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ABSTRACT

Are Muslims portrayed more negatively than other religious groups? If so, what factors are associated with this negativity? We apply computer-assisted, lexicon-based coding to over 850,000 articles that mention Muslims, Hindus, Jews, or Catholics in 17 national and regional US newspapers over the 20-year period of 1996–2015 and compare them to a representative baseline of articles. We show that the average tone of articles about Muslims is considerably more negative than both this baseline and compared to articles about the other groups. The negative tone is most strongly associated with stories about extremism and events in foreign settings. However, even controlling for a wide range of factors does not eliminate the negativity in stories mentioning Muslims. We discuss the implications of these findings for media objectivity and for public attitudes and policy preferences with respect to Muslims and other social groups.

A substantial body of survey research has shown that Muslims are consistently viewed less favorably than other groups in American society (Axt, Ebersole, and Nosek 2014; Parrillo and Donoghue 2005; Putnam, Sander, and Campbell 2007). The media have been a prominent source of information about Muslims, with more Americans learning about Muslims from the media than from any other source (Pew Research Center 2007, 4). However, most Americans believe that the US media cover Muslims unfairly (Pew Research Center 2017, 72), and, indeed, Americans' attitudes have been shown to be markedly more negative when their primary source of information is the media rather than interpersonal relationships or education (Pew Research Center 2007, 4). In addition, experimental and survey evidence has demonstrated that media exposure to Muslims is linked not only to negative perceptions, but also to greater support for civil restrictions of Muslim Americans as well as military action in Muslim countries (Saleem et al. 2016; Saleem, Yang, and Ramasubramanian 2016). Developing a deeper understanding of media coverage of Muslims is thus critical for understanding the sources of public attitudes and policy preferences with respect to this highly stigmatized group.

Motivated by these concerns, scholars have closely investigated media portrayals of Muslims over the past two decades. Most studies have found that Muslims are depicted

in a largely negative manner (Baker, Gabrielatos, and McEnery 2013; Mertens and de Smaele 2016; Moore, Mason, and Lewis 2008; Nacos and Torres-Reyna 2007; Poole and Richardson 2006; Trevino, Kanso, and Nelson 2010). This wide-ranging scholarship has documented coverage of Muslims in different time periods, media outlets, and geographic settings (Ahmed and Matthes 2017). Yet it has two structural limitations. First, it has not typically investigated Muslims in a comparative context. Studies that focus exclusively on Muslims cannot convey how negative coverage is compared to other religious groups, or to the average media story. It may be the case, for example, that positive stories in general (and perhaps especially stories about religious groups) simply receive less press than their negative counterparts. If this were true across the board, the negativity associated with Muslims may simply reflect a general media tendency rather than specific negativity related to Muslims.

Second, although some studies have identified key individual factors associated with particularly negative coverage, so far none has been able to systematically assess whether these factors – alone or in combination – account for negative coverage of Muslims. It may be the case, for instance, that *events* are responsible for driving coverage in a negative direction. Stories about terrorism and extremism, stories that exclusively cover foreign developments or those published after September 11 2001 may be associated with negative coverage given the inherent negativity of those topics. It may also be the case that coverage that is negative on average may be primarily a function of particular *newspaper characteristics*, such as whether stories were published in conservative or tabloid newspapers, whose journalists and readers may be more inclined toward skeptical or sensationalist coverage of Muslims. In short, scholarship on media portrayals of Muslims cannot yet answer two key questions: how negative is coverage of Muslims relative to other groups and to the American media as a whole; and, does controlling for key factors eliminate the relative negativity associated with coverage of Muslims?

We build on existing research to address each of these questions. We use computer-assisted, lexicon-based coding of over 850,000 articles that mention Muslims, Hindus, Jews, or Catholics in 17 national and regional US newspapers across the 20-year period of 1996–2015 and compare them to a representative baseline of articles. We selected these groups because they are significant world religions that constitute minorities within the Protestant-majority United States and allow for comparison across a range of perceived outsiderness. In contemporary American society, Kalkan, Layman, and Uslaner (2009, 2) identify Catholics as "mainstream," and Jews as part of a "band of others" defined by ethnic, racial, and religious characteristics. They argue that Muslims may be a particularly stigmatized outgroup because they belong to two "bands of others," based not only on their religious difference, but also on "cultural practices that are very different from mainstream conventions" (Kalkan, Layman, and Uslaner 2009, 2). This description also applies to Hindus, who form a similar proportion of the American population as Muslims, and are frequently associated in media coverage with negative foreign events such as riots and violence in South Asia. Our coding method allows us to calibrate coverage of each of these groups relative to the media as a whole, and thus also relative to one another. This, in turn, enables us to explore the particular factors that may affect the tone of articles mentioning Muslims. We seek to identify the elements that are most closely associated with negativity, and we examine whether controlling for these factors can eliminate the gap in the tone of coverage between Muslim articles and those referencing other religious groups.

We demonstrate that the tone of American newspaper articles mentioning Muslims has indeed been consistently and substantially negative, compared both to a representative set of articles and to stories containing references to Hindus, Jews, or Catholics. Two types of event-based coverage in particular – stories about extremism and those in foreign settings – have a strong negative impact on article tone. In addition, stories in tabloids are more negative than those in broadsheets, on average. On the other hand, two other factors presumed to cause negative coverage – publication after 9/11 and publication in conservative newspapers – are not uniformly associated with a more negative tone. Instead, we find subtler interactions, suggesting that the post-9/11 era is associated with negative tone primarily for stories about Muslims in tabloid newspapers.

Most significantly of all, we find that controlling for events and newspaper characteristics associated with negative coverage does not eliminate the gap in tone between stories mentioning Muslims and those containing references to Hindus, Jews, or Catholics. Coverage of Muslims remains negative – both in absolute and relative terms – under all circumstances. These findings have implications for understanding how the media cover Muslims, one of the most disfavored groups in American society. They demonstrate conclusively that negative coverage of Muslims is neither a function of a general media tendency to emphasize negative stories, nor can it be accounted for by stories about negative events or by coverage in presumptively more negative outlets. This suggests that the media are a key vector that contributes to widespread negative attitudes toward Muslims in the United States.

Media coverage of Muslims

Scholars have devoted substantial attention to the standing of Muslims in Western societies in recent years. They have identified negative attitudes toward Muslims based on a general sense of affect toward groups that fall outside the cultural mainstream (Kalkan, Layman, and Uslaner 2009), stereotypes of Muslims and Muslim-Americans as violent and untrustworthy (Sides and Gross 2013), cultural differences between Muslims and non-Muslims (Sniderman and Hagendoorn 2007) or state policies that suggest Muslims are threatening longstanding traditions, privileges, or everyday habits (Helbling and Traunmüller 2016). Since most survey respondents in the United States and elsewhere have limited first-person contact with Muslims, the media play a key role in communicating about Muslims in terms that affect social constructions, public attitudes, policy preferences, and policy outcomes (Bleich, Bloemraad, and de Graauw 2015; Boomgaarden and Vliegenthart 2009; Chong and Druckman 2007; Schneider and Ingram 1993).

It is therefore not surprising that studies of Muslims in the media have proliferated since the attacks of September 11, 2001. These have ranged from close analyses of relatively few articles (Abrahamian 2003; Jackson 2010; Powell 2011) to medium- and large-n overviews of hundreds or even hundreds of thousands of articles (Baker, Gabrielatos, and McEnery 2013; Moore, Mason, and Lewis 2008; Trevino, Kanso, and Nelson 2010). Most scholars have found that coverage has been substantially negative. Even those that have revealed a more complex portrayal of Muslims tend to find that positive depictions exist alongside negative ones, not that the former outweigh the latter (Bleich et al. 2015; Bowe, Fahmy, and Matthes 2015; Nacos and Torres-Reyna 2007).

Although existing scholarship largely agrees that Muslims are portrayed negatively, it lacks a common reference point that conveys just how negative coverage of Muslims is compared to that of other identity groups. With few exceptions, media studies of Muslims do not reference articles that are not about Muslims. For example, Trevino, Kanso, and Nelson (2010) gauge the number of favorable, unfavorable, and neutral terms associated with Muslims before and after 9/11 in editorials in three major US newspapers. They show that the number of unfavorable terms exceeds the combination of favorable and neutral terms in both time periods. Bowe, Fahmy, and Matthes perform a content analysis on stories about Muslims collected from a one-month period in 2009 from 18 large circulation newspapers in the United States (2015, 48). They determine that a majority of stories contained neutral frames, while approximately 24% contained negative frames and 4% contained positive frames (Bowe, Fahmy, and Matthes 2015, 51).

These analyses differ over the extent of negativity they find in their respective pools of articles. But their common methodology of examining articles solely about Muslims raises a question about *ex ante* expectations with respect to the tone of these articles. What constitutes evidence of negative framing, given that both the media as an industry and the cognitive biases of media consumers prioritize negative coverage (Soroka 2014; Trussler and Soroka 2014)? Even if articles mentioning Muslims are not positive on balance, how do they compare to coverage of other religious groups such as Hindus, Jews, or Catholics? It is only through calibrating coverage of Muslims against other sets of articles that we can begin to reliably compare the extent of the negativity.

Accurately gauging the relative tone of articles about Muslims also allows us to pinpoint the factors most associated with negativity in existing coverage. We draw on existing scholarship to identify factors commonly understood to affect the tone of articles that refer to Muslims. This enables us to assess each individually and to isolate those most strongly associated with the tone of articles in our Muslim corpus. We build on these findings to assess whether controlling for all of these elements can eliminate the "Muslim gap," by which we mean the negative gap between coverage of Muslims and coverage of other groups such as Hindus, Jews, and Catholics.

Factors associated with negative coverage of muslims

We assess two categories of factors that have been associated in the existing literature with negative coverage of Muslims. The first category focuses on the effect of themes surrounding types of *events*, such as terrorism or extremism, foreign stories, or 9/11. For example, if the tone of articles about Muslims is highly negative, is it because radical Islamist extremists have engaged in terrorist acts more frequently in recent years than have actors associated with other faiths? Chermak and Gruenewald (2006, 429) found that terrorism in general and 9/11, in particular, have a high news value because they are "violent, intense, unambiguous, unexpected, rare, and hostile to elite people and/or nations." Terrorism and other forms of extremism are of course neither unique nor intrinsic to Muslims. However, the proportion of the newspaper coverage of Muslims that focuses on extremists may be greater than is the case for other religious groups, even if simply because of a greater prominence of Islamist extremist actors in the contemporary era. One study of the British media's coverage of Muslims between 2000 and 2008, for example, found that almost half (47%) of all articles surveyed were about terrorism or extremism (Moore, Mason, and Lewis 2008, 10).

Other studies suggest that the tone of newspaper articles may vary depending on whether the stories involve coverage of domestic (internal) or foreign (external) events (Entman 1991; Nossek 2004). A number of scholars have applied these insights to the coverage of domestic Muslims versus foreign Muslims, and have found that stories about "our" Muslims are generally more positive than stories about "their" Muslims (Ibrahim 2010; Mertens and de Smaele 2016; Powell 2011). Many scholars have also argued that 9/11 was an important turning point in the coverage of Muslims, driving it in a more negative direction (Abrahamian 2003; Jackson 2010; Powell 2011). We test these event-based variables through examining the following hypotheses:

> H1 – Articles containing references to extremism have a more negative tone than articles containing no such references

> H2 – Articles containing references only to locations outside the United States have a more negative tone than articles that contain references to domestic locations or no location references

> H3 – Articles mentioning Muslims published after 9/11/2001 have a more negative tone than those published prior to that date

In addition to focusing on topics and events, students of the British media, in particular, have found that *newspaper characteristics* can affect coverage of Muslims. For example, the left- versus right-leaning of the media outlet has been shown to influence the tone of coverage about Muslims (Bleich et al. 2015). Scholars who have analyzed additional countries have found that ideological differences among media outlets play a role in some national contexts, but not in others (Mertens and de Smaele 2016). Although US newspapers, on the whole, are not as strongly or consistently attached to an ideology as are their British counterparts (Hallin and Mancini 2004, 208–210), surveys show that conservative American respondents are less favorably disposed toward Muslims than are liberal ones (Smith 2013, 4–8). Studies of the US media have demonstrated that readers have a strong preference for news that fits their ideological perspective and that media outlets respond to these preferences (Gentzkow and Shapiro 2010). This offers a structural incentive for conservative papers to appeal to their readership with more negative coverage of Muslims.

Scholars have also found a broadsheet-tabloid distinction in coverage of Muslims. Comparing depictions in the British broadsheets *The Guardian* and *The Times* from the mid- to late 1990s to those in the tabloid *The Sun*, Poole (2002, 249) writes that the latter delineated Muslims as "subject to ridicule" with "clear implications for the exclusion of Muslims from 'Britishness'." Using British data from 1998–2009, Baker, Gabrielatos, and McEnery (2013, 72–76) also found differences in word choice between tabloids and broadsheets, including a disproportionate focus on terrorism and extremism in tabloids. The American media market has fewer high-circulation tabloids than does the British market, yet it is possible to examine these insights in the US context. We test the observations about newspaper characteristics by examining the following hypotheses:

> H4 – Articles mentioning Muslims in newspapers with a more conservative political orientation have a more negative tone than do articles in less conservative newspapers

> H5 – Articles in tabloid newspapers containing references to Muslims have a more negative tone than do articles in broadsheet newspapers

Explaining the Muslim gap

Testing these five hypotheses allows us to identify the specific factors that have the largest negative impact on Muslim articles in U.S. newspapers. While the results contribute to scholarly discussions about media portrayals of Muslims, we also seek to understand whether Muslims form a particularly stigmatized group in the American media. We therefore assess whether any overall gap in tone between Muslims and other groups can be offset by controlling for all important elements in combination. If, for example, the more negative tone of articles referring to Muslims compared to that of Hindus, Jews, or Catholics is a function of stories about extremism or foreign events, particularly in the post-9/11 era, some may conclude that there is little cause for concern about the even-handedness of the media. If the negative tone exists in conservative and tabloid outlets, but not in centrist and left-leaning broadsheets, this could be taken as evidence of a known, but limited and explicable, set of biases. The effects of such negative coverage may well be harmful to Muslims, but the source of the negativity itself would be understood. If, however, all of these factors taken together do not account for the "Muslim gap" of negative coverage, this raises broader questions about media objectivity and neutrality.

To better understand the factors that affect the comparatively negative coverage of Muslims, we therefore assess whether controlling for reporting on extremism, foreign events, and time period, as well as for newspaper ideology and format, eliminates the gap between the tone of coverage of Muslims and that of Hindus, Jews, or Catholics.

Data

In order to test our hypotheses, we collected an extensive corpus of articles from prominent United States newspapers published over the 20-year-period from January 1 1996 through December 31 2015. By selecting mainstream print media instead of online media, social media, or television reporting, we specifically chose the media format least likely to engage in sensationalism or demonization of a group like Muslims, and where we would therefore expect the "Muslim gap" to be relatively minimized. More specifically, we examine 853,839 articles drawn from 17 newspapers, adding up to more than 796 million words.[1] Our main purpose in constructing the dataset is to obtain a representative sample of the major US print media coverage of these religious groups. We selected newspapers available in Lexis–Nexis, Factiva, and ProQuest databases that range from left to right in political orientation, encompass different regions of the country, and include broadsheet papers as well as tabloids. We also ensure the inclusion of the prominent and high-circulation national newspapers that frequently influence regional and local newspapers as well as elite opinion.

As comparison groups to Muslims, we selected Hindus, Jews, and Catholics as religious minorities that have been the subject of relatively frequent coverage in the US media. In demographic terms, Catholics are the largest group within our study, comprising approximately 21% of the US population in 2014, with the population of Jews, Muslims, and Hindus estimated at 1.9%, 0.9%, and 0.7% respectively (Pew Research Center 2015, 4). Given the prevalence and relative positivity of the term "Judeo-Christian" in the United States media (Hartmann, Zhang, and Wischstadt 2005), we expect Jews and Catholics to be associated with less negative coverage than the other groups. Hindus were selected

as the closest analogue to Muslims, in that they are the third largest world religion, they comprise a similar percentage of the US population, and they are neither "Judeo-Christian" nor self-identify as white (Pew Research Center 2015, 52). Kalkan, Layman, and Uslaner (2009, 2) have argued that Muslims are double outsiders in the American mind by virtue of being "a religious minority group with cultural practices that are very different from mainstream conventions," a description that also applies to Hindus. Including Hindus therefore allows us to control for the effect of perceived racial, religious, and cultural differences.

For each religion included, we selected all articles containing the name of the religion (Islam, Hinduism, Catholicism, Judaism) or its adherents (Muslim, Hindu, Catholic, Jew) in the title or in the article text. Plurals (e.g., Muslims) and adjective versions (e.g., Jewish) were also captured by the search.[2] Table 1 displays the distribution of articles across newspapers and religious groups.

The greatest numbers of daily articles occurred in the aftermath of significant events, although the nature of this significance varies across the four religious groups included. In the top 25 of number of articles published on a given day for a particular religion, 22 are about Muslims, and each of these days falls in the weeks immediately following the 9/11 attacks. The other three are about Catholics, with two involving the death of Pope John Paul II and the election of Pope Benedict XVI in 2005. The top day for Judaism is August 8 2000, following Al Gore's nomination of Senator Joseph Lieberman as his running mate, making Lieberman the first Jewish candidate on a major party ticket. The top day for Hindus is May 29 1998, in the wake of nuclear tests by Pakistan and India.

In order to test our hypotheses about the impact of different topics on the valence of a text, we classify each article in the corpus for extremism based on the presence of particular words in the text. In their review of the literature on media portrayals of Muslims, Ahmed and Matthes (2017, 13) note that prominent US media sources contain a common theme of Muslims as "'terrorists', 'extremists', 'fundamentalists', 'radicals', and 'fanatics'." We mark any article containing one or more of these five word stems as referencing extremism.[3]

Table 1. Number of articles included in our corpus, by newspaper.

	Catholic	Jewish	Muslim	Hindu	Total
New York Times	38,288	62,568	54,850	5496	161,202
Washington Post	42,350	34,404	45,719	3104	125,577
USA Today	6291	4984	7926	462	19,663
Wall Street Journal	7126	9947	21,145	1521	39,739
Arizona Republic	37,594	5325	3100	415	46,434
Atlanta Journal-Constitution	15,564	14,429	10,406	1167	41,566
Boston Globe	31,403	20,515	15,463	1357	68,738
Denver Post	12,163	7535	5175	472	25,345
Las Vegas Review-Journal	7992	4939	2225	240	15,396
Minneapolis Star-Tribune	10,495	6203	4490	563	21,751
Philadelphia Inquirer	39,312	15,024	14,755	975	70,066
Richmond Times Dispatch	11,273	6261	6098	448	24,080
San Jose Mercury News	19,924	11,501	13,260	1442	46,127
Tampa Bay Times	46,211	11,620	10,235	920	68,986
New York Daily News	10,154	15,231	8687	524	34,596
New York Post	6195	11,431	8686	359	26,671
Philadelphia Daily News	10,292	3584	3846	180	17,902
Corpus	352,627	245,501	236,066	19,645	853,839

Table 2. Type and political leaning of newspapers included in our corpus.

	Description	Political leaning
New York Times	National	Left
Washington Post	National	Left
USA Today	National	Centrist
Wall Street Journal	National	Centrist
Arizona Republic	Regional (West)	Right
Atlanta Journal-Constitution	Regional (South)	Centrist
Boston Globe	Regional (Northeast)	Left
Denver Post	Regional (Mountain)	Left
Las Vegas Review-Journal	Regional (West)	Right
Minneapolis Star-Tribune	Regional (Midwest)	Left
Philadelphia Inquirer	Regional (Mid-Atlantic)	Left
Richmond Times Dispatch	Regional (South)	Right
San Jose Mercury News	Regional (Pacific)	Left
Tampa Bay Times	Regional (South)	Left
New York Daily News	Tabloid (NYC-based)	Centrist
New York Post	Tabloid (NYC-based)	Right
Philadelphia Daily News	Tabloid (Mid-Atlantic)	Left

We are also interested in the location of people or events described in a newspaper article. Our text-based geo-coding procedure searches for more than 1100 U.S. geographical terms: the name of any U.S. state or state capital, any U.S. city with more than 100,000 inhabitants now or in the past, as well as any city with more than 15,000 inhabitants in any of the 12 states in which one of our 17 newspapers is published. To identify foreign coverage, we search for the name of any foreign country or national capital. Many articles will contain U.S. names as well as foreign ones, so for the purpose of our analysis we mark as foreign only those that contain foreign names but no domestic ones.

Finally, we classify newspapers as left, centrist, or right based on the number of times they endorsed a Democrat or Republican for president between 1996 and 2012. We categorize them as left (right) if they endorsed Democratic (Republican) candidates four or more times over these five election cycles. All other newspapers are categorized as centrist.[4] We categorize newspapers as tabloid based on their format, with all other papers classified as national or regional broadsheets. Table 2 summarizes the type, region, and political orientation of each newspaper in our dataset.

Method

In order to analyze the tone of the coverage of religious groups in U.S. papers, we adapt automated sentiment analysis techniques developed by scholars in computational linguistics, machine learning, and business analytics. Recent years have seen rapidly growing interest among social scientists in the automated analysis of texts, with sentiment analysis prominent among the tools political scientists have used (see e.g., Grimmer and Stewart 2013; Hopkins and King 2010; Thomas, Pang, and Lee 2006; Young and Soroka 2012). However, both the method and the application presented here are new.

The basic goal of sentiment analysis is to identify whether a text is positive or negative overall. Approaches to sentiment analysis fall broadly into two categories: machine learning, where a sample of coded texts – i.e., texts whose sentiment is known – is used to train a computer to distinguish tone, and lexicon-based, where dictionaries of words with positive or negative valence are used to track the relative prominence of positive and negative

words. In this paper, we opt for a lexical approach, which has several key advantages. Among others, it is easily reproducible and generalizable across topics and newspapers, and it provides information not just on whether a text is positive or negative, but also about *how* positive or negative it is.

Lexical sentiment analysis

Computer scientists and linguists have developed many different general-purpose sentiment lexica, which often overlap surprisingly little. For instance, across the eight lexica we incorporate, just 331 words (135 positive, 196 negative) appear in every lexicon with the same polarity (positive or negative), even though all of these lexica contain at least several thousand words and none is issue- or subject-specific. Differences across lexica are attributable to several factors: the sources used to determine which words to include, the method used to determine a word's valence, and simple human errors such as mis-spelling. Whatever their cause, these differences call into question the reliability and applicability of any single lexicon.

Instead of selecting one particular lexicon, therefore, we draw on eight widely used general-purpose lexica, constructed by a range of different methods. Table B1 in the appendix lists the lexica we include. To arrive at an overall assessment of the valence of a text, our analysis below relies on an average of the scores from all eight lexica. To calculate the valence of an article according to a particular sentiment lexicon, we look at each word in the article in turn. If it is in the lexicon, we add its valence to a running count for the article.[5] However, a very long article with 10 words of positive valence may be perceived as neutral by a reader, while a single sentence with 10 such words will be read as having a strong sentiment. We therefore divide the valence sum by the total number of words in the article.

It may seem intuitively plausible that the average newspaper article would have a valence of zero, given that each lexicon contains positive, neutral, and negative words. However, as noted above, research suggests that the media covers negative stories in greater proportion to positive ones, and that its coverage of negative stories is more intense than its coverage of positive ones (cf. Garz 2014; Lengauer, Esser, and Berganza 2011; Soroka 2006). Hence, even if articles mentioning religious groups are on balance negative, it may be the case that they are no more negative than the average newspaper article. What we need, in other words, is a way to calibrate the valence measures we produce against a body of texts that is representative of U.S. newspaper coverage.

Because our databases do not permit random sampling of articles, we approximate this process by identifying a list of 17 neutral words that are relatively common in English and use these as search terms to select articles on a random distribution of topics from the same set of source newspapers, producing a 'representative corpus' of 48,135 articles (containing a total of over 35 million words),[6] whose average valence we assign a value of 0. In addition, we standardize the valence measures so that their standard deviation in the representative corpus is set to 1. These calibration parameters are then applied to each article in our religions corpus, allowing us to say not only whether an individual article is positive or negative overall, but also *how* positive or negative relative to our representative corpus of newspaper articles.[7] Moreover, the approach produces values that can be directly compared across different applications and topics, in contrast to the case-

specific, non-generalizable sentiment analysis approaches that have dominated the litera-ture until now.

Analysis and discussion

We begin by visualizing the valence distributions of articles in Figure 1. The figure displays kernel density estimates, which correspond to a smoothed histogram with the *y*-axis repre-senting probability densities and the area under the curve equal to 1.[8] The mean calibrated valence for full-text articles containing any reference to Muslims or Islam is –0.832, or over four-fifths of a standard deviation below the mean of the representative corpus. By contrast, the average valence means for articles about other religious groups are close to or above the mean of the representative corpus: for Hindus, the mean is –0.057; for Jews, it is 0.050; and for Catholics, it is 0.176. Given the distributions of valences across our corpora, the average article mentioning Muslims or Islam features a more negative tone than over 81% of all newspaper articles in our representative corpus. It is also more negative than 74% of articles mentioning Hindus, 78% of articles mentioning Jews, and 86% of articles mentioning Catholics.

Figure 2 shows monthly average valences (smoothed by using a 3-month moving average), along with an overall trend line and a vertical bar marking September 11 2001. The data show that the valence of articles mentioning Muslims has been consistently negative, whereas articles referring to Hindus, Jews, and Catholics have by comparison been much closer to neutral across time, on average. Only articles about Hindus have
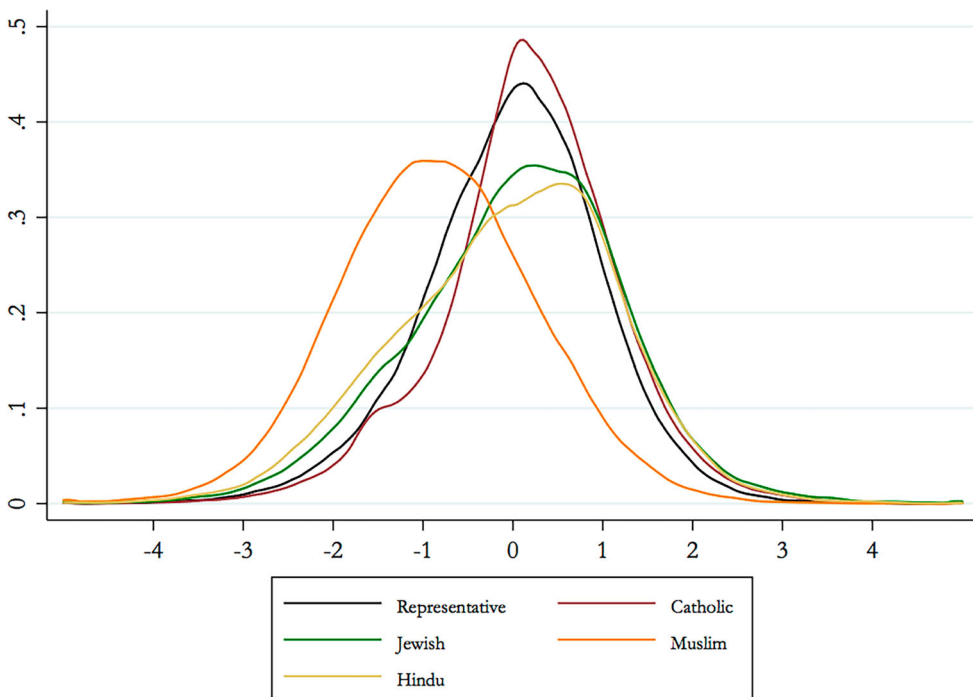

Figure 1. Valence distribution estimates (kdensity) of articles by religion compared to the representa-tive corpus.
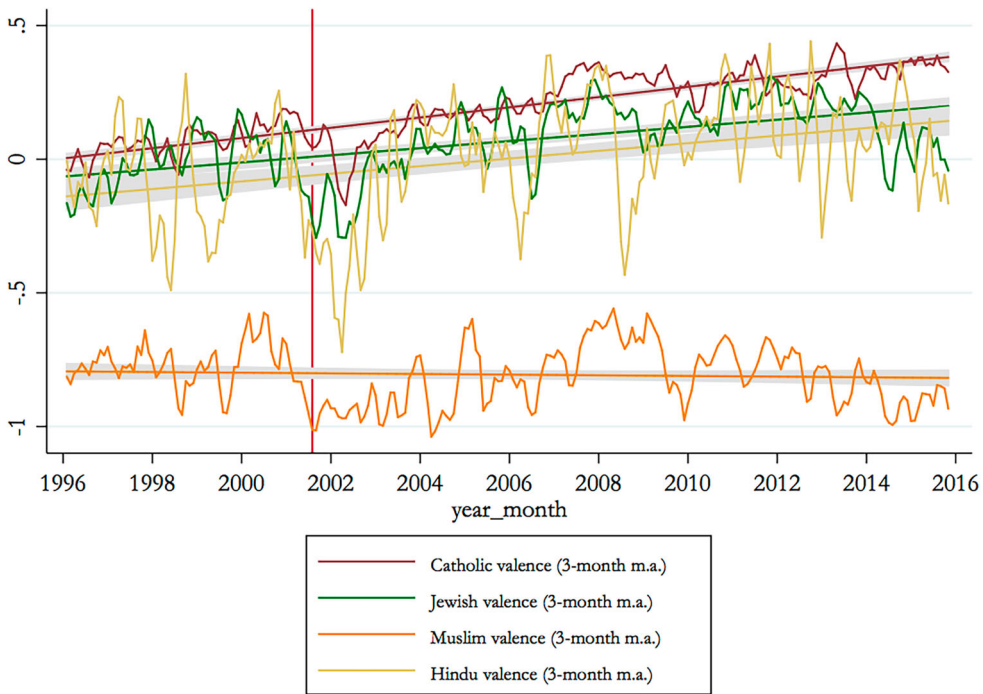
Figure 2. Three-month moving average valences of articles mentioning religious groups.

exhibited limited periods of negativity that approach the average valence level of the Muslim corpus. Moreover, while the average tone of individual articles has become noticeably more positive for Hindus, Jews, and Catholics over time, the same is not true for Muslims. As a consequence, the gap between Muslims and the other three groups has grown.

By focusing on the full text of all articles with one or more mentions of the religious group, we have consciously chosen a selection mechanism that yields a relatively positive overall valence for Muslims. For comparison, we examined the mean tone in articles that mentioned the religious group three or more times. Articles in this category are more likely to be centrally focused on the group than are articles that may simply mention the religion in passing. The mean tone of articles about Muslims with three or more mentions is –0.920, modestly more negative than is the case for the full dataset. This slight downward shift is also true for Jews (–0.016) and for Catholics (–0.131). The effect is somewhat greater for Hindus (–0.215).

In addition, we isolated the tone of the specific *sentences* that named the particular group, ignoring all sentences in each article that did not explicitly mention the group or religion. This represents the tone that readers encounter in closest proximity to the name of each religious group in any given article. This procedure yields an average valence for Catholics that is notably higher at 0.347. For Hindus and Jews, it is roughly similar to the full article valence, at –0.022 and 0.060, respectively. For Muslims, however, the mean tone is markedly lower. The average valence of sentences about Muslims is –1.102, which makes the average sentence more negative than the tone in

almost 87% of all articles in our representative corpus. In short, articles mentioning Muslims are strikingly negative in comparative perspective, and the more frequent and proximate is the mention of Muslims, the more negative is the tone. Overall, our strategy of selecting the textual sources that are comparatively most positive ought to maximize the likelihood of being able to eliminate the "Muslim gap."

Repeated exposure to negative cues associated with particular groups is likely to leave a long-term impression regardless of the conscious interpretations of the cues at the moment they are experienced (Lowery et al. 2007; Mohan et al. 2016). Our approach is particularly well-suited to capturing positive and negative shadings even in sentences or articles that may appear neutral to an average observer. However, to provide a more intuitive sense of our measures of positive and negative tone in substantive terms, Table 3 provides examples of sentences from our dataset about Muslims at a range of valences to help illustrate the distinctions in tone.

We now turn to assess the factors most closely associated with negativity in articles about Muslims, particularly compared to those about Hindus, Jews, or Catholics. To test hypotheses 1–5, we focus first on the sub-corpus of articles mentioning Muslims only. We estimate linear OLS regressions to examine the correlation between extremism, foreign stories, time period, newspaper ideology, newspaper format, and the tone of Muslim coverage. We aim to understand the extent to which each factor is associated with the tone of articles referring to Muslims, and whether the correlation is in the expected direction. Model I examines each variable without interaction terms, while Model II includes interactions to test the combination of 9/11 on the tone of articles in conservative papers and in tabloids, where we might expect 9/11 to have shifted outcomes the most. Table 4 displays the results of the regressions. The results of both models strongly support H1 and H2, as they show a large negative correlation between articles

Table 3. Sample preprocessed sentences at standard deviation valence intervals.

Valence score	Sample preprocessed sentences
−2	• That has been followed by the taking over of most of the country by the Taliban a fundamentalist Islamic movement that considers much of western culture to be evil • A Muslim man charged with setting fire to a Marietta mosque may be in the country illegally law enforcement officials confirmed Thursday
−1	• Muslims have been silent and even maybe passive members of the society Rehana Jan said • Separately Bosnian Muslims rallied yesterday to demand to return to a Serb-held town
0	• As a foreign correspondent I spent 13 of 17 years close to Muslims as a colleague and friend first at the UN then in India, Pakistan and Afghanistan • I am talking about the major world religions Judaism, Islam, and Christianity
1	• Colleagues said they expected her to ask secretary of state Colin I Powell one of the administration's most popular figures to embark on a listening tour in crucial Muslim nations • The journey is not a required part of the annual pilgrimage or hajj but many Muslims take the chance to visit Islam's second most holy site
2	• Arizona is home to infinite spiritual expressions from the centuries-old Catholic tradition brought by the early Jesuit and Franciscan priests to the Muslims who call modern-day Arizona home • Each food kit was enriched with extra vitamins and designed to be acceptable to the Muslim diet while also supplying 2300 calories enough nutrition for about a day

Table 4. Tone of US newspaper coverage of Muslims.

	(I)	(II)
Extremism	−.519	−.519
	(.004)	(.004)
Foreign	−.631	−.631
	(.007)	(.007)
Post-9/11	.031	.058
	(.006)	(.006)
Right	.118	.128
	(.008)	(.020)
Tabloid	−.414	−.162
	(.008)	(.019)
Right & Post-9/11		−.005
		(.022)
Tabloid & Post-9/11		−.310
		(.021)
Constant	−.507	−.529
	(.005)	(.006)
Adj R^2	.0872	.0882
N (newspaper articles)	236,066	236,066

Note: Each cell gives the estimated coefficients from OLS regressions, with standard errors in parentheses. All coefficients are statistically significant at the $p < .001$ level, except Right & Post-9/11, which is not statistically significant.

about extremism and articles set exclusively in foreign locations, on the one hand, and the tone of articles mentioning Muslims, on the other hand. By contrast, H4 is not supported, as articles in conservative papers did not have a more negative tone than those in other types of newspapers.

A comparison of the two models suggests that more nuance is required to assess H3 and H5. On the one hand, Models I & II show that there is no simple correlation between post-9/11 articles and a negative tone of articles about Muslims. These models also demonstrate that tabloids published articles with a more negative tone about Muslims across the entire time period. However, Model II reveals that the more negative tone of articles in tabloids is largely a product of the post-9/11 time period, suggesting a complex rather than straight-forward relationship between the post-9/11 and tabloid variables identified in H3 and H5. Overall, the results of the models presented in Table 4 show that extremism and the reporting of foreign events are associated with large negative effects on the tone of articles about Muslims, that conservative papers are not more negative than other outlets, and that tabloids are notably more negative, especially in the post-9/11 period.

These findings reveal information that speaks directly to scholarship about the factors most strongly associated with media portrayals of Muslims. They also allow us to better understand whether these factors, alone or in combination, can account for the Muslim gap. To explore this, we regress our key variables on the full dataset of articles mentioning Muslims, Hindus, Jews, and Catholics. Here we estimate the extent to which taking into account the factors identified by the theoretical literature and in Models I and II attenuates the gap in tone between Muslim articles and articles referring to the other three groups. Model III in Table 5 provides a baseline that replicates the findings of the over-time analy-sis displayed in Figure 2. It shows that compared to the tone of stories naming Hindus, Jews, and Catholics taken as a whole, stories mentioning Muslims have a significantly more negative tone.

Table 5. Tone of US newspaper coverage of Muslims, Jews, Catholics, and Hindus.

	(III)	(IV)	(V)
Muslim	−.951	−.654	−.624
	(.003)	(.003)	(.006)
Extremism		−.640	−.637
		(.003)	(.003)
Foreign		−.692	−.693
		(.005)	(.005)
Tabloid		−.402	−.393
		(.004)	(.005)
Right		.169	.180
		(.003)	(.004)
Post-9/11		.099	.111
		(.003)	(.003)
Tabloid & Muslim			.230
			(.019)
Tabloid & Muslim & Post-9/11			−.305
			(.021)
Right & Muslim			−.053
			(.020)
Right & Muslim & Post-9/11			−.008
			(.022)
Post-9/11 & Muslim			−.030
			(.007)
Constant	.118	.152	.141
	(.001)	(.002)	(.003)
Adj R^2	.1300	.1994	.1997
N (newspaper articles)	853,839	853,839	853,839

Note: Each cell gives the estimated coefficients from OLS regressions, with standard errors in parentheses. All coefficients are statistically significant at the $p < .001$ level, except Right & Muslim & Post-9/11, which is not statistically significant.

Model IV examines the relationship between the variables identified in hypotheses 1–5 and the tone of all articles, while including a dummy variable for Muslims. Before discussing Model IV, it is useful to note that articles mentioning Muslims or Islam are far more likely to contain references to extremism than are articles naming other religions or their adherents. References to extremism occur in more than 48% of all Muslim articles, but in only under 6% of Catholic articles, 17% of Jewish articles, and 24% of Hindu articles. In addition, a substantially higher percentage of articles about Muslims and Hindus compared to Jews and Catholics are set exclusively in foreign locations. Of all articles about Muslims, 11% contain references to foreign locations with no domestic references; for Hindus, it is even more common at 15%. For Jews, it is only 5% and for Catholics, a mere 2%.[9] The prominence of extremism and foreign news in the coverage of Muslims gives credence to the possibility that the negative tone associated with articles mentioning Muslims in model IV may be largely driven by a negative tone associated with these features.

Model IV shows that references to extremism and to foreign locations as well as publication in tabloids are sizably and statistically significantly negatively correlated with the tone of articles referring to all groups, while the coefficients for publication in a conservative paper or after 9/11 are smaller and are correlated with more a more positive tone. Controlling for these variables attenuates the negative Muslim coefficient, but it does not come close to eliminating it. In fact, in this model, the estimated coefficient for an article about Muslims is almost identical to that for an article about extremism. In
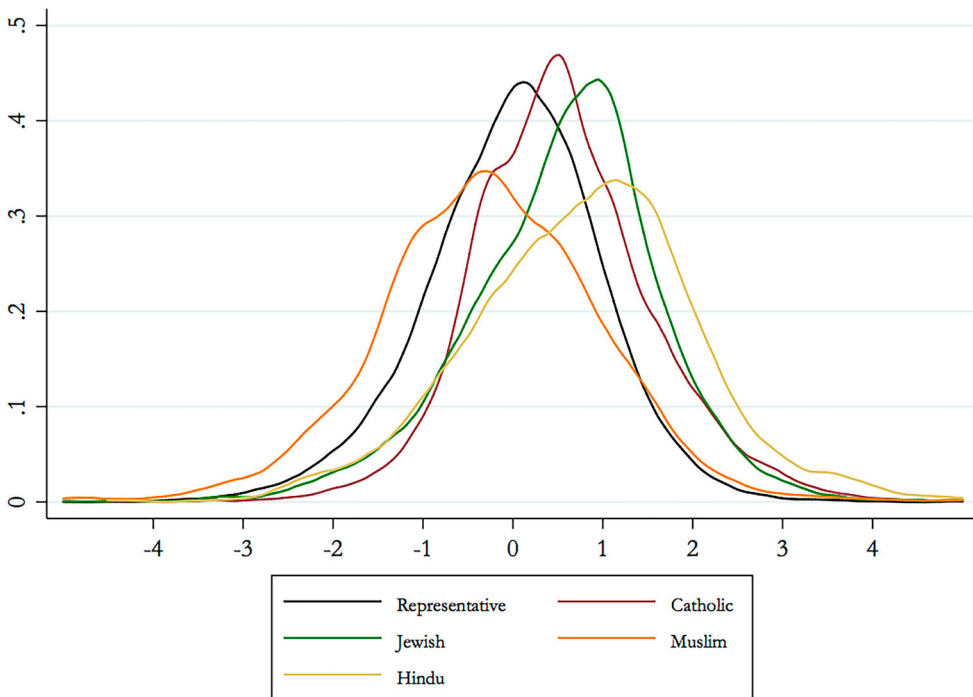
Figure 3. Valence distribution estimates (kdensity) by religion under most positive circumstances for Muslims compared to the neutral corpus.

other words, all else equal, an article about Muslims that has absolutely no references to extremism is likely to have a tone that is similar to an article about Hindus, Jews, or Catholics that contains explicit references to terrorists, extremists, fundamentalists, radicals, or fanatics.

Model V adds a series of interaction measures between tabloids, conservative papers, and post-9/11 articles to test whether coverage of Muslims by these types of papers – especially after 9/11 – is negatively correlated with the tone of articles. The results of this model show similar coefficients for extremism and foreign stories compared to Model IV. They also show a similarly negative coefficient for tabloids and a modestly positive one for conservative papers. The interaction variables indicate that coverage of Muslims in tabloids was more negative after 9/11 than before, but not that there was a comparable association in conservative papers. Stories published after 9/11 in other types of papers were generally more positive for all four groups combined, with a minute offset to that finding for post-9/11 articles mentioning Muslims.

Model V thus offers a thorough exploration of whether the key variables driving negative coverage together account for the "Muslim gap" in coverage. However, even when selecting the most positive set of circumstances for coverage of Muslims – articles containing no references to extremism, and ones not uniquely about foreign locations; articles in conservative papers and not in tabloids; and articles published after 9/11 – the predicted valence of an average article about Muslims is –0.282. In fact, as illustrated by Figure 3, the mean valence of this subset of articles is –0.256 for Muslims, compared to 0.556 for

Catholics, 0.571 for Jews, and 0.779 for Hindus. The average article mentioning Muslims under these circumstances is thus still more negative than 63% of *all* articles in our representative corpus, and is even more negative in comparison to articles referring to other religious groups under similar conditions. In sum, no set of variables we tested eliminates the "Muslim gap."

Conclusions

Our study offers a number of contributions to scholarship about media representations of Muslims. It provides the first analysis that is calibrated against a representative set of articles and that compares coverage of Muslims to that of Hindus, Jews, and Catholics. Our data demonstrate that the tone of articles mentioning Muslims is substantially more negative than the tone of average newspaper articles. The same cannot be said about coverage of Hindus, Jews, or Catholics, where the overall tone is similar to or modestly above that of our representative corpus of articles. Based on our data, we estimate that the average article about Muslims has a more negative tone than over four-fifths of all articles published in leading US newspapers during the two decades from 1996 to 2015.

We also contribute to understanding the factors that most affect this tone. Unlike in some geographic locations, conservative newspapers in our American sample do not cover Muslims more negatively than do other outlets. Nor, somewhat counter-intuitively, has there been a uniform post-9/11 downward shock in coverage of Muslims, although this effect does exist clearly in tabloids. Instead, stories about extremism and those set exclusively in foreign locations are most strongly correlated with negative coverage of Muslims. These findings lend plausibility to claims that a meaningful portion of the negative tone of newspaper articles about Muslims is due to coverage of events, even if skeptics may emphasize that journalists have a degree of choice over which stories to cover, how long and intensely to cover them, and what precise terms to use in their articles.

Most importantly, we find that controlling for all of the factors known to be associated with negativity still does not eliminate the negative tone of articles mentioning Muslims. The average story identifying Muslims is more negative than 81% of articles in our representative corpus. Even articles mentioning Muslims that contain no overt reference to extremism and are not set exclusively in a foreign location, that are in conservative papers (which are associated with a slightly more positive tone) and not in a tabloid newspaper, and that were published after 9/11 (a turning point after which stories in many newspapers became modestly more positive) still have a tone more negative than 63% of all articles in our representative corpus and are even more negative relative to the tone of comparable articles mentioning Hindus, Jews, and Catholics. The "Muslim gap" identified by our analysis is very robust. Moreover, the gap would likely be even greater if we focused on sentence-level data or if we analyzed outlets less staid than mainstream print media.

These findings have important implications. Decades of research on implicit cognition has demonstrated that unconscious factors influence attitudes and behavior toward groups of people (Freeman and Ambady 2011; Greenwald and Banaji 1995). Although no single reader can remember the details of thousands of articles mentioning Muslims, there are likely to be significant memory effects attributable to "unreportable residues of prior experiences" (Banaji, Hardin, and Rothman 1993, 272, fn 1). In experimental settings,

for example, simple differential exposure to sequences of negative, neutral, and positive words shifted the unconscious relative assessment of respondents toward stimuli images and social groups (Karpinski and Hilton 2001, 783–786; Mohan et al. 2016). These underlying dynamics suggest that there may be implicit biases within the media that influence coverage by journalists as well as attitudes of readers.

Furthermore, studies have demonstrated that media exposure reinforces racial stereotypes and that it is associated with higher racism scores (Dixon 2008). In particular, Saleem, Yang, and Ramasubramanian (2016) have shown that consuming media about Muslims in the United States is connected to stereotypical beliefs, negative emotions, and support for policies that are harmful to Muslims. Given that the media are the primary influence on Americans' opinions about Muslims (Smith 2013, 6–7), the consistently negative tone of articles likely contributes appreciably to negative public impressions of Muslims. Articles about Muslims are simply markedly more negative than comparable articles referring to Hindus, Jews, or Catholics, and compared to a representative set of articles. These observations provide reasons to believe that systematic, long-term associations between Muslims and negative words have a substantial impact on newspaper readers' beliefs, emotions, and policy preferences. While future scholarship may reveal factors that attenuate the "Muslim gap," its robustness across a wide swath of US newspapers indicates that it is an enduring, systemic, and consequential part of the American landscape.

Notes

1. Details on corpus creation and preprocessing appear in Appendix A.
2. See Appendix A for the precise search terms.
3. To assess whether these key terms omitted common and important markers of extremism, we inductively expanded the set of word stems included in the concept measure. While doing so increased the proportion of articles in our corpus identified as referencing extremism, the results of all statistical analyses remained substantively the same, as did all the key findings. Details on the method used to expand our word list and on the results of the analyses appear in Appendix F.
4. Presidential endorsement data was taken from Noah Veltman's aggregation of this information (noahveltman.com/endorsements/; last accessed December 21 2016). We also estimated ideological effects using Gentzkow and Shapiro's (2010) slant scores even though their dataset was incomplete for our purposes. The substantive findings were similar.
5. We also account for intensification and negation (intensification refers to words that modify the strength of the polarity of a word, such as the "very" in "very good"). The procedure we adopt, based on (Taboada et al. 2011), is detailed in Appendix C.
6. Corpus construction details are available in Appendix A.
7. Validation information is available in Appendix E.
8. We use the default parameters for the kdensity function in Stata: the Epanechnikov kernel, and the associated "optimal" (Silverman) bandwidth.
9. Appendix D gives a complete breakdown of the prevalence across the individual religion sub-corpora of our indicators of extremism and foreign setting, as well as the prominence of articles from tabloids, conservative papers, and the post-9/11 period in each sub-corpus.

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No potential conflict of interest was reported by the authors.

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