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Patterns of Bias: How Mainstream Media Operationalize Links between Mass Shootings and Terrorism

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ABSTRACT

How do race and/or religion shape news media coverage of mass shooters and whether media associate mass shooters with terrorism? This article combines natural language processing (NLP), statistical analysis of U.S. mass shooting events (1990–2016) and an in-depth case-study comparison to evaluate whether media exhibit patterns in how they frame mass shooters from different racial and/or religious groups. First, we use NLP to target and model the specific adjectives media use to describe mass shooters. We find identifiable text patterns in the adjectives media apply to mass shooters that vary along racial/religious lines. Second, we statistically estimate disagreement between established definitions of terrorism and media associations with the term "terrorism" (excluding negations). This analysis suggests that media disproportionately fail to link non-Muslim white perpetrators to events that should properly be considered terrorism. Our in-depth case-study comparison reinforces and contextualizes these results. This research provides scientific evidence to support the increasingly prominent public speculation that U.S. institutions insufficiently acknowledge the threat of white-perpetrated terrorism. We suggest that biased media coverage reflects and contributes to a process by which certain identity groups are framed as outsiders.

KEYWORDS

Media bias; NLP; mass shootings; terrorism

Introduction

How do race and/or religion shape news media coverage of mass shooters and whether media associate mass shooters with terrorism? After violent extremists sieged the U.S. capitol in January 2021, some American policymakers designated domestic terrorism as a top-tier national security concern (Grisales, 2021). In the penumbra of that attack lies a network of far-right (often white supremacist) domestic terrorists who have been responsible for considerably more post-9/11 American deaths than are foreign terrorists, but whose violence infrequently prompts comprehensive government counter-terrorism action (Mallin, 2019). For example, in 2019, a gunman inspired by previous white supremacist mass shooters and his own anti-immigrant agenda killed 23 people at a Walmart in El Paso, Texas, and this year (2022), a white supremacist killed 10 black Americans at a supermarket in Buffalo, NY. Even as the FBI investigated the El Paso shooter as a domestic terrorist, the

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New York Times editorial board criticized U.S. government institutions and public attitudes for biased complacency to the country's "white nationalist terrorist problem," relative to the "zeal" with which those institutions "have targeted radical Islamic terrorists" (NYT editorial Board, 2019).

The *Times* editorial voiced a growing concern that powerful U.S. actors – including media and policymakers – are quick to treat perpetrators of political violence who are perceived as members of minoritized[1] racial and/or religious groups (including BIPOC,[2] Muslim or immigrant individuals) as terrorists, while those same powerful actors are reluctant to accurately name non-Muslim white terrorists as such (Gladstone, 2015). Racial and/or religious biases shape news coverage of violent crimes (Dixon, 2017; Dixon & Linz, 2000b), public attitudes about terrorism (D'Orazio & Salehyan, 2018; Huff & Kertzer, 2018), the volume and quality of media attention a given terrorist attack receives (Kearns et al., 2018; Powell, 2011), and whether U.S. actors identify given acts of terrorism *as terrorism* (Betus et al., 2021; West & Lloyd, 2017). How media cover terrorism can have deleterious legal, political and social effects for marginalized groups (Baele et al., 2017; Hodgson & Tadros, 2013; Meier, 2020; Norris, 2017; Windisch et al., 2018); can influence widely used terrorism databases (e.g., LaFree & Dugan, 2007); and can shape state counter-terrorism policies.

In this article, we examine media associations with the term "terrorism" across the universe of mass shootings in the United States from 1990 to mid-2016. To do so, we generate and evaluate comprehensive media corpora of mass-shooting news articles. We combine Natural Language Processing (NLP) techniques that isolate the adjectives media use to discuss a given shooter, statistical analysis of disagreement between established definitions of terrorism and media associations with the term "terrorism" (excluding negations), and an in-depth case-study comparison of coverage of two high-profile mass shootings to contextualize our results. We find that: adjectives applied to mass shooters vary along racial and/or religious lines; media associations of an event with the term "terrorism" are inconsistent along racial and/or religious lines, suggesting that media disproportionately fail to link non-Muslim white perpetrators to events that should properly be considered terrorism; and terrorism associations are contextually linked to coverage of perpetrator identities in ways that emphasize the racial and/or religious identities of certain perpetrators and not others. These findings provide scientific evidence that U.S. media have been more inclined to associate mass shooters from minoritized groups (e.g., BIPOC, Muslim and/or immigrants) with terrorism, relative to non-Muslim white shooters. We suggest that the media's terrorism associations we observe here contribute to a process by which certain groups are framed or otherized (by dominant groups) as American outsiders and/or enemies of the state (Dionne & Turkmen, 2020; Lajevardi, 2020).

This article makes several specific contributions. First, we use NLP to isolate and model the specific adjectives that media use to describe mass shooters. This analysis showcases variation across shooter profiles, identifies text patterns of subtle biases in how media frame mass shooters, and models the use of sophisticated NLP technology for media text analysis.

Second, we expand upon recent studies that demonstrate media linkages between Islam and terrorism (Betus et al., 2021; Powell, 2011, 2018). These existing studies – usually restricted to post-9/11 events with known terrorist motivations – exclude important and potentially informative variation. We therefore expand our case selection to the universe of U.S. mass shootings (1990–2016). This allows us to include false-positive cases in which

media apply terrorism labels to events not considered terrorism, as well as events for which possible terrorism motivations may have been overlooked. Broadening our timeframe allows us to identify racial and/or religious trends that predated the highly salient post-9/11 context.

Third, we develop a novel approach to quantifying media treatment along racial and/or religious lines: modeling disagreement between a shooter's known motivations (manually coded as terrorism or not, based on a comprehensive review of available evidence) and media associations of that event with the term "terrorism."[3] While the social identity of non-Muslim white shooters bears no relationship to whether news media accurately associate their shootings with terrorism, media do accurately associate Middle Eastern shooters with terrorism. This provides scientific support for recent speculation that U.S. institutions insufficiently acknowledge the threat of white-perpetrated terrorism; bolsters findings from more targeted, smaller-*n* research; and suggests that observed trends are broader in scope than previous studies could conclude.

Fourth, we generate a comprehensive text corpus of media coverage of U.S. mass shooters, which includes annotated metadata of each mass shooter's racial and/or religious identity, motive(s), and targeted victims. Finally, we model how social scientists can productively integrate qualitative case studies and computational data-centered research to amplify, validate, and contextualize their conclusions (Tanweer et al., 2021; Card et al., 2018).

Media Portrayals of Minoritized Actors

Racial categories are social, political and legal constructions that shift over time in response to changing political contexts and lived experiences (Barrett & Roediger, 2005; Lopez, 1997; Mingus & Zopf, 2010; Nagel, 1994; Omi & Winant, 1994; Zepeda-Millán & Wallace, 2013). In the United States – where centuries of systemic, institutionalized racism disproportionately prioritize select European descendants – privileged groups perceive certain identities as others who deviate from whiteness based on their race, religion, immigration status, nationality, language or other characteristics (Calasanti & Gerrits, 2021; Gonzalez-Sobrino & Goss, 2019; Husain, 2019; Joshi, 2006; Lyle, 2014; Tesler, 2016; Zepeda-Millán & Wallace, 2013). Although more than 40% of U.S. Muslims identify as white (Pew Research Center, 2017), U.S. policies, media, and public attitudes have increasingly otherized the highly heterogeneous U.S. Muslim population and cast it "as a potentially threatening Other based on racial characteristics" (Considine, 2017 6; Elver, 2012; Mohamed, 2018).

Negative stereotypes against racially and/or religiously marginalized groups frequently drive U.S. political behavior (Banks, 2014; Hutchings & Valentino, 2004; Jardina, 2019; Tesler, 2016) and news coverage (Graham & Lowery, 2004; Kilgo & Harlow, 2019). Biased public messages can activate or reinforce negative attitudes (Domke et al., 1999; Gilliam et al., 2002; Hutchings & Jardina, 2009; Valentino et al., 2002; Zaller, 1992) and can lead to policies that impede individual liberty, security and well-being for targeted groups (Merolla & Zechmeister, 2009). For example, relative to European immigrants, other immigrants to the United States trigger more public opposition to immigration (Brader et al., 2008; Valentino et al., 2013), activate support for exclusionary policies or candidates (Newman et al., 2018), and are profiled as potential national-security threats (Kanstroom, 2003; Miller, 2005).

These biases routinely shape how U.S. news and film industries portray individuals, groups and characters (Entman, 2007; Entman & Rojecki, 2010; Fairclough, 2013; Van Dijk, 1993, 2015). News media disproportionately demonize or delegitimate nonviolent BIPOC rights activists, frame them as illicit, or treat them as villains (Entman & Rojecki, 2010; Kilgo, 2021; Kilgo & Harlow, 2019; Lawrence, 2000). Even relatively sympathetic post-9/11 portrayals of Arab and/or Muslim fictional characters are often accompanied by – and used to justify – negative portrayals and real-world mistreatment (Alsultany, 2012, 2013). Meanwhile, racial and religious bigotry run rampant on social media platforms and yield biased algorithms (Garcia, 2016) that shape how language is modeled, analyzed and censored (Abid et al., 2021; Bender et al., 2021; ap et al., 2019; Noble, 2018).

Similar to these broad trends, news sources tend to cover violent events in biased ways. Local television broadcasts continually over-portray white individuals as victims rather than as perpetrators of crime, and news media give white perpetrators of violent crime more sympathetic coverage, relative to minoritized perpetrators (Dixon, 2017; Dixon & Linz, 2000a). Violence perpetrated by white men is more likely to be attributed to mental illness (Chen et al., 2015), which partially diminishes their culpability for violence (Duxbury et al., 2018), while exposure to a mental illness frame makes respondents more likely to assume that a violent perpetrator is white (Kunst et al., 2018). On the other hand, people harboring anti-Muslim attitudes are less likely to attribute violence perpetrated by Muslims to mental illness (Mercier et al., 2018).

Generalizing from this research, we expect that U.S. news media will attach disproportionately negative frames to minoritized individuals. This treatment may be attributable to an out-group homogeneity effect, in which people from dominant groups perceive the behavior of minoritized individuals as monolithic representatives of their group and then draw homogeneous conclusions about the group, based on that individual behavior (Matthes et al., 2020; Park & Rothbart, 1982; Rothgerber, 1997). When a news journalist perceives a subject as a member of the out-group (rather than as co-member of an in-group) , the journalist could be less likely to empathize with the subject, resulting in less favorable coverage.

This effect could be particularly acute when the out-group individual in question is a violent perpetrator. Media could interpret the perpetrator's violence as indicative of a broader threat that the perpetrator's out-group poses to the dominant group. As a result, the perpetrator's violence – perceived as uniquely threatening – inspires disproportionately negative coverage. We therefore expect that news media will be more likely to characterize non-Muslim white perpetrators in relatively neutral or positive frames and treat their violence as isolated incidents (rather than as representative of a group's behavior). In contrast, media will be more likely to characterize racially and/or religiously minoritized perpetrators in more negative terms and will emphasize the perpetrator's group identity.

Hypothesis 1: Relative to minoritized shooters, media will be more likely to cover non-Muslim white shooters in a neutral or positive light, by: (A) using adjectives that are relatively positive, specifically referencing social characteristics that are regarded as favorable; (B) emphasizing mental health as an exogenous factor contributing to the shooter's behavior and partially alleviating the perpetrator's culpability; and (C) avoiding or underemphasizing the shooter's background or identity.

Existing research on U.S. mass shootings provides evidence for similar hypotheses among smaller-*n*, qualitatively-analyzed cases (Chen et al., 2015; Duxbury et al., 2018) or random samples of media coverage over truncated time frames. Our NLP analysis – which uniquely targets media's specific references to mass shooters – evaluates whether these trends hold among a comprehensive corpus of national and regional news coverage of all U.S. mass shootings (1990–2016).

Race, Religion and Terrorism

If media outlets give non-Muslim white perpetrators disproportionately positive coverage (H1), are media also more likely to associate minoritized perpetrators with the term "terrorism"? Terrorism refers to any act of violence motivated by a political objective that is broader than the given act's specific targets or victims (Phillips, 2018).[4] Despite this general definition, dominant groups often heuristically associate the concept of terrorism with groups whom the dominant groups perceive as outsiders or foreign perpetrators who pose an existential threat to dominant groups, state institutions, and/or national narratives:

"[T]he `terrorist' becomes the most dangerous Other and is recognized by certain `subhuman' qualities and vague characteristics – language, strange religious rituals, unusual clothing, and so forth. The `terrorist Other' is thus presented to the white public as an uncivilized savage who must be destroyed to assure our safety and the preservation of the American Way of Life" (Marable, 2002, p. 11).

Indeed, throughout U.S. history, racial and/or religious biases have shaped how media and policymakers identify terrorism. When marginalized groups lacking institutional power adopt extreme ideologies and resort to politically motivated violence to disrupt systems of power, those groups are often labeled as terrorists. In contrast, media and policymakers have historically avoided associating movements predominated by dominant groups who embrace extreme, politically motivated violence (e.g., white nationalists) with terrorism (Swarns & Robertson, 2015). Such biased applications of the concept of terrorism disproportionately minimize the severity of certain politically violent movements and villainize others.

Some evidence suggests that Americans encounter particularly salient media associations between terrorism and Arab, Middle-Eastern, or Muslim groups. Longstanding Orientalist tropes (Said, 2020; 1981), high-profile terrorist events prior to 9/11, and U.S. coverage of domestic and global events (Figure S4) all likely contributed to these associations, which further crystallized after 9/11 (Dana et al., 2018; Elver, 2012; Hussain & Bagguley, 2012; Naber, 2008; Nacos & Torres-Reyna, 2007; Sayyid, 2014; Wilkins, 2008), casting millions of innocent Muslim Americans as "outsiders at home" (Lajevardi, 2020; Lajevardi & Oskooii, 2018).

Today, media tend to treat Muslim-perpetrated terrorist attacks as uniquely threatening. U.S.-based terrorist events conducted by Muslim perpetrators (2006–2015) received 357% more news coverage than other terrorist attacks (Kearns et al., 2018). Powell (2011, 2018)'s comprehensive studies of post-9/11 U.S. terrorist events demonstrate that, when terror is committed by Muslims, media routinely connect that terror to Islam and to a fear of the foreign other. Media frame terrorist attacks by Muslim or Arab perpetrators as part of a foreign, organized offensive against "Christian America" but do not adopt similar fear-based frames when covering non-Muslim white domestic terrorists (whom media tend to

cast as "minor threat[s]" of "isolated incidents by troubled individuals"; Powell, 2011, p. 90, see also: Chermak & Gruenewald, 2006). Meanwhile, U.S. respondents disproportionately associate Muslim perpetrators with terrorism (Schmuck et al., 2018; West & Lloyd, 2017).[5]

The existing observational research tends to focus on post-9/11 events that have been designated as terrorism (e.g., Betus et al., 2021; Powell, 2011, 2018); this approach allows for an examination of variation within known terrorist attacks but excludes non-terrorist violence that media may unduly associate with terrorism. In this article, we examine the universe of U.S. mass shootings (1990–2016; well before and after 9/11). Extending this analysis to all mass shootings allows us to identify acts of terrorism that may have been overlooked, non-terrorism acts of violence that may have been incorrectly associated with the term "terrorism," and any disagreement that varies along racial/religious lines across a longer timeframe.

Given the socially constructed links made by dominant groups between terrorism and minoritized groups (i.e., those treated as outsiders), we expect that U.S. media will accurately associate minoritized perpetrators of politically motivated mass shootings with terrorism but will understate or overlook the political nature of non-Muslim white perpetrators' mass-shooting terrorist events. As such, biased associations with the term "terrorism" will emerge is a component of the media's racially and/or religiously biased coverage of mass shootings.

Hypothesis 2: Media will be more likely to accurately associate racially and/or religiously minoritized perpetrators of terrorism with affirmative[6] mentions of the term "terrorism." Media will be less likely to accurately associate non-Muslim white perpetrators of terrorism with affirmative mentions of the term "terrorism."

Evidence supporting this hypothesis would suggest that subjective terrorism designations contribute to an ongoing process by which minoritized groups are otherized as U.S. outsiders.

Case Study: Media Coverage of U.S. Mass Shooters

We examine mainstream media coverage of U.S. mass shootings between 1990 and mid-2016.[7] We consider events cataloged in Stanford University's Mass Shootings in America (MSA) database: shootings in which perpetrator(s) used firearm(s) to kill or injure three or more people (Stanford University, 2019; organized crimes excluded). Given our interest in perpetrator characteristics, we exclude 34 cases with no identified perpetrator, resulting in n = 265 U.S. mass shootings. Mass shooters in this database represent a range of motives and racial and/or religious identities.

Annual incidents of U.S. mass shootings increased considerably after 1990 (Figure S7; Grow, 2014). Although most mass shootings involve ten deaths or fewer, isolated events are becoming more fatal (Figure S7).[8] Mainstream newspapers disproportionately covered a few high-profile events and gave other events little or no attention (Figure S8). There is a statistically significant relationship between number of casualties and news coverage (Figures S8-S9), though this effect appears to be largely driven by a few exceptionally deadly, high profile shootings (e.g., Pulse Nightclub, 2016; and Sandy Hook Elementary School, 2012).

Mass Shootings and Terrorism

A mass shooting that is *perpetrated to advance a political agenda broader than the event itself* constitutes an act of terrorism (Phillips, 2018). Under this definition, roughly 8% of shootings in our dataset could be considered acts of terror. However, terrorism remains a nebulous concept that is challenging to identify (Ruby, 2002; Schmid, 2004; Young, 2019) and generates inconsistent definitions (Appendix A, Table S4).[9] Meanwhile, the process of identifying a political motive is also challenging, particularly when violence is conducted by an isolated perpetrator, when perpetrators appear to have multiple motives or political affiliations, or when objectives shift over the course of a political movements' lifespan. Given these ambiguities, subjective demographic stereotypes can influence how experts or media identify political motivations (i.e., acts of terrorism) or the relevance of a perpetrator's identity in making those assessments (Hodgson & Tadros, 2013; Lakoff, 2000). The 9/11 attacks on the United States appear to have facilitated an increase in terrorism's prominence in mainstream media coverage but made little change in its substantive context or meaning (Appendix A, Figures S3–S4).

Methods

Data

Using the MSA database to identify mass shooting events, we then develop three specific datasets to identify and analyze patterns in news coverage (Table 1).

Multi-newspaper text corpus We develop a multi-newspaper text corpus of articles related to MSA-identified mass shootings, which we use in our NLP and statistical regression analyses (Appendix B). The corpus consists of 4,146 articles about any of the 265 identified mass shooters, published in any of twelve select nationally or regionally circulating newspapers.[10] Included articles were published within one week of a given mass shooting; mentioned either the name or the age of the suspected shooter; mentioned the city in which the event occurred; received a Lexis-Nexis tag for the appropriate U.S. state; and received at least one of the following Lexis-Nexis event tags: *mass shootings, shootings, terrorism*, or *terrorist attack*. We link this multi-newspaper text corpus to the events identified in the MSA database.

Event-specific variables To evaluate agreement or disagreement between whether a given shooter had a political motive (and therefore should be associated with the term "terrorism") and media's association of that event with affirmative references to the term "terrorism" (evidenced in the multi-newspaper text corpus), we develop 37 additional variables about each MSA shooter's motive(s), identity and victims. Variables were hand-coded from police reports, court cases, online databases, and other publicly available documentation. The sources and procedures used to identify perpetrator motives were entirely distinct from the multi-newspaper text corpus used to identify affirmative media mentions of the term "terrorism." We use these variables in our regression analysis (Appendix D).

NYT coverage for case-study comparison For our in-depth case-study comparison (Appendix F), we collected *New York Times* articles about two prominent mass shooters: Nadal Hasan (the Muslim shooter at Fort Hood, 2009) and Dylann Roof (the non-Muslim white shooter at Mother Emanuel A.M.E. Church, 2015). Included articles were published in the

Table 1. Description of data and variables.

Analysis	Datasets	Criteria for inclusion	Key variable description
NLP character analysis	Multi-newspaper text corpus (4,146 articles)	Article mentions a given shooting/ perpetrator	**Adjectives** used to describe the perpetrator.
Statistical analysis (regression)	Multi-newspaper text corpus (4,146 articles)	Article mentions a given shooting/ perpetrator	**Media association**: dictionary matches of "terrorism" or "terrorist" (excluding negations) in each article about about a perpetrator, as a proportion of total words in the articles about that perpetrator.
	Public documents: courts, databases, NGOs, public sources	Google search for relevant documents by event	**Terrorism designation** applied to events with a political motive; other hand-coded control variables (based on codebook).
	Media association & terrorism designation variables		**Disagreement regarding classification of terrorism**: amount of disagreement between media association and human-coded terrorism designation.
In-depth case-study comparison	*New York Times* (99 articles)	Article mentions Hasan/Roof, published within 1 week of event	**References to perpetrator identity, motive, relation to terrorism**, hand-coded, quantified, and qualitatively examined.

New York Times within one week of the event[11] and mentioned the perpetrator's name.[12] These criteria yielded 50 articles covering Hasan's violence and 49 articles covering Roof's violence.

NLP Character Analysis (H1)

We use unsupervised machine learning, originating from the computing field of Natural Language Processing (NLP), to identify systematic patterns within media portrayals (among the multi-newspaper text corpus) of the perpetrators of MSA-identified mass shootings (H1). Unsupervised learning allows an automated model to uncover patterns across large collections of un-annotated, politically relevant text (Card et al., 2015; Grimmer & Stewart, 2013; Roberts, 2016). Probabilistic topic modeling (Blei, 2012) and structural topic modeling (Grimmer, 2010; Mcauliffe & Blei, 2008; Roberts et al., 2014) – both widely used in social science – inductively discover topics that represent commonly co-occurring word clusters within a collection of text.

Building on earlier work that learned latent personas for entities based on commonly co-occuring descriptors (Card et al., 2016; Bamman et al., 2013), we extract the adjectives used to refer to mass shooters, and use a form of topic modeling to identify clusters of related terms. In particular, we make use of Scholar, a neural topic model which allows us to flexibly incorporate metadata (Card et al., 2018, Appendix C). The resulting topics represent specific human personas and can be used to discover

archetypal personas (e.g., a dark hero, romantic lead, or villain; Card et al., 2016; Bamman et al., 2013). In short, Scholar localizes topic modeling to the characteristics of each person mentioned in text.

We use Stanford CoreNLP to preprocess articles (e.g., generating a tree-structured grammatical parse for each sentence in each article), identify entity mentions of type person which specifically refer to the perpetrator (identified by name, "XX-year-old," or the words "gunman" or "shooter"), and extract adjectives which refer to the perpetrator of interest. Each resulting document is the set of adjectives associated with a perpetrator, extracted from a given article in our corpus . We then use Scholar to identify topics that represent common, distinct personas applied to mass shooters across our corpus and to evaluate the associations of these various topic personas to perpetrators' racial and/or religious identities.

The NLP Scholar framework applied to real-world newspaper text corpora encounters several limitations. Model outputs are: somewhat dependent upon the randomness involved in model optimization, shaped by inevitable preprocessing errors (e.g., those that occur when using tools for named-entity recognition or co-reference resolution) and other noise introduced at various research stages and modeling decisions, and based on small amounts of data (relative to the size of text corpora typically used in NLP tasks). We therefore treat observations based on these analyses as suggestive rather than conclusive.

Statistical Analysis (H2)

Next, we evaluate whether media are less likely to accurately associate non-Muslim white perpetrators with the term "terrorism," relative to perpetrators from minoritized groups. Since the social meaning of terrorism could shift over time (e.g., after a critical juncture like 9/11), we first confirm that the media's use of the term "terrorism" has remained conceptually stable over our timeframe (Appendix A). Next, we code prominent definitions of terrorism for their core elements (Appendix A, Table S4). The single element common in each of these definitions (and scholarly understandings, Phillips, 2018) is that a perpetrator must have a political motive that is broader than the event itself. We therefore use this as our definition of terrorism.

Media Associations with Terrorism We use computational dictionary methods to quantify media associations with the term "terrorism" among the multi-newspaper text corpus. For each article in the corpus, we identify whether the words "terrorism" or "terrorist" appeared in a sentence that did not include a negation proximate to the mention of terrorism. Phrases like "no solid evidence of terrorism" or has not been described as a terrorist event' would not be considered an association with the term "terrorism." For each MSA-identified mass shooting event, we calculate the proportion of articles relevant to that event in our multi-newspaper text corpus that mentioned terrorism (Appendix B, Figure S10). This measure does not distinguish between articles that explicitly classify an event as terrorism, cite another source classifying an event as terrorism, or make any other affirmative mention of "terrorism." All of these scenarios represent media signals that associate a perpetrator's violence with terrorism.[13]

Terrorism Designations Meanwhile, two coders separately hand-coded events in the MSA database, following a carefully designed protocol and search criteria (Appendix D). We review police reports, court cases, online databases, and other publicly available

documentation for each mass shooting to determine whether the perpetrator had a political motive beyond the event itself, therefore qualifying the event as an act of terrorism. We use motive as identified by officials (e.g., police) and/or official documentation. We create a binary variable (1: terrorism; 0: not terrorism) and a second variable to capture ambiguities of terrorism designations. To ensure the reliability of human-coded variables, we define terrorism according to overlap from established definitions (Appendix A), develop rigorous deductive coding guidelines, base our codes on officially documented motives, and evaluate intercoder reliability.[14]

Disagreement For each MSA-identified event, our dependent variable captures the difference between affirmative *media associations* with the term "terrorism" within the multi-newspaper text corpus (Appendix D) and our hand-coded *terrorism designation* (based on our manual research, the data for which was entirely distinct from the multi-newspaper text corpus). Disagreement indicates that the media either associated an event in which the perpetrator had no political motive with affirmative mentions of the term "terrorism" (false positive) or did not associate an event which had a political motive with the term "terrorism" (false negative).

Finally, we estimate whether a perpetrator's racial and/or religious identity is associated with the probability of disagreement between media association with the term "terrorism" (among the multi-newspaper text corpus) and independently hand-coded terrorism designations. Because a shooter's race or religion should not be associated with how and whether events are understood as terrorism, null findings would indicate that shooter identity is not a meaningful predictor of inconsistency in how the term "terrorism" is applied.

In-depth Case-Study Comparison

We augment our NLP and statistical analyses with an in-depth case-study comparison of how the *New York Times* covered two prominent mass shooters: Nidal Hasan (2009) and Dylann Roof (2015). Hasan – a Muslim U.S. military psychiatrist with middle-Eastern heritage – opened fire at his military base in Fort Hood, Texas, killing thirteen people and injuring thirty. Experts think Hasan was motivated both by political ideologies (i.e., terrorism, including opposition to U.S. military priorities) and by other motives (including interpersonal workplace conflicts, wartime trauma, and mental instability). U.S. Senators called Hasan's shooting the deadliest U.S. terrorist attack since 9/11 (Lieberman & Collins, 2011). Six years later, Roof – a white man with Christian roots and white supremacist sympathies – shot and killed nine Black Americans at Mother Emanuel African Methodist Episcopal Church in Charleston, South Carolina. Like Hasan, it appears Roof was motivated by political ideologies (i.e., terrorism, including his intentions to incite a race war)[15] and by mental instability.

We examined relevant articles published in the *Times* within one week of each event. A single researcher hand-coded, quantified, and comparatively analyzed relevant articles (e.g., published within the first two days of each event or within the first week that mentioned "terrorism," "terrorist," or "terror") for references to shooter motive or identity (Appendix F). The cases of Hasan and Roof each contain nuances and particularities which prevent a perfect comparison.[16] Nevertheless, this examination provides contextual

evidence that reinforces our main results and generates new insights about media's inconsistent coverage of racial and/or religious identities and terrorism associations.

Results

NLP Character Analysis (H1)

Our NLP character analysis suggests that media coverage of mass-shooting perpetrators varies along racial and religious lines, as predicted in H1. First, we examine the adjectives most strongly associated with perpetrators of the five events that received the highest volume of media coverage (those with at least 35 articles in the corpus, Table 2). Adjectives associated with all three non-Muslim white shooters (at Aurora, Sandy Hook, and Tucson) represented relatively neutral (or even positive) attributes, describing the shooters as smart, polite, a doctoral graduate student, or as having mental health issues (mental, disturbed). Notably, these adjectives do not represent anything about the shooters' identities. In contrast, media associated shooters with Muslim backgrounds (at Fort Hood and Orlando) with their identities as Muslim, devout/religious, or gay and used fewer positive adjectives. While not systematic, this analysis suggests important differences between adjectives used to describe non-Muslim white shooters and Muslim-affiliated shooters.

Given entrenched heuristic links in the United States between terrorism and racial and/or religious identities, we also expect that media will be more likely to associate minoritized perpetrators of politically motivated violence with terrorism, relative to non-Muslim white counterparts (H2). Indeed, three of the five most-covered mass shooting events (Table 2) could be considered terrorism: Fort Hood (2009), Orlando, and Tucson. Of these, the adjective terrorist appeared as strongly associated with the Muslim-affiliated shooter in Orlando, but no such indication of terrorism was associated with Tucson's white perpetrator.

Second, we look for patterns in the adjectives used to describe perpetrators across all events, first by using Scholar as a purely unsupervised topic model and then by incorporating metadata about each perpetrator. Table 3 shows a set of personas (topics) learned by one instantiation of the model without the inclusion of metadata. Topics appear to fall into three types. *Procedural* topics refer to details of the mass shooting. *Mental/behavioral* topics refer to the perpetrators' mental, behavioral, and/or emotional state. *Identity* topics refer to the perpetrator/s social identity (including race, citizenship, or religion). We qualitatively compare the topics most associated with two distinct shootings at Fort Hood (2009 and 2014): Coverage of the 2014 event (perpetrated by an American from Puerto Rico) was clearly dominated by a mental health frame (able mental young much little intelligent likely

Table 2. Adjectives most strongly associated with the most-covered events.

Event	Minoritized Perpetrator	Terms
Fort Hood (2009)	Y	major muslim devout military outspoken cleric stable
Aurora Movie Theater	N	booby-trapped alleged due doctoral black-clad graduate
Orlando Nightclub	Y	gay abusive terrorist cool religious elementary muslim
Sandy Hook Elementary	N	nervous new smart awkward boisterous regular prone
Tucson Political Event	N	violent jittery suspect mental able disturbed polite

Table 3. Example dimensions (ways of characterizing perpetrators) learned using the scholar framework. *Note*: "Black" most often refers to clothing rather than to race.

Terms	Type
first second next former last lone prime high unknown recent final senior	procedural
active unclear alleged former potential small confident suspected	procedural
dead pronounced relative nearby loose armed civilian open former adult	procedural
clear able deranged bizarre unable self-inflicted murderous innocent	mental/behavioral
good different strange late bad difficult nice last odd unclear dangerous	mental/behavioral
able mental young much little intelligent likely psychiatric bright afraid	mental/behavioral
quiet calm sorry former polite smart shy respectful guilty reserved real	mental/behavioral
white black young male suspect unemployed stocky recent crucial racist	identity
muslim american immigrant religious multiple gay fifth possible naturalized	identity

psychiatric bright afraid). In contrast, coverage of the 2009 event (perpetrated by a Muslim American with Palestinian heritage) emphasized the shooter's Muslim identity (Muslim American immigrant religious multiple gay fifth possible naturalized).

When we include race as a metadata element in the model (Figure 1), we can use Scholar to learn a different set of topics that are predictive of a shooter's identity (probability of being non-Muslim white). This encourages the model to learn topics that are useful in predicting perpetrator identity. The two topics most associated with non-Muslim white perpetrators contain relatively innocuous associations. One is a procedural topic and the other has a positive slant – associating the perpetrator with being able intelligent sorry bright quite shy smart. By contrast, one of the two topics most likely to be associated with minoritized perpetrators is an identity-based topic about Islam and citizenship and the other has a negative slant, describing perpetrators as deranged hostile disruptive. This suggests that mainstream newspapers are more likely to associate non-Muslim white perpetrators with less negative personas and associate minoritized perpetrators with more negative personas that may emphasize minoritized racial and/or religious identities.

Consistent with research using different data and methods (Chen et al., 2015; Duxbury et al., 2018), our topic modeling of shooter adjectives across a comprehensive universe of events reveals discernible patterns along racial and religious lines. It provides compelling evidence that media tend to adopt less negative adjectives when covering non-Muslim white

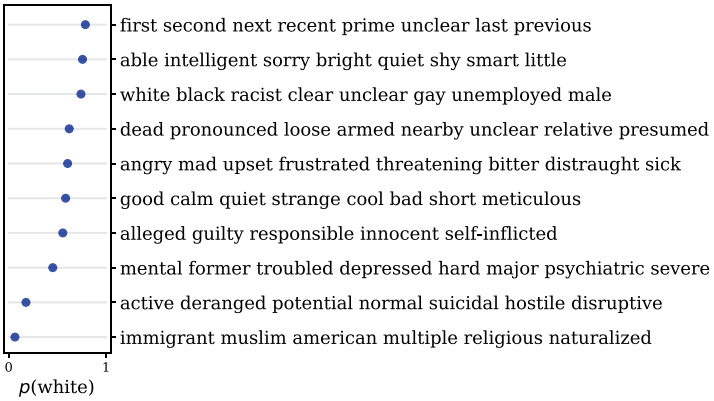

Figure 1. Latent dimension learned by Scholar when using the predicted probability of a perpetrator being non-Muslim white (per dimension) as a label to be predicted (Appendix C).

perpetrators and more negative frames (including those that emphasize how perpetrators deviate from dominant identities) when covering minoritized perpetrators.

Support from Case-Study Comparison Our case-study comparison demonstrates these trends in practice. Media gave considerably more attention to aspects of Hasan's (minoritized) identity, relative to Roof's identity. Media highlighted Hasan's Middle-Eastern heritage with much greater frequency than they discussed Roof's European-based background.[17] Media regularly referenced the Hasan family's immigration status but never discussed Roof's family history. Although both shooters allegedly prayed before opening gunfire, Hasan's Muslim identity and practices (e.g., his Mosque attendance, daily prayer and piousness) became central to media coverage of his violence, while Roof's Lutheran background was almost entirely ignored. Finally, media featured American Muslims disavowing Hasan's violence (a practice which one bemoaned: "I don't understand why the Muslim-American community has to take responsibility for [Hasan]") but spotlighted no such clarifications from Christian or other communities with whom Roof was affiliated.[18]

Statistical Analysis (H2)

Our statistical analysis evaluates whether a perpetrator's minoritized identity – which shapes media adjectives (above) – also influences media associations with the term "terrorism." H2 anticipates variation (along racial and/or religious lines) in disagreement between media associations with the term "terrorism" and hand-coded terrorism designations; we expect media to be more likely to disagree with hand-coded designations when classifying non-Muslim white perpetrators of terrorism, relative to minoritized counterparts. We evaluate this hypothesis against alternative factors that could shape disagreement, including severity of the event, perpetrator links to violent groups, the amount of news coverage an event received, whether the event targeted a government entity, whether the target was a school, and whether the event was a social dispute.

Figure 2 presents results for our disagreement analysis. We find a large, negative, statistically significant relationship between Middle-Eastern shooters (M3) and media/human-coder disagreement about whether to associate the shooter's violence with the term "terrorism." When news sources cover a Middle-Eastern perpetrated event that could be considered terrorism, media reliability associate that event with the term "terrorism" (excluding negations). However, we observe no relationship between a non-Muslim white shooter's identity and whether or not media accurately associate that shooter's violence with terrorism. In the case of white shooters, media associations with the term "terrorism" may be *inconsistent* with expert coding of events. This suggests that, unlike Middle-Eastern shooters, U.S. media may make no subjective assumptions about non-Muslim white shooters, thus privileging "whiteness" as a norm. Attacks that target minoritized groups or government/political institutions (often perpetrated by non-Muslim white shooters) are positively, statistically significantly related to disagreement.[19] When perpetrators target minoritized groups or government/political institutions, media associations are inconsistent with expert coder designations; media appear to inaccurately classify (overlook) these violent events as acts of terrorism.

In sum, media and expert coders often disagree about terrorism events (often perpetrated by non-Muslim white shooters) that target minoritized victims, whereas terrorist events

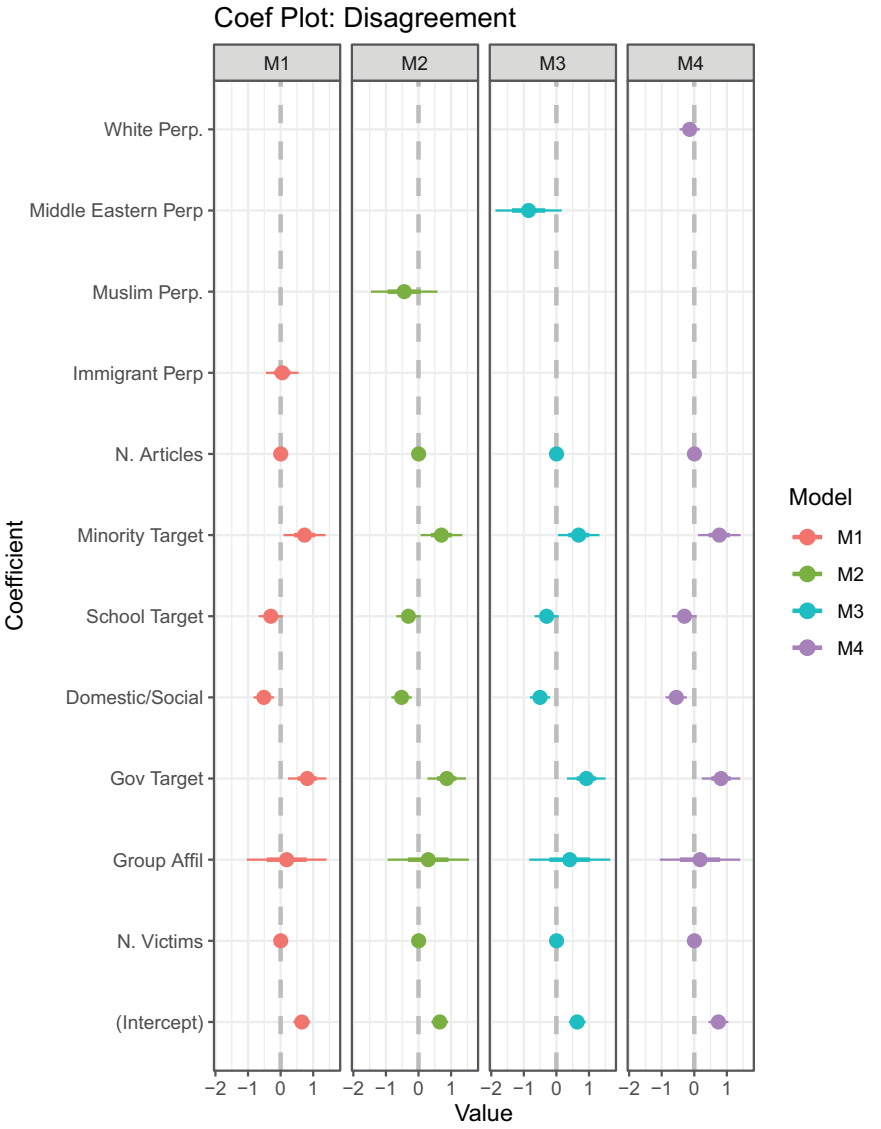

Figure 2. Coefficient plot (Models 1–4, Appendix E): Perpetrators and disagreement in the news.

perpetrated by Middle-Eastern shooters are unlikely to face disagreement. This suggests that media may harbor subtle, racial and/or religious biases about the threats associated with minority-targeted terrorism (on one hand) and Middle-Eastern perpetrated terrorism (on the other).[20] By comparing disagreement between independent research-based assessments of shooter motive and media associations with the term "terrorism," we are able to identify media error in coverage. If such error was not shaped by racial and/or religious biases, we would observe no relationship between shooter identity and disagreement. Although this is true among white perpetrators, our findings suggest that media readily associate Middle-Eastern terrorists as such.

Support from Case-Study Comparison Our in-depth case-study comparison suggests that the *content* of media terrorism associations may also vary. Roof's white supremacist terrorism not only received fewer mentions of terrorism (relative to Hasan's),[21] but those mentions disproportionately occurred in opinion commentary, while terrorism references in Hasan's attack usually occurred in formal news coverage. Several opinion pieces following Roof's attack critiqued the media for avoiding covering Roof's shooting as terrorism[22] and situated Roof's violence within the "long [and oft-overlooked U.S.] legacy of [white-perpetrated] racial terrorism" against black communities,[23],

This case-study comparison suggests that the media may be more inclined to make associations between terrorism and minoritized perpetrators, like Hasan. Heuristic associations between terrorism and non-Muslim white perpetrators, like Roof, appear to be less well-established. Indeed, the burden of naming Roof's terrorism largely fell on public commentators and activists seeking to dislodge long-standing racial and religious associations with terrorism. Together, our statistical analysis and case-study comparison provide strong scientific support for anecdotal observations that U.S. institutions fail to respond to "white nationalist terrorism" with the same "zeal" they apply to "radical Islamic terrorists" (NYT Editorial Board, 2019).

Discussion

This research combined natural language processing, statistical analysis of original datasets, and an in-depth case-study comparison to identify how racial and/or religious biases shape media coverage of U.S. mass shooters. Together, these analyses suggest that media – perhaps unintentionally – adopt and reproduce subtle biases, not only in how they cover individual perpetrators, but also if/how they present those responsible for political violence as perpetrators of terrorism. Convergence across these methods lends credibility to our theoretical premise.

Academic research on terrorism focuses on the causes of, consequences of, and effective responses to political violence (e.g., Abrahms, 2008; Crenshaw, 2000; Hoffman, 2006). These studies tend to use a list of events that have been previously defined as terrorism. However, many of these pre-defined lists (e.g., the Global Terrorism Database LaFree and Dugan, 2007) are based on news coverage. Because news coverage plays a prominent role in setting the scope for academic research on terrorism, it is essential to recognize what we uncover here: that racial and religious biases shape media coverage and associations with the term "terrorism." Addressing the origins of these biases will require significant social change. One simple step could help begin to mitigate these biases, however: The AP Style Guide should add an entry on "terrorism" to dictate the conditions under which a journalists should appropriately associate an event with terrorism.

The media biases highlighted in this article could have important implications for how certain U.S. groups are perceived. Racial identities are constructed (rather than fixed) and shift and codify over time. When media coverage disproportionately discusses certain individuals' identity-based characteristics, presents those individuals as uniquely culpable (e.g., avoiding mental health explanations), and frames those individuals as acutely threatening (e.g., as terrorists who pose a danger to U.S. institutions), that media coverage could contribute to a process that *racializes* those groups. By *racialize*, we mean minoritizing a group in a way that imposes a racial identity that does not necessarily comport with how

the group perceives itself. In short, this media coverage may reflect and reinforce biased attitudes that treat certain identities as "normal" while racializing others as foreign, threatening outsiders.

This study has certain limitations. Mass shootings are relatively rare events. We triangulate NLP, statistical and in-depth case-study comparison to make the most of available data. Still, the rarity of mass shootings limits the extent to which we can extract generalizable trends from event-level observations. Meanwhile, by limiting our analysis to high-circulation publications (and to only the *New York Times* for our case-study comparison), we do not capture the full range of news coverage content and styles to which the U.S. public is exposed.

Perhaps more importantly, the scope and nature of U.S. mass shootings have likely shifted since 2016. At a minimum, mass shootings are becoming more frequent, as are mass-shooting related deaths and injuries (Bump, 2021). The annual count of mass shootings increased during the COVID pandemic from 417 (2019) to 611 (2020) and 693 last year (Gun Violence Archive, 2022b). By July 2022, the U.S. had experienced at least 330 mass shootings in 2022, including one school shooting that killed nineteen children and two teachers (Uvalde, TX; Gun Violence Archive, 2022a; The New York Times, 2022).

Finally, the threat of domestic terrorism, including violence posed by white supremacists, appears to be gaining increased attention from U.S. policymakers and the general public. Current conversations about deep-seeded racial injustices – punctuated by recent mass shootings targeting black, Muslim, Jewish, Asian, and Latino/a/x communities in the United States and elsewhere – may be increasing public awareness that racial and/or religious biases shape how powerful institutions respond to political violence. Indeed, a New York state law – crafted in response to the 2019 white-supremacist shooting in El Paso, TX – enabled the racially motivated shooter who killed ten black Americans in Buffalo, NY, this July to be charged with domestic terrorism (NPR, 2022). Future research should examine whether media bias is shifting or reducing accordingly. In the meantime, we suggest that the past coverage examined here contributed to the racialization of certain minoritized identities, which in turn may continue to influence when and how news media, law enforcement officials and policymakers name and respond to the forces of political violence that threaten American lives every day.

Notes

1. We adopt D'ignazio and Klein (2020)'s use of the term "minoritized groups" to describe people "who are positioned in opposition to a more powerful social group." This term "indicates that a social group is actively devalued and oppressed by a dominant group, one that holds more economic, social, and political power" (26).
2. "BIPOC" refers to Black, Indigenous and People of Color. Although an imperfect approach to representing social identities, this term emphasizes the racial violence – particularly against Black and Indigenous people – upon which the United States was founded (Grady, 2020). U.S. dominant perceptions of whiteness are subjective, shifting constructions that imbue unearned advantages upon people with light complexions, Christian backgrounds, and/or European ancestry (Omi & Winant, 1994). We use "BIPOC" to refer to U.S. citizens and residents who, today, are perceived by dominant groups as existing outside the subjective bounds of whiteness and are therefore harmed by long-standing U.S. systems of "white supremacy, patriarchy, and capitalism" (*The BIPOC Project* N.d.). These groups may potentially include immigrants, Muslims, and/or people with Middle-Eastern ancestry.

3. Appendix A contains a detailed textual analysis of the New York Times' use of the term "terrorism" over time (Sandhaus, 2008), allowing us to ensure that no linguistic shifts in the meaning of the term are the cause of any patterns we may observe.
4. See, also: Hoffman (1986), Rich (2013). Appendix A (e.g., Table S4) provides an in-depth discussion about why we focus on a political motive as the key element of the definition of terrorism.
5. Meaux et al. (2020) find no association between Islam and terrorism among U.S. respondents.
6. We exclude terms ("terrorism"/"ist") proximate to a negation (e.g., "no evidence that this was terrorism").
7. Digitized news is not reliably available prior to 1990.
8. The deadliest U.S. mass shooting on record to date (Las Vegas, 2017) occurred after our data cutoff.
9. The Associated Press Stylebook provides no guideline for using the term "terrorism" (Associated Press, 2019). The word "extremist" (a concept often associated with terrorism) only appears in AP guidelines for discussing concepts or political ideologies that claim association with Islam (e.g., *jihad*, Taliban, and Islamist).
10. Newspapers selected from the Media Frames (Card et al., 2015) gold standard: *San Jose Mercury News, USA Today, St. Louis Post-Dispatch, Daily News, Tampa Bay Times, Washington Post, Philadelphia Inquirer, Saint Paul Pioneer Press, Palm Beach Post, Atlanta Journal and Constitution, New York Times, St. Petersburg Times*.
11. Hasan: Nov 5–6, 2009; Roof: June 18–19, 2015. Roof's shooting was conducted the evening of June 17 but Roof was not identified as the shooter until June 18.
12. We include news articles, news reports, news blogs, news reviews, opinion pieces, letters to the editor, expert debates, magazine pieces, and educational features. We exclude photos, videos, podcasts, interactive timelines, social media links, and reader comments.
13. Only 15% of confirmed terrorist events involved Muslim perpetrators, but those events received disproportionately high coverage volume and included 4 of 5 events whose coverage most frequently mentioned terrorism.
14. Coders searched for each separate event and used court proceedings, existing databases and gray literature to code the motive for a given event (Appendix D). We used a random sample of 20 events to evaluate intercoder reliability, so each instance of disagreement significantly penalized our scores. When using a binary measure (0 = not terrorism; 1 = terrorism), coders achieved a high level of agreement (Kappa score: 0.78). When using a more nuanced ordinal measure (0 = clearly not terrorism; 1 = could be terrorism; 2 = clearly terrorism), coders achieved a lower but acceptable level of agreement (Kappa score: 0.612; this score exceeds coder agreement achieved by other reputable research projects, e.g., Braithwaite & Gallagher Cunningham, 2020). Disagreement among the ordinal scale was driven by two events which one coder labeled as 1 and the other labeled as 2 and by two events which one coder labeled as 0 and the other labeled as 1.
15. Intent to incite a race war, as motivated Roof and the 2019 Mosque shootings at Christchurch, New Zealand, is distinct from a hate crime. The former is a clear intent to promote a broader, violent political agenda while the later is an extreme, violent instance of hatred directed at an individual from a minority group.
16. These include: confounding motivations, how the shooter's identity uniquely shaped his hostilities, shifting approaches to understanding and investigating terrorism, and subtle distinctions between terrorism and hate crimes. Because terrorism is a federal crime, law-enforcement officials interviewed by media may be selective in when/how they discuss an event as terrorism, and these strategies may shift over time.
17. In both cases, we exclude references to extremist/white supremacist ideologies.
18. Despite Roof's Christian roots, Sen. L. Graham (R-SC) invoked a heuristic association between Islam and terrorism when he called Roof a "racial jihadist." *Jihad* refers to the Islamic struggle to do good. It can include holy war and is often associated with Muslim-identifying extremists (see, for example, Associated Press, 2019).

19. For example, although the 2011 shooting of U.S. Congresswoman Gabrielle Giffords could be considered an act of terrorism, many news sources did not associate the event with the term "terrorism."
20. School shootings and domestic disturbances yield low levels of disagreement. Shooters' immigrant status does not appear to shape disagreement.
21. A slightly greater proportion of articles covering Hasan's shooting explicitly mentioned terrorism (Hasan, 36%; Roof, 30.6%), and those Hasan articles contained considerably more total references to terrorism (61 total references), relative to Roof articles (41 total references). Mentions of terrorism include reports about ongoing law-enforcement investigations; sources quoted to assert, suggest, or consider whether the event was terrorism; and commentary declaring that terrorism occurred.
22. "[A]dvocates are asking why the attack has not officially been called terrorism. Against the backdrop of rising worries about violent Muslim extremism in the United States, advocates see hypocrisy in the way the attack and the man under arrest in the shooting have been described by the news media" (Gladstone, 2015).
23. "For 198 years, angry whites have attacked Emanuel A.M.E. and its congregation, and when its leaders have fused faith with political activism, white vigilantes have used terror to silence its ministers and mute its message of progress and hope" (Egerton, 2015).

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