.com following the 2021 mass shooting in Atlanta, Georgia (Conklin, 2021). The article, titled: *Atlanta shooting suspect Robert Long: What to know*, described the Atlanta mass shooting and provided details about the shooter, who was a Christian. In the *Control* Condition, participants did not read a news article.

Participants then completed the dependent measures from previous studies, as well as additional exploratory measures.

Results

Consistent with Study 4, participants who read about the Boulder shooter (M = 23.38, SD = 22.08, Mdn = 15, n = 326) estimated a greater percentage of mass shooters were Muslim, relative to participants who read about the Atlanta shooter, M = 17.92, SD = 19.49, Mdn = 10, n = 330; t(642.14) =

3.36, $p < .001$, $d = 0.26$, 95% CI [0.11, 0.42]; $W = 42848$, $p < .001$. Participants who read about the Boulder shooter also estimated that a greater percentage of mass shooters were Muslim relative to the control group ($M = 20.57$, $SD = 21.67$, $Mdn = 13$, n = 324), although this effect was only statistically significant when using a non-parametric analysis, $t(647.9) = 1.64$, $p = .051$, $d = 0.13$, 95% CI [-0.03, 0.28]; $W = 59352$, $p = .006$. I did not find evidence that these findings interacted with attitudes towards Muslims (p's > .399).

Consistent with past studies, I did not find evidence that negative attitudes towards Muslims were more negative in the *Boulder Shooter* condition ($M = 2.37$, $SD = 0.75$) than in the *Control* condition, $M = 2.29$, $SD = 0.74$, $t(647.99) = 1.24$, $p = .217$, $d = 0.10$, 95% CI [-0.06, 0.25]. However, in contrast to Studies 2 and 4, attitudes towards Muslims were more negative in the *Boulder Shooting* condition than in the *Atlanta Shooting* condition, $M = 2.24$, $SD = 0.64$, $t(636.76) = 2.23$, $p = .026$, $d = 0.17$, 95% CI [0.02, 0.33].

Also unlike in Study 4, participants who read about the Atlanta shooting believed that a greater percentage of mass shooters are Christians ($M = 50.75$, $SD = 27.28$, $Mdn = 50$), relative to participants who read about the Boulder shooting, $M = 42.75$, $SD = 26.20$, $Mdn = 41$; $t(652.6) = 3.83$, $p < .001$, $d = 0.27$, 95% CI [0.11, 0.42]; $W = 62383$, $p < .001$, and relative to participants in the control group, $M = 45.04$, $SD = 27.41$, $Mdn = 47.5$; $t(651.65) = 2.67$, $p = .008$, $d = 0.21$, 95% CI [0.05, 0.36]; $W = 47243$, $p = .010$.

Finally, I did not find evidence that support for security policies targeting Muslims differed across conditions (p's > .075), a finding which did not interact with attitudes towards Muslims (p's > .146).

Discussion

Study 5 replicates the results of Study 4, demonstrating that exposure to news coverage of a mass shooting with a Muslim perpetrator causes people to believe that Muslims are responsible for a larger share of mass shootings. This finding suggests that news organizations and journalists may want to exercise caution when reporting on the religion of mass shooters. If coverage of a Muslim mass shooter increases the perception than mass shootings are caused by Muslims, it might be better for news providers to simply adopt a policy of never discussing a mass shooters religion. However, a potential issue with this recommendation is the possibility that the public will fill-in missing details about a mass

shooting by making assumptions about the perpetrator that confirm their existing prejudices. In Studies 6A and 6B, I test whether this is the case by examining responses to news coverage which does not identify a mass shooter's religion.

STUDY 6A: What Happens When a Shooter's Religion is not Reported?

In Studies 6A and 6B, I examined how participants respond to news coverage which does not identify a mass shooter's religion. Although a number of studies have looked at the negative consequences of news coverage, research rarely examines how news coverage might be altered to prevent these consequences. Despite the absence of evidence on this topic, many organizations make recommendations about which information should and should not be included in media reports. For example, the *Associated Press Stylebook* (Associated Press, 2020) recommends that information about the race of criminal perpetrators should not be included in news reports, unless this information is directly relevant to the crime or can be used to aid in the capture of an individual sought by police. Yet, it is not clear what the effects of this policy are. As one example of how such a policy might be ineffective, research has demonstrated that when a criminal perpetrator's identity is ambiguous, members of the public frequently make assumptions about the perpetrator's race based on racial stereotypes (Dixon, 2006b, 2007). For example, one study presented participants with news coverage of an unidentified suspect who killed a police officer in Los Angeles (Dixon, 2007). When participants in the study were not given any information about the suspects race, they assumed the suspect was probably Black.

Thus, when no information about a mass shooter is presented, members of the public might assume that the mass shooter is likely a Muslim. If this is the case, exposure to news coverage of an unidentified shooter could increase the extent to which people believe mass shooting are caused by Muslims, just like coverage of a Muslim mass shooter. Because the majority of mass shooters are not Muslim (e.g. 91.4% of shooters in the database used in Study 1 are not Muslim), failing to identify the religion of mass shooters could lead to many cases where unidentified mass shooters are mistakenly assumed to be Muslim. As a result, failing to report information about religion might increase, rather than decrease, the negative consequences of news coverage of mass shootings.

In Studies 6A and 6B, I test whether news coverage of an unidentified mass shooter has the same effect as coverage of a Muslim mass shooter.

Research Questions

In Study 6A, I predicted that participants presented with an unidentified mass shooter would estimate that a greater percentage of mass shooters are Muslim, relative to participants who were not

shown a news article. I also tested whether this effect would interact with attitudes towards Muslims, although I did not have a prediction about whether this would be the case.

Additionally, I also examined the percentage of participants who assumed that the unidentified shooter was a Muslim. I predicted that participants with negative attitudes towards Muslims would be more likely to assume that the unidentified shooter was Muslim.

Methods

Participants

To balance resource constraints and statistical power, I defined the minimum effect size of interest in Study 6A as *d* = 0.3. For 80% power to detect an effect of size d = 0.3 (one tailed test, α = .05), n = 278 is required. Additionally, I assumed that participants who had attitudes towards Muslims that are more negative than positive (i.e. participants who fall on the negative side of the attitudes towards Muslims scale) will be most likely to assume that an unidentified shooter is a Muslim. Assuming 35% of participants meet this criterion (based on the data from Study 4), I estimated that I would need to collect 794 participants to have 278 participants with negative evaluations of Muslims (794/0.35 = 278). To further increase the percentage of the sample with negative attitudes towards Muslims, I recruited only participants who identified as politically conservative. Target sample size, measures, hypotheses, and analysis plan were pre-registered prior to data collection (https://aspredicted.org/blind.php?x=hg6gs5).

I recruited 791 participants through Prolific.co. Using Prolific's pre-screening feature, I recruited only politically conservative participants. I excluded 12 (1.5%) participants for failing more than one of three comprehension checks, leaving a final sample of *n* = 779.

Procedure

Participants were randomly assigned to one of two conditions. In the *Unidentified Shooter* condition, participants read a news article which was nearly identical to the articles from Study 4, except it contained no information about the mass shooter's name or religion. The article described events roughly similar to those in past mass shootings in the US which had non-Muslim perpetrators. Specifically, it describes a mass shooter who hijacked a car, engaged in an indiscriminate shooting spree, and was eventually shot and killed in a standoff with police.

After reading the article, participants in the *Unidentified Shooter* condition were asked "If you had to guess, which of the following religions do you think the shooter is most likely to be a member of?". Participants were given the following options (in random order): "Islam", "Christianity", "Hinduism", "Atheism", and "Judaism". In the *Control* condition, participants did not read an article (and did not complete the question about the shooter's religion). Next, all participants the dependent measures from Study 4, and several additional measures.

Results

Half of the participants (50.11%) in the *Unidentified Shooter* condition assumed the shooter was Muslim. Additionally, participants with more negative attitudes towards Muslims were more likely to assume the unidentified shooter was Muslim ($B = 1.20$, $p < .001$).

As predicted, participants who read about the unidentified mass shooter believed that a greater percentage of mass shooters were Muslim ($M = 33.64$, $SD = 26.15$, $Mdn = 27.5$), relative to participants who did not read an article, $M = 25.15$, $SD = 23.92$, $Mdn = 15$; $t(769.25) = 4.72$, $p < .001$, $d = 0.34$, 95% CI [0.20, 0.48]; $W = 58722$, $p < .001$. I did not find evidence that the magnitude of this effect depended on participants' attitudes toward Muslims ($B = 2.65$, $p = .237$). Additionally, I did not find evidence that negative attitudes towards Muslims differed across conditions ($p = .248$).

As in earlier studies, I did not find evidence that support for security policies targeting Muslims differed across conditions ($p = .225$), a finding which did not interact with attitudes towards Muslims ($p = .326$).

STUDY 6B: Replication of Study 6A

Study 6B was conducted for several reasons. First, as Study 6A was conducted with a conservative sample, Study 6B was intended to replicate the results of Study 6A with a sample of liberal, conservative, and moderate participants. Second, Study 6B added an additional condition to demonstrate that news coverage of an unidentified mass shooter increases the perceived percentage of Muslim mass shooters relative to news coverage of a Christian mass shooter (in addition to changing perceptions relative to a condition with no news coverage).

Methods

Participants

I aimed for 90% power to detect $d = 0.2$ or greater (one-tailed test, $\alpha = .05$) between conditions, which requires $n = 429$ per condition. With three conditions, the total required sample for Study 6B was n = 1287. Target sample size, measures, hypotheses, and analysis plan were pre-registered prior to data collection (https://aspredicted.org/blind.php?x=nu2te8).

I recruited 1291 participants through Prolific.co, 36 (1.8%) of whom were excluded for failing more than one attention check, leaving a final sample of $n = 1255$.

Results

Consistent with Study 6A, a significant percentage of participants in the *Unidentified Shooter* condition assumed the shooter was most likely Muslim (25.2%). Participants with negative attitudes towards Muslims were more likely to assume the unidentified shooter was Muslim ($B = -5.92$, $p < .001$). Additionally, and confirming my pre-registered predictions, participants who encountered news coverage of an unidentified mass shooter believed that a greater percentage of mass shooters were Muslim ($M = 28.65$, $SD = 25.43$, $Mdn = 20$, n = 412), relative to both participants who read about the Christian shooter, $M = 20.85$, $SD = 21.88$, $Mdn = 12$, n = 416; $t(793.3) = 4.69$, $p < .001$, $d = 0.33$, 95% CI [0.19, 0.47]; $W = 66356$, $p < .001$, and to participants who did not read an article, $M = 21.63$, $SD = 22.99$, $Mdn = 12$, n = 427; $t(808) = 4.15$, $p < .001$, $d = 0.29$, 95% CI [0.15, 0.43], $W = 68320$, $p < .001$. As with Study 6A, I did not find evidence that these effects interacted with attitudes towards Muslims (p's > .286).

Participants who read about the unidentified shooter reported attitudes towards Muslims ($M = 2.51$, $SD = 0.73$) that were more negative than participants who read about the Christian shooter, $M =$

2.41, *SD* = 0.71, *t*(825.28) = 2.00, *p* = .045, *d* = 0.14, 95% CI [0.00, 0.28], but not significantly more negative than participants in the control group, *M* = 2.44, *SD* = 0.73, *t*(836.06) = 1.25, *p* = .214, *d* = 0.09, 95% CI [-0.05, 0.22].

As in earlier studies, I did not find evidence that support for security policies targeting Muslims differed across conditions (*p*'s > .077), a finding which did not interact with attitudes towards Muslims (*p*'s > .810).

Finally, I found evidence that news coverage altered beliefs about Christian mass shooters. Participants who read about the Christian shooter estimated that a greater percentage of mass shooters are Christian (*M* = 46.09, *SD* = 25.32, *Mdn* = 46) relative to participants who read about the unidentified shooter, *M* = 42.90, *SD* = 28.51, *Mdn* = 40; *t*(806.77) = 1.69, *p* = .091, *d* = 0.12, 95% CI [-0.02, 0.25]; *W* = 77828, *p* = .033, and relative to participants in the no article control group, *M* = 42.63, *SD* = 27.81, *Mdn* = 40; *t*(826.53) = 1.88, *p* =.060, *d* = 0.13, 95% CI [-0.01, 0.27]; *W* = 93513, *p* = .043. However, both effects were only statistically significant when using non-parametric tests.

Discussion

Studies 6A and 6B demonstrated that when news coverage of a mass shooting does not identify the mass shooter, many people, especially those who are prejudiced towards Muslims, assume this unidentified shooter is a Muslim. Consequently, news coverage of an unidentified mass shooter increases the extent to which people overestimate the percentage of mass shooters who are Muslim.

These findings indicate that a policy of withholding information about the religion of mass shooters is unlikely to prevent, and may even exacerbate, the negative consequences of media coverage. When a mass shooter is not Muslim, as is the case in the majority of mass shootings, withholding information about religion will lead many people to mistakenly assume the shooter is Muslim, increasing the extent to which mass shootings are attributed to Muslims. Furthermore, in the rare cases that a mass shooter is Muslim, withholding information about religion is unlikely to mitigate the negative effects of coverage. Although I do not demonstrate this by directly comparing coverage of an unidentified shooter and coverage of a Muslim mass shooter, I separately demonstrate that both types of coverage have similar negative effects (relative to no coverage). Thus, withholding information about religion will probably have the same (or very similar) effects as reporting that a shooter is Muslim.

In sum, Studies 6A and 6B suggest that withholding information about a mass shooters' religion will increase the negative consequences of coverage when the shooter is not Muslim and will probably have very little effect when the shooter is Muslim.

GENERAL DISCUSSION

In six studies, I examined media coverage of Muslim and non-Muslim mass shooters and the effects of this coverage on public attitudes. In Study 1, I demonstrated that between 2010 and 2020, Muslim mass shooters received more television news coverage than non-Muslim shooters. This increase in coverage for Muslim shooters was larger for news networks that are more conservative (e.g. Fox News) relative to networks that are more liberal (e.g. MSNBC).

Study 2 examined whether exposure to news coverage of Muslim mass shooters increases negative attitudes towards Muslims. Across six experiments and over 3000 participants, I did not find evidence that participants who were randomly assigned to read news coverage of a Muslim mass shooter had more negative attitudes towards Muslims, relative to participants who read coverage of a non-Muslim shooter. Although an absence of evidence is not the same as evidence for a null effect, the confidence interval in around the effect size in Study 2 (B = .05, 95% CI [-.02, .12]) suggests if an effect does exist, it is likely small (e.g. $B < 0.12$).

In addition to examining changes in overall evaluations of Muslims, I also tested whether news coverage of a Muslim mass shooter changed beliefs about the extent to which mass shooting are caused by Muslims. In Study 3, I demonstrated that members of the public, especially those who frequently watch news networks that allocate more coverage to Muslim mass shooters, overestimate the percentage of mass shooters who are Muslim. Studies 4 and 5 used experiments to demonstrate that exposure to news coverage of a Muslim mass shooter causes people to overestimate the percentage of mass shooters who are Muslim. In Studies 6A and 6B, I tested whether withholding information about a shooter's religion from news coverage would prevent these effects. It did not. When news coverage of a mass shooting did not mention the shooter's religion, a significant percentage of people (50% of the conservative sample in Study 6A, 25% of the politically balanced sample in Study 6B) assumed the shooter was Muslim. As a result, news coverage with no information about a shooter's religion caused an increase in the perceived percentage of mass shooters who are Muslim, just like news coverage which identified the shooter as a Muslim.

Partisan Media Coverage

The results of the news analysis in Study 1 are consistent with past research which finds that violent acts with Muslim perpetrators receive more coverage (Kearns et al., 2019) and are framed differently (Betus et al., 2019) than violent acts with non-Muslim perpetrators. I expand on this research by demonstrating that more conservative (vs liberal) news sources allocate more coverage to Muslim perpetrators and are more likely to frame Muslim preparators in a negative way. Moreover, in Study 3 I find that, even after controlling for political conservatism and negative attitudes towards Muslims, consumers of more conservative (vs liberal) news networks are more likely to overestimate the extent to which violence acts are committed by Muslims. In Study 4 and 5, I show that media coverage can cause this overestimation.

In concert, these findings may help explain why liberals and conservatives in the United States hold a different set of factual beliefs about many issues, including beliefs about the extent to which Muslims are responsible for acts of violence. Partisan differences in beliefs are often attributed to relatively recent advances in technology and media, such as social media echo chambers (Garimella & Weber, 2017), websites which present biased news targeted specifically at political partisans (Lelkes et al., 2017), and fake news (Osmundsen et al., 2020). Yet, my findings suggest that traditional forms of media, like television, may also play a significant role in explaining belief polarization. As television news is the most consumed form of news, especially among people aged 50 and older (Pew Research Center, 2018), its contribution to partisan differences in factual beliefs is likely significant.

As one example of how the differences I find could shape partisan differences in beliefs, my results indicate that more conservative news networks are more likely to describe Muslim mass shooters as terrorists, and more likely to discuss the role of religion in Muslim shootings. This may explain why people who are politically conservatives are more likely to endorse stereotypes about Islam and terrorism (Mercier et al., 2018).

A notable limitation of these findings is that the number of mass shootings included in Study 1 is small (n = 56), especially the number with Muslim perpetrators (n = 4). Although I have multiple observations (days) for each mass shooting, which increases the precision of my estimates and my statistical power, these results should still be interpreted with caution. I note however, that the differences

between Muslim and non-Muslim perpetrators I observe are similar to those demonstrated in past research (Betus et al., 2019; Kearns et al., 2019).

Despite widespread speculation about a media double-standard, I do not find evidence that mental illness is less likely to be mentioned in coverage of Muslim mass shooters than in coverage of non-Muslim shooters, even by more conservative news networks. I advise caution in interpreting this null effect, especially since the small number of Muslim mass shooters in my sample limits statistical power, making it unlikely that I would have detected a difference in coverage if it was small in magnitude. Nonetheless, I note that I do find that mental illness is discussed more frequently when perpetrators have a past mental illness diagnosis. This indicates that the sample size and methods used in Study 1 are sufficient to detect differences in mental illness coverage in situations where such differences would be expected. Additionally, a failure to find a difference in mental illness coverage between Muslim and non-Muslim perpetrators is consistent with past research which has also failed to find such differences (Betus et al., 2019). Thus, although members of the public perceive Muslim mass shooters as less mentally ill than non-Muslim mass shooters, my results provide tentative evidence that these perceptions are not the result of news coverage. Instead, Muslim mass shooters may be perceived as less mentally ill for other reasons, such as a motivation to blame religion (rather than mental illness) for their actions (Mercier et al., 2018).

Effects of Media Coverage on Prejudice

The effects of media coverage on prejudice is an important topic which has been the focus of large amount of research (Dixon, 2019). Yet, much of this research suffers from significant methodological limitations, including the use of small samples. Study 2 is (in my knowledge) the largest and most comprehensive experimental test of whether exposure to news coverage containing negative information about a minority group can increase prejudice towards that group. Despite this, Study 2 fails to find evidence that news coverage increases negative attitudes towards Muslims.

Notably, the experiments presented in Studies 4-6 also test whether media coverage increases prejudice towards Muslims, with mixed results. Studies 5 and 6B found evidence that news coverage of a Muslim mass shooter and news coverage of an unidentified shooter (whom many participants assumed was Muslim), increased negative attitudes towards Muslims. However, these effects were only found

relative to participants who encountered coverage of a Christian shooter and not relative to participants who did not encounter any news coverage. Additionally, 6A did not find evidence that coverage of a Muslim mass shooter increased negative attitudes towards Muslims, and Study 4 found evidence that this coverage made attitudes towards Muslims more *positive* (relative to a no coverage control group).

To evaluate the overall evidence for the effect of news on attitudes towards Muslim, I combined the all the data from Studies 2, 4, 5, 6A, and 6B. As in Study 2, I calculated the overall effect across all studies using a multi-level model with a random intercept for each study, and with political conservatism as an interaction variable. Across all studies, I did not find evidence that news coverage affected attitudes towards Muslims (B = 0.08, p = .130, 95% CI [-.02, .17]), nor did I find evidence for an interaction with political attitudes (B = 0.00, p = .845, 95% CI [-.03, .03]).

This finding is consistent with past research on news coverage and attitudes towards Muslims (Boydstun et al., 2018; Das et al., 2009; Saleem et al., 2017), but conflicts with research demonstrating that news coverage can increase prejudice towards other minorities groups, including African Americans (Dixon, 2006a; Gilliam & Iyengar, 2000). This difference in findings could indicate that it is harder to increase prejudice towards Muslims than to increase prejudice towards other minority groups. In America, explicit attitudes towards Muslims are generally more negative than explicit attitudes towards other minority groups (McCarthy, 2019), which could make it harder to make these attitudes even more negative than they already are. For example, on a feeling thermometer ranging from 0 (most negative) to 100 (most positive attitude), the average American reports very warm feelings towards Blacks (M = 83; Pew Research Center, 2019a), but much more ambivalent feelings towards Muslims (M = 49; Pew Research Center, 2019c). Thus, the difference between my findings and the significant effects demonstrated in past research on news coverage and prejudice towards African Americans may indicate that it is easier to decrease the extent of Americans' positive attitudes towards Blacks than it is to make Americans' ambivalent attitudes towards Muslims more negative.

Yet, as there are significant methodological issues with much of the research on news coverage and prejudice towards minority groups, it is also possible that the significant effects found in this research are false positives. Future research should use more rigorous methods, such as pre-registered replication studies, to help clarify whether these effects are genuine.

Although I do not find evidence that news coverage of Muslims increases negative attitudes towards Muslims, this finding does mean that news coverage does not affect discrimination. In contrast to the null findings observed in research on prejudice, studies have found significant increases in discrimination towards Muslims following acts of mass violence with Muslim perpetrators (Rousseau et al., 2011). For example, in the year following 9-11, hate crimes towards Muslims were 17 times higher than in the year prior to 9-11 (Ser, 2016).

Why might discrimination increase without overall changes in attitudes? One possibility is that acts of discrimination are committed by a minority of the population who already hold prejudiced attitudes prior to a major news event. When a news event occurs, prejudiced individuals may attribute the event to a minority group, leading them to act on their prejudice and discriminate against members of the group they believe is responsible.

Attitudes Towards Muslims vs Beliefs About Muslim Mass Shooters

Why did news coverage of a Muslim mass shooter change beliefs about the extent to which Muslims commit mass shootings, but not overall attitudes towards Muslims? Attitudes towards Muslims are a broad, high-level attitude. These attitudes are likely the result of many different things, including personal interactions or relationships that people have with Muslims (Cooper, 2017; Savelkoul et al., 2011), media depictions of Muslim celebrities (Alrababah et al., 2019), exposure to Muslim refugees, (Hangartner et al., 2017), Christian nationalism (Merino, 2010), and beliefs about the extent to which Islam inspires terrorism (Andersen & Mayerl, 2018). In contrast, an individuals' perception of the frequency that mass shootings are committed by Muslims is a specific belief about the world, which should be easier to change with the presentation of relevant news coverage.

Interaction with Attitudes Towards Muslims

Highlighting the power of media to shape beliefs, I generally (on 6 out of 7 statistical tests) do not find evidence that the effects of media coverage interact with attitudes towards Muslims. That is, in contrast to past research suggesting that people are more receptive to evidence confirming their existing beliefs (Ditto & Lopez, 1992), I do not find evidence that individuals who are more prejudiced towards Muslims are more willing to shift their beliefs about Muslims in response to news coverage of Muslim mass shooters. Instead, my results are consistent with theories about Bayesian updating (Hill, 2017)

which posit that, regardless of their initial attitudes, people update their beliefs to integrate both their existing attitudes and new information.

Beliefs About Minority and Majority Groups

Although my results clearly show that exposure to news coverage about a minority religious group (Muslims) changed perceptions of the extent to which violence is caused by that group, I found mixed evidence for a comparable effect on beliefs about the majority religious group (Christians). In Studies 4 and 6B, I controlled the content of the news articles to ensure that both the Muslim and Christian articles spent a similar amount of time discussing the shooter's religion (one paragraph). Using a within-paper meta-analysis to combine the effects across these studies, I find that the change in beliefs about Muslim shooters in response to an article about a Muslim shooter (Study 4: *smd* = 0.34, 95% CI [0.18, 0.497]) was larger than the average change in beliefs about Christian shooters produced by the article about a Christian shooter (Studies 4 and 6B: *smd* = .08, 95% CI [.03, 0.18]; $z = 2.7$, $p = .008$; see Appendix C for full analysis details). Thus, when the amount of time spent discussing religion is held constant, news coverage produced a larger change in perceptions of Muslims.

In contrast, in Study 5 I used articles from foxnews.com. In this study, the article about the Christian shooter spent a significant amount of time discussing the shooter's religion (seven paragraphs), while the article about the Muslim shooter only mentioned the shooter's religion once. In this case, I found no evidence that the size of the change in beliefs about Muslim and Christian shooters was different ($z = 1.5$, $p = 0.126$). As the media analysis in Study 1 indicates that news organizations typically do not spend a lot of time discussing Christianity following a Christian shooting, this level of focus on a Christian shooter's religion appears relatively rare. Nonetheless, the results of Study 5 suggest that in the rare cases when news coverage does focus extensively on a Christian shooter's religion, this coverage can have effects comparable to the effects of coverage of Muslim shooters.

News Coverage and Policy Support

I do not find evidence that exposure to news coverage of Muslim mass shooters changes support for security policies that attempt to prevent mass shootings by specifically targeting Muslims. One explanation for this null result is that opposition to such policies is not motivated by beliefs about how effectively they would reduce mass shootings, but instead by the view that it is immoral to specifically

target a group on the basis of “sacred” categories like race or religion (Tetlock, 2003). As a result, those opposed to such policies (in my studies, the majority of participants) may be unwilling to shift their opposition to them, even if a change in their perceptions of mass shootings leads them to think that such policies might be more effective.

Conclusion

Finally, I find that reducing public associations between Muslims and mass shootings may be difficult. Although I demonstrate that news coverage of a Muslim mass shooter increases perceptions about the extent to which Muslims are responsible for mass shootings, I also show that a similar increase occurs in the absence of information about a shooter’s religion. Thus, when a mass shooter is Muslim, simply omitting information about their religion is unlikely to prevent media coverage from reinforcing negative beliefs about Muslims. Furthermore, when a shooter is not Muslim, omitting information about religion may actually increase the perceived association between Muslims and mass shootings.

My findings add to a growing body of research indicating that news coverage of mass shootings can have negative consequences, including increasing stress and anxiety (Wilson, 2014), making future shootings more likely (Jetter & Walker, 2018), and in my case, contributing to negative stereotypes about a minority religious group. Furthermore, my findings suggest that the negative consequences resulting from news coverage of Muslim mass shooters are unlikely to be mitigated by changing in the way mass shootings are covered. Instead, the best way to mitigate the negative consequences of mass shootings might be for news organizations to simply spend less time covering them.

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APPENDIX A

Perceptions of Mass Shooters question:

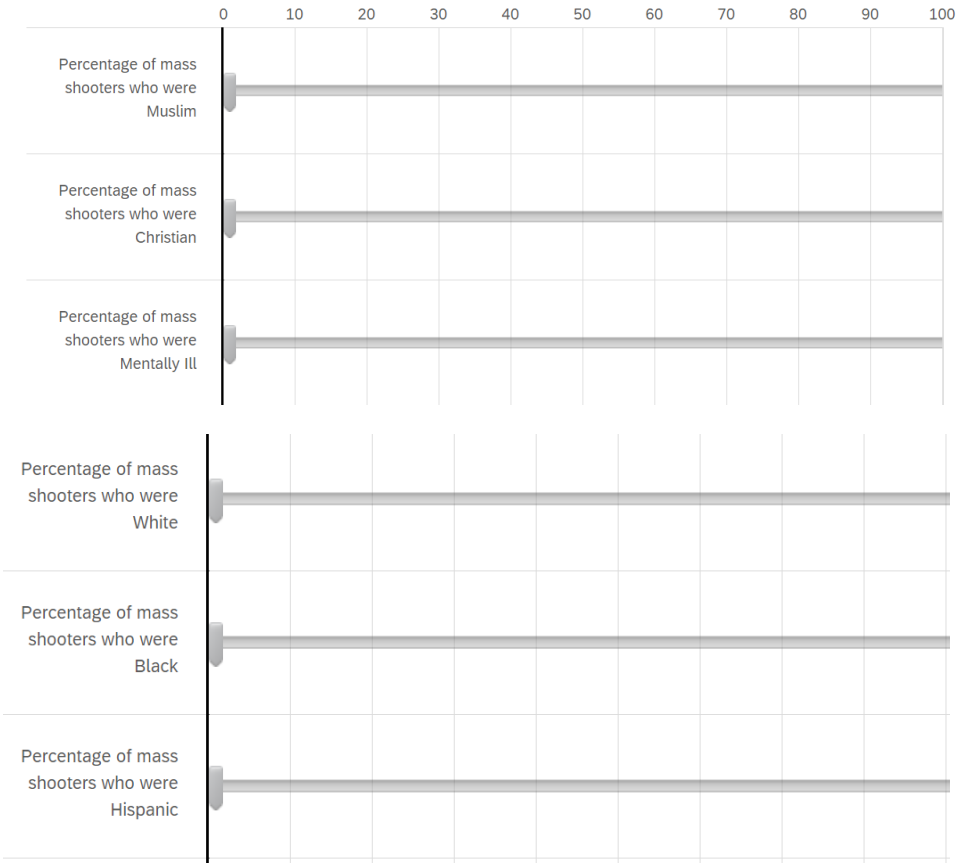
In this survey, we are interested in your beliefs about past mass shooters in the United States. Below, please estimate the number of mass shooters in the United States in the last 10 years (i.e. between Jan 1st, 2010 and Jan 1st 2020) who were from each of the groups below.

When we say "mass shooting', we specifically mean an event which meets the following definition:

A multiple homicide incident in which four or more victims are murdered with firearms—not including the offender(s)—within one event, and at least some of the murders occurred in a public location or locations in close geographical proximity (e.g., a workplace, school, restaurant, or other public settings), and the murders are not attributable to any other underlying criminal activity or commonplace circumstance (armed robbery, criminal competition, insurance fraud, argument, or romantic triangle).

Note that the totals below may add up to greater than 100%, as shooters can belong to multiple groups.

In the last 10 years, what percentage of mass shooters in the United States fell into the following categories:



APPENDIX B

Scale Measuring Support for Anti Muslim Policies:

Please indicate your support for the following policies on the scale below:

	strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
Muslims should be banned from entering the United States	○	○	○	○	○	○	○
Law enforcement should spend more time patrolling Muslim neighborhoods than non-Muslim neighborhoods	○	○	○	○	○	○	○
Muslims should receive extra screening when passing though airport security	○	○	○	○	○	○	○
The government should keep a registry of Muslims	○	○	○	○	○	○	○
Muslims should receive extra screening before they are allowed to purchase guns	○	○	○	○	○	○	○
When someone who is Muslim purchases a gun, they should not have to undergo any more screening than anyone else does	○	○	○	○	○	○	○
Airport security should not spend more time screening Muslims than they spend screening anyone else	○	○	○	○	○	○	○
Muslim neighborhoods to not need more policing than any other neighborhood does	○	○	○	○	○	○	○

APPENDIX C

Within Paper Meta-Analysis Reported in General Discussion

I used an online calculator at https://www.meta-mar.com/smd to calculate and combine standardized mean differences. The Muslim effect from Study 4 (Muslim vs Control) has a standardized mean difference of 0.34, 95% CI [0.18, 0.497]. The average Christian effect across Study 4 (Christian vs Control) and Study 6B (Christian vs control) is .08, 95% CI [.03, 0.18]. To compare these effects, I used the following formula (from http://www.metafor-project.org/doku.php/tips:comp_two_independent_estimates):

$$z = \frac{\hat{\mu}_1 - \hat{\mu}_2}{\sqrt{SE[\hat{\mu}_1]^2 + SE[\hat{\mu}_2]^2}},$$

Where:

z = the z-score

u_1 = the standardized mean difference for effect 1

u_2 = the standardized mean difference for effect 2

$SE[u_1]$ = the standard error of effect 1

$SE[u_2]$ = the standard error of effect 2

Using this formula, I found that the Muslim effect in Study 4 was significantly different from the Christian effects (Study 4 and 6B combined), z = 2.7, p = .008. When comparing the Fox News articles in Study 5, I did not find that the effects are significantly different from each other, z = 1.5, p = 0.126.