Metaphorical Violence in Political Discourse

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Metaphor is more than a literary device. It is a fundamental cognitive ability that drives the capacity to reason about state and actions in the world [1, 2]. Metaphor—which involves understanding of abstract concepts in terms of more basic ones—permeates political discourse [3, 4]. Its ubiquity is evident in the frequent use of statements such as “It’s time to drain the swamp”, “Obama sprinted toward victory on Election Day”, and “Trump attacks Jeff Sessions over Russian probe methods”. No one is releasing water, running, or causing physical harm. How is metaphorical violence expressed, for instance, expressions with words such as “attack”, “slaughter”, and “hit”, and how does it influence political thought and communication? Here, we describe novel time-resolved observations and explanatory dynamical models of the use of metaphorical violence language in political discourse on U.S. cable television news in the period leading up to the two most recent presidential elections. Our results quantify the details and dynamics of the use of these metaphors, revealing how cable news shows act as reporters, promoters, expectation-setters, and ideological agents in different degrees in response to differing cultural situations. Our work has implications for shaping political discourse and influencing political attitudes.

Conceptual metaphor theory holds that metaphorical statements, such as “Costs are rising,” involve structuring one concept in terms of another; in this case, costs are conceptualized in terms of physical verticality. In this way, metaphor is not just language; it is a way of thinking [1, 2, 5] and it is linked to emotions [6] and grounded in bodily experience [7]. Because metaphor is pervasive and many people care about political matters, it is useful to examine how it is used and how it might shape public opinion on matters of national or international importance, such as climate change [8] and politics [3, 9]. We are especially interested in violence metaphors in political discourse. We define *violence metaphors* as those that portray political concepts in terms of physical violence. Consider two statements from cable TV news in 2012. Both feature the word “attack”:

- (1) Because we want you to pay for your own birth control, that’s an *attack* on your womb like we’re flying a predator drone over your fallopian tubes and calling in a strike?¹
- (2) John McCain and his allies have been trying to turn the Benghazi attacks into a political scandal for the president since September.²

The first statement refers to political efforts to force employers to provide insurance that covers birth control for women. It is metaphorical because the womb is not physically assaulted. Here

¹Adam Carolla on *The O’Reilly Factor*, FOX News, September 10, 2012; <https://goo.gl/jVBsqH>

²Chris Matthews on *Hardball with Chris Matthews*, MSNBC, November 15, 2012; <https://goo.gl/Pfs4Sc>

there is a mapping from a *source domain* of violence, associated with bodily harm, wars, battles, etc., to a *target domain* of argumentation, in this case, about who should pay for birth control. The second refers literally to a terrorist attack in the town of Benghazi; clearly, it is not metaphorical.

Metaphor can heighten emotions in political communication [10]. Reporters understand this well. They use metaphor to draw attention and create a reaction in readers and listeners [3]. Americans have long been fascinated by the political theater afforded by television, and, over time, the media has come to frame debates as violent events [11]. The trend toward increased spectacle and competitive framing continues; for instance, political campaigns are often portrayed as military campaigns (see [12, 13]). In the U.S. and elsewhere, political contests are now routinely conceptualized in terms of physical actions, often taken against another, such as footraces (see [14]) or battles (see [15]). Importantly, using metaphorical violence in political discourse has real consequences on reasoning; for instance, it can increase the tendency to polarize (see [16]).

The influence and diverse range of ideological perspectives of U.S. cable television news make it an important system to understand. Interested in how metaphorically violent language would vary in reportage around debates leading up to a U.S. presidential election, we analyzed language used on the most-watched cable television news networks MSNBC, CNN, and Fox News [17]. CNN and MSNBC are on the progressive end of the ideological spectrum, and Fox News, the conservative end [18]. Right before the 2016 presidential election, 40% of Trump voters said Fox News was their primary source of news, whereas 27% of Clinton voters said theirs was MSNBC or CNN [19]. For our analysis, we analyzed the use of metaphorical violence language on two different shows from each of these three networks during September 1 to November 30 in 2012 and 2016, periods in which four major political events occurred: three presidential debates and election day.

The main questions of interest concern how metaphorical violence was used leading up to election day: Which networks produce the most metaphorical violence language? Is this consistent across years? What is the contribution of each show to total use? What is the difference in how often metaphorical violence language is used, and does this change across networks or years? Who is conceptualized more often as attacking and being attacked by metaphorical violence, and does this change across networks and time? In addition to revealing details of the use of metaphorical violence language on cable television news, informing the study of political communication and action, our results provide data for understanding a deep question in cognitive linguistics: to what extent and how does the cultural context influence which metaphors are used [20, 6]?

Our main results are a series of observations about the use of metaphorical violence language across different cultural situations and by different cultural actors. We expected metaphors to change over time in response to, or in anticipation of, the cultural events of the presidential debates and election day, and on the specific actions taken and language used by the candidates themselves. We also expected metaphor use to differ across the three networks given their differing ideologies [3], though we also expected some similarities across networks, because of shared cultural frames [6].

To address these questions, we collected data from the Internet Archive’s TV News Archive (TVNA), a curated library containing millions of short video clips from cable television news shows from the last decade. We collected data from the two most highly rated news shows on each network in each of the two study years (details in the supplement). We relied on closed caption data provided by the TVNA to create textual transcripts of each show, and searched each transcript for words that signal, or instantiate, the source domain of violence, the *violence signal*. We considered only phrases that use one of three violence signals—*attack*, *beat*, or *hit*. If a violence signal was found in an episode of a show, a human reviewer then manually decided whether it represented metaphorical

violence based on the context, annotating the text to identify subject, verb, and object of the phrase for all uses of metaphorical violence. Analyzing subject and object allowed us to determine who was portrayed as the aggressor and who was portrayed as the victim.

We collected cable television news transcripts indexed by date, network, and show. We identified and counted daily metaphorical violence use based on the violence signals *attack*, *hit*, and *beat* (see Table ??). We counted the daily instances of Democratic presidential candidates (Barack Obama in 2012 and Hillary Clinton in 2016) and Republican presidential candidates (Mitt Romney in 2012 and Donald Trump in 2016) appearing as the aggressor or victim of metaphorical violence (see Table 2). Sometimes the aggressor and victim of metaphorical violence are clear, as a reporter on CNN’s *Anderson Cooper 360* described Clinton criticizing Trump in the first debate as Clinton hitting Trump ³:

- (3) Clinton *hit* Trump for voicing support for invading Iraq and calling climate change a hoax.

The subject and object are not always explicitly specified in a single sentence, but often can be inferred. We include a reference to the video link on the Internet Archive so the reader can understand the context that leads us to our inferences. For instance, a guest on *The Rachel Maddow Show* described some of Donald Trump’s comments as a metaphorical *attack* on Hillary Clinton, without saying their names explicitly:⁴

- (4) One joke after another ...was a political attack mildly veiled in humor.

Overall, we observed 758 uses of metaphorical violence language in 2012, and 917 in 2016. In 2012, the MSNBC show *Hardball* alone contained 208 metaphorical violence uses, whereas other MSNBC shows ranged from 60 to 120. Shows on CNN were more consistent, ranging from 99 to 155, as were shows on Fox News, ranging from 130 to 219. The distribution of specific violence signals across networks and shows was similar in both 2012 and 2016: *attack* was used most, *beat* next most, and *hit* least. Interestingly, in 2012 MSNBC led in total metaphorical violence language use, and *hit* and *beat* were used more often than *attack* on that network. In both 2012 and 2016, the Republican candidate was both the aggressor and victim of metaphorical violence more often than the Democratic candidate. In 2016, Trump was characterized as doing metaphorical violence 115 times by Fox News, compared to 47 times for Clinton. This finding is consistent with other research that suggests conservatives more often conceptualize interpersonal relationships in terms of violence or are more likely to resort to violence in interpersonal relationships than progressives [21, 22].

To compare the dynamics and time-course of metaphorical violence use across the different networks, we modeled change in frequency of use as an impulse function with two states (Equation 1). We fit our dynamical model for six time series, one for each network in each study year. Bayesian multi-model inference allowed us to identify the best-fit model and to quantify the relative likelihood of other parameterizations being better (all best-fits were significant). We next calculated change in relative frequency of metaphorical violence use, or *delta*, across networks, violence signals, and clausal subject and object (Equation 2). We found both positive and negative values for *delta*, meaning that metaphorical violence language did not increase uniformly within the study period across networks and years. Fox News and CNN had negative *deltas* in 2012. In the case of Fox News in 2012, metaphorical violence language decreased starting September 9 and ending September

³https://archive.org/details/CNNW_20160928_040000_Anderson_Cooper_360/start/2820/end/2880

⁴https://archive.org/details/MSNBCW_20161021_010000_The_Rachel_Maddow_Show/start/3000/end/3060

25, the days leading up to the first presidential debate on October 3. CNN's use dipped after November 6, election day. In 2012, MSNBC was the only network with a positive change, starting on September 13 and ending September 27, just before the first debate. In 2016, *delta* was positive and larger in magnitude for all three networks, with the start date of the elevated state overlapping to a much greater degree (see Figure 1). This reflects the differences in cable news viewership between 2012 and 2016: 67.2 million watched the first Obama-Romney debate in 2012 compared with 84 million for the first Clinton-Trump debate in 2016 [23].

(a) 2012

(b) 2016

Figure 1: Observed daily frequencies (markers) and best-fit models (lines). The dynamical impulse model is given in Equation 1. In four of the six network-year pairs, there is an increase in the frequency of metaphorical violence language in the three-month study period: MSNBC in 2012 and all three networks in 2016. However, two of the six network-year pairs showed decreases in frequency of metaphorical violence language use in one three-month period: CNN and Fox News in 2012. Some data points (with Frequency > 7) not shown for 2016 to make a clearer comparison.

MSNBC’s positive *delta* in 2012 resulted mainly from an increased use of the signal *attack*.

Show (Network)	Total Uses
The Rachel Maddow Show (MSNBC)	93
Hardball With Chris Matthews (MSNBC)	208
Anderson Cooper 360 (CNN)	99
Piers Morgan Tonight (CNN)	118
The O'Reilly Factor (Fox News)	141
Hannity (Fox News)	133

(a) Total number of uses metaphorical violence language by news show in 2012

Show (Network)	Total Uses
The Rachel Maddow Show (MSNBC)	81
The Last Word with Lawrence O'Donnell (MSNBC)	115
Anderson Cooper 360 (CNN)	145
Erin Burnett OutFront (CNN)	155
The O'Reilly Factor (Fox News)	202
The Kelly File (Fox News)	219

(b) Total number of uses metaphorical violence language by news show in 2016

Table 1: Total uses by show in each of the two study years

There was no change in use of the signal *hit* on MSNBC. CNN's use of *hit* and *attack* decreased by about 80%. On Fox News in 2012, most of the decrease in overall metaphorical violence use resulted from decreases in the use of *hit* and *beat*, with *attack* use remaining nearly constant. In 2016, *deltas* were positive for all networks. All *deltas* were positive for violence signals as well, with one exception: MSNBC's use of *hit* fell by 63%. MSNBC's use of *beat* and *hit* increased by a factor of 2. In 2016, CNN's use of *attack* accounted for most of its overall increase in metaphorical violence language use, and for Fox News, use of *attack* increased by nearly 300%.

In 2012, the candidates were involved in less of the metaphorical violence than in 2016 (Table 2). Two of the three networks showed a decrease in overall metaphorical violence use at some point in the three-month study period in 2012. Even the increase in use on MSNBC was not as pronounced in 2012 as it was in 2016, with a *delta* of 0.59 in 2012 and 1.14 in 2016. Changes in frequency of metaphorical violence language use were uniformly positive and larger in magnitude in 2016.

What might have caused the difference in timing and magnitude of changes in the level of metaphorical violence usage between 2012 and 2016? Fox News' decrease in metaphorical violence usage preceding the first debate seems to fit with the traditional role of lowering passions and expectations, and casting one's preferred candidate as the underdog [11]. This explanation is supported by the content of the metaphors themselves. For example, on the September 17 episode of *Hannity*, Sean Hannity said,

(5) I want to see Romney *hit* harder. I want to see him ...take it right to (Obama).

A panelist followed up, telling Hannity, "If Romney had your passion, if Romney had your intelli-

Subject/Object	Network	$f^{(1)}$	$f^{(2)}$	reactivity	total uses
Subject=Barack Obama	MSNBC	0.47	0.38	-0.04	26
	CNN	0.58	0.12	-0.23	30
	Fox News	0.55	0.50	-0.02	31
Subject=Mitt Romney	MSNBC	0.51	0.77	0.13	33
	CNN	0.72	0.00	-0.36	36
	Fox News	0.52	0.57	0.02	31
Object=Barack Obama	MSNBC	0.65	0.69	0.02	41
	CNN	0.74	0.00	-0.37	39
	Fox News	0.54	0.50	-0.02	33
Object=Mitt Romney	MSNBC	0.63	0.77	0.07	41
	CNN	0.81	0.11	-0.35	44
	Fox News	0.83	0.79	-0.02	51

(a) 2012

Subject/Object	Network	$f^{(1)}$	$f^{(2)}$	reactivity	total uses
Subject=Hillary Clinton	MSNBC	0.23	0.32	0.05	17
	CNN	0.32	0.72	0.20	32
	Fox News	0.30	1.38	0.54	47
Subject=Donald Trump	MSNBC	0.74	1.21	0.24	60
	CNN	1.03	2.34	0.66	103
	Fox News	0.84	3.23	1.20	115
Object=Hillary Clinton	MSNBC	0.28	0.41	0.07	22
	CNN	0.33	1.00	0.33	41
	Fox News	0.51	1.54	0.51	60
Object=Donald Trump	MSNBC	0.25	0.66	0.20	28
	CNN	0.69	1.07	0.19	56
	Fox News	0.87	2.04	0.58	87

(b) 2016

Table 2: Uses and *delta* for Republican and Democratic candidates as subject and object of metaphorical violence.

gence, he would have a shot.”⁵ Then the next day, a contributor on *The O’Reilly Factor* said,

(6) Romney is not projecting strength. He put out a statement, he got *attacked*, and he crawled

⁵<https://goo.gl/mc8aXk>

into a hole. He should have kept moving forward with what he was saying.⁶

The underdog strategy worked: Romney enjoyed a boost in the polls after the first debate. Before the debate, only 29% of survey respondents expected Romney would “do a better job” in the debate. After the debate, 72% of those who watched it thought Romney did a better job [24].

The increase in MSNBC’s usage of metaphorical violence began September 13 and continued for two weeks in response to a statement made by Mitt Romney criticizing the Obama administration’s response to terrorist attacks on a U.S. compound in Benghazi, Libya. Romney called the administration’s response “disgraceful” and claimed they “sympathize with those who waged the attacks.” On September 13, Rachel Maddow described this statement as both “*attacking*” President Obama and

(7) *attacking* U.S. diplomatic personnel in the places that were being attacked.⁷

Maddow went on to quote a “senior republican foreign policy adviser” who said the Romney campaign was “just trying to score a cheap news cycle *hit* based on the embassy statement and now it’s just completely blown up.” On the same day, Chris Matthews wondered on *Hardball*,

(8) who is pushing that and saying, ‘release the statement, *attack, attack, attack*’?⁸

As described, 2016 differed from 2012 in quantity and dynamics of use of metaphorical violence on cable television news. We now consider specific examples of metaphor use in 2016. Donald Trump made aggression an explicit character feature early on in the primary election campaign, claiming in January 2016, “I could stand in the middle of Fifth Avenue and shoot somebody and I wouldn’t lose any voters, OK?”⁹ Many of Trump’s statements against others either originated on Twitter or were echoed on Twitter. These statements were reported in cable news as metaphorical violence. Below we first give some examples demonstrating the themes of metaphorical violence that made up the higher use for the three cable news networks we studied. As tweeting seemed to show up regularly in 2016, we end by calculating models relating metaphorical violence frequency to candidate tweeting.

In playing its role as cheerleaders and expectation-setters, CNN and Fox News anticipated a first debate where much metaphorical violence would be done by each candidate. This anticipation partly caused increased metaphorical violence usage. Fox News and CNN increased metaphorical violence use just before the first presidential debate. It seems news outlets were expecting debates that resembled violence, not taking the underdog strategy for either candidate as in 2012. Both CNN and Fox News noted the novelty of having a debate between candidates of different genders, and the new experience for Trump of debating a woman “of his same generation.” On *Anderson Cooper 360* on CNN, various commenters said the following¹⁰

(9) Is he going to *hit* back if *attacked* tomorrow, or even if not *attacked*?

(10) There’s a gender dynamic going on here. It’ll be interesting to see whether he *attacks* her the way he *attacked* “Little” Marco (Rubio).

⁶<https://goo.gl/HJ6BWu>

⁷<https://goo.gl/QD2SFv>

⁸<https://goo.gl/DQULSG>

⁹https://www.realclearpolitics.com/video/2016/01/23/trump_i_could_stand_in_the_middle_of_fifth_avenue_and_shoot_somebody_and_i_wouldnt_lose_any_voters.html

¹⁰https://archive.org/details/CNNW_20160926_000000_Anderson_Cooper_360

- (11) (Trump) thrives on the *attack* ...how that will work out when it's a woman of his same generation ...that will be dramatic.

The same broadcast mentions a Trump tweet that referenced Gennifer Flowers' affair with Bill Clinton¹¹. A commentator goes on to quote Jane Goodall, who said "Trump debates like a chimp in a dominance ritual." Cooper's guest explained that Trump "is not just arguing, but intimidating" his opponents¹². On Fox news, host Megyn Kelly and guests on *The Kelly File* weighed in on debate strategy¹³:

- (12) You have a column out saying she should get in his face and stay in his face ...put him in the pain locker and shake it around. You think she should *attack, attack, and attack* some more. Doesn't she have to worry about people saying ...sexist terms like she is a shrew, she's shrill?
- (13) What she needs to do is *attack* him on many points calmly one after another.
- (14) If I was Donald Trump I would really stay away from *attacking* Hillary Clinton.

During a man-on-the-street segment on *The O'Reilly Factor*, one passerby said Clinton "*beat* the [bleep] out of Donald Trump. It was like a boxing match, Hillary hit him 1, 2, bing bing."¹⁴

In the closing minutes of the first 2016 debate, Hillary Clinton introduced the story of former Miss Universe Alicia Machado. Trump spoke out on the Fox News morning show Fox and Friends the next morning, and on Twitter over the next few days, to defend his negative view of Machado. A reporter on *Anderson Cooper 360* cast Clinton's strategy as metaphorical violence on September 27

- (15) The Clinton campaign had an ad ready to *hit* Trump¹⁵.

On September 30, in the third of a series of three tweets about Machado, Trump called Machado "disgusting" and told readers to "check out sex tape."¹⁶ The following quotes from the September 30 episode of *Erin Burnett OutFront*¹⁷ demonstrate how metaphorical violence was used to describe the exchange of words on this issue, and the candidates' reactions and counter-reactions:

- (16) Did the debate hurt Donald Trump and are his *attacks* on a former Miss Universe taking a toll?
- (17) In a statement (Machado) says Trump's latest *attacks* are cheap lies with bad intentions.
- (18) Trump is also *attacking* the media.
- (19) Tonight Hillary Clinton hammering Donald Trump for his *attacks* on former Miss Universe Alicia Machado.

Regarding Trump's tweets, Clinton herself asked at a campaign rally, "Who gets up at three o'clock in the morning to engage in a Twitter *attack* against a former Miss Universe?"¹⁸

¹¹https://archive.org/details/CNNW_20160926_000000_Anderson_Cooper_360/start/120/end/180

¹²https://archive.org/details/CNNW_20160926_000000_Anderson_Cooper_360/start/3180/end/3240

¹³https://archive.org/details/FOXNEWSW_20160926_010000_The_Kelly_File

¹⁴https://archive.org/details/FOXNEWSW_20160928_030000_The_OReilly_Factor/start/2940/end/3000

¹⁵https://archive.org/details/CNNW_20160928_040000_Anderson_Cooper_360/start/1800/end/1860

¹⁶<https://twitter.com/realdonaldtrump/status/781788223055994880>

¹⁷https://archive.org/details/CNNW_20160930_230000_Erin_Burnett_OutFront

¹⁸https://archive.org/details/CNNW_20160930_230000_Erin_Burnett_OutFront/start/1020/end/1080

Two days before the second debate, the Washington Post published a video in which Trump brags that being famous enables him to sexually assault women¹⁹. Trump apologized for those words in a video posted to Twitter that night²⁰. Along with the apology in the same video, Trump accused, “Bill Clinton has actually abused women, and Hillary has bullied, attacked, shamed, and intimidated his victims.” Two quotes from a special edition of *Last Word* illustrate the coverage of this threat using metaphorical violence²¹. This is also further evidence that cable news uses metaphorical violence in their coverage of debate preparation and in expectation-setting.

- (20) Clinton ...has already been practicing for these *attacks* from Donald Trump ...she already has her playbook.
- (21) (Clinton’s) team has been preparing for Donald Trump to throw every possible *attack* at her.

On the day of the second presidential debate, all three channels were in an elevated state of metaphorical violence usage. In pre-debate coverage on *The O’Reilly Factor*, Fox News anchor Tucker Carlson used metaphorical violence to describe his understanding of Trump’s strategy

- (22) (Donald Trump) has decided not simply to *attack* Hillary Clinton ...but to *attack* basically the entire American establishment, the press ...and basically the keepers of American standards.

Here Donald Trump is framed as a herculean aggressor, with the specific victims of his attacks being Clinton, the American establishment, the press, and those who value prototypical American norms of behavior.

The day after the second debate, Donald Trump began criticizing Paul Ryan, the Speaker of the House, on Twitter. Trump wrote, “Paul Ryan should spend more time on balancing the budget, jobs and illegal immigration and not waste his time on fighting the Republican nominee.” Trump criticized Ryan five more times in the next six days on Twitter²². All three networks reported on this exchange using metaphorical violence. Juan Williams said this on October 15 on *The O’Reilly Factor*²³:

- (23) That is something that Donald Trump is spending time on, attacking Paul Ryan because Paul Ryan is distancing himself, but he’s attacking a fellow Republican instead of broadening or shoring up his base with republicans.

In the following weeks, there were many more contentious issues that caused a series of “attacks” and counter-attacks. Among these was the Al Smith fundraising dinner, a tradition where each candidate is invited and expected to make light-hearted jokes at the other candidate’s expense. Voices on MSNBC, and on the other two networks, felt Trump’s jokes were mean-spirited and described the jokes as attacks. Here is one example from MSNBC’s in which Senator Al Franken described some of Trump’s jokes as attacks, with Clinton as the victim, at that dinner on the October 20 episode of *The Rachel Maddow Show*

¹⁹<https://goo.gl/tk3ZNf>

²⁰<https://twitter.com/realDonaldTrump/status/784609194234306560>

²¹https://archive.org/details/MSNBCW_20161008_100000_The_Rachel_Maddow_Show; although the show ID says it’s *The Rachel Maddow Show*, but it is in fact *The Last Word with Lawrence O’Donnell*

²²http://www.trumptwitterarchive.com/archive/paul%20ryan/ttff/9-1-2016_11-30-2016

²³https://archive.org/details/FOXNEWSW_20161016_030000_The_OReilly_Factor/start/420/end/480

(24) It takes skill to write a joke. And there were some where he just *attacked* her.

Many of these instances of metaphorical violence involve statements on Twitter. To understand the link between candidate tweeting and metaphorical violence usage, we fit a series of linear regressions with classes of metaphorical violence usage as the dependent variable and daily tweets issued by major candidates as the independent variable. This analysis also provides a further quantification of how broader cultural trends affect the timing and amount of metaphorical violence usage. This analysis demonstrates that metaphorical violence can be used as an indicator of communicative efficacy. In this case, metaphorical violence use provides a yardstick for the impact of candidate Twitter use in both election years. Our analysis confirms that, compared to 2012, 2016 was the year of the “Twitter Election” [25], using metaphorical violence as a measure of Twitter impact.

In 2016, all linear model fits were significant across categories of metaphorical violence (Table 3). In 2012, there were still a number of statistically significant fits, but much less variance could be explained through Twitter use. About 1/4 of metaphorical violence use across all categories can be predicted from either Hillary Clinton’s or Donald Trump’s Twitter use in 2016. Across both years and all candidates, CNN was most reactive to Twitter use. Candidate Twitter use explained between 17% and 26% of the variance in metaphorical violence where the candidates were either the subject or object of metaphorical violence in both years.

Met. Vi. Category	(Reg. coefficient, r^2) for tweets from			
	@BarackObama	@MittRomney	@HillaryClinton	@realDonaldTrump
All	(0.01, 0.07)**	(0.11, 0.09)**	(0.05, 0.24)***	(0.08, 0.31)***
MSNBC	(0.01, 0.01)	(0.11, 0.04)	(0.02, 0.05)*	(0.07, 0.07)*
CNN	(0.02, 0.07)**	(0.14, 0.04)	(0.04, 0.20)***	(0.12, 0.15)***
Fox News	(0.01, 0.02)	(0.09, 0.02)	(0.05, 0.14)**	(0.08, 0.14)***
Self as subject	(0.01, 0.23)***	(0.06, 0.21)***	(0.01, 0.25)***	(0.03, 0.26)***
Other as object	(0.01, 0.16)***	(0.05, 0.14)***	(0.01, 0.21)***	(0.01, 0.17)***

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Table 3: Regression coefficients, r^2 , and significance indicators for linear models of metaphorical violence usage as a function of the number of tweets from individual candidates. The regression coefficient represents the additional metaphorical violence uses that occur with each message the candidate tweets. r^2 represents the fraction of variance that is represented through a linear relationship with candidate tweets. The 2016 candidates’s Twitter use had a greater impact on metaphorical violence usage than the 2012 candidates’s. In both years, Twitter use had a strong effect on metaphorical violence use where the tweeting candidate was cast as the subject of metaphorical violence, or where the other candidate was the object of metaphorical violence.

Our efficient and effective approach to data collection and annotation enables new experiments aimed at understanding the dynamic relationship of language use in the media and voter attitudes. Consider that in one large scale study, online news agencies selected which news topics would be published when, and results showed that discussion of the chosen topics on social media correlated

with publication of news stories [26]. Whereas that study took years to implement, we believe many more natural experiments can be done using the approach we have outlined here (see also [27]). To understand the impact of metaphorical violence language—or any specific sort of language—we can record data from the Internet TV News Archive, concurrently polling test subjects to record, for instance, their recent TV viewing history, political opinions, use of metaphorical violence in prompts, and support for political violence to identify correlations (as in [13]).

In summary, our data and analyses revealed similarities and differences in the use of metaphorical violence language on U.S. cable television news across networks and presidential election years. There were differences in how much metaphorical violence language was used and in the relative changes and timing of use across networks and years; for instance, in some cases, metaphorical violence language use increased around presidential debates, and in others, it decreased. There were similarities in the details of use of specific violence signals and in which party’s candidate was most involved in metaphorical violence; for instance, *attack* was used most often, and Republican candidates were represented as either the aggressor or the victim of metaphorical violence more than Democratic candidates. Thus, our study has provided detail and perspective on the workings and dynamics of metaphorical violence in political discourse. Previously, metaphorical violence was known to be a feature of political communication, but its extent and dynamics were not known. We have shown that use of metaphorical violence language can change substantially over a short period, both in amount and in kind, in response to external actions and cultural events. We have shown that different political perspectives make different use of metaphorical violence language. Yet there is still a lot more we do not know. We know little about the relationship between metaphorical violence language used on television and actual violent actions. Some may infer cause and effect, as the suggestion that observing violence in video games leads to tolerance for and actions of violence in the real world [28]. Others may simply see the use of specific metaphorical language primarily for purposes of political persuasion [10, 29]. In a time of ever-more optimization and automation, we must consider carefully how to shape political discourse to create the desired outcomes. Our results are one step in the direction of understanding how use of specific metaphorical language influences political attitudes.

Methods

Data were collected from the Internet Archive’s TV News Archive (TVNA).²⁴ Using custom software to access, annotate, and analyze TVNA data, we could effectively download, review, and code hundreds of hours of news broadcasts.²⁵ We collected data from the two most highly rated news shows on each network in each of the two study years, relying on closed caption data to create textual transcripts of each show. We searched each transcript for words that signal violence, namely, *attack*, *beat*, or *hit*. If a violence signal was found, a human reviewer then manually decided whether it represented metaphorical violence based on context, annotating the text to identify subject, verb, and object of the phrase for all uses of metaphorical violence. Annotations were stored along the transcript, date and time, show, and network to enable later analyses.

We focused primarily on three violence signals which were far the most commonly used metaphorically among a list of twenty violence words that we initially considered. Our initial list was built based on a close reading of newspapers and other online news, and cable news transcripts. We

²⁴See <https://archive.org/details/tv>.

²⁵Our custom software, Metacorps, is freely available at <https://github.com/mt-digital/metacorps>.

assume there is one best interpretation of whether or not a statement is metaphorical. For this reason, we do not calculate inter-rater reliability. We have, however, made our full datasets available, including the original phrases found in cable news transcripts containing metaphorical and non-metaphorical violence, and all our annotations (<http://mt.digital/static/data/metvi-data.tar.gz>). We provide a way to review our annotations, modify them, and re-run all these analysis through a Docker container of the Metacorps web application and a Jupyter notebook that runs all analyses. Instructions for reviewing our analyses and performing your own are in the supplement, and on GitHub at <https://github.com/mt-digital/metvi-analysis>.

We modeled change in frequency of metaphorical language use as an impulse function with two states:

$$f[t] = \begin{cases} f^{(1)} & \text{if } t \in T^{(1)} \\ f^{(2)} & \text{if } t \in T^{(2)} \end{cases} \quad (1)$$

Many more complicated models for change in frequency are possible. Here, we simply used the simplest model of change—that there is one state and then at some point later there is another. Of course, in general there may be fewer than two states or more than two states, and there is no reason to suppose there would be exactly two. Nevertheless, we have opted to use the simplest possible model, supposing there is change.

The dates for which we have data form a time series, T , of frequencies of use for each of the three networks in each of the two election years, six total. All shows do not air episodes every day. When neither of a network’s two shows aired an episode on a given day, that day is not included in T . On a day that is included in T , there may be one or two episodes, so when considering dynamics, we plot and model the frequency of metaphorical violence use per episode. Frequency is simply the number of uses in a day divided by the number of episodes of the shows in that day. The time series are modeled as beginning at a mean frequency $f^{(1)}$ (State 1), then at some point later, the mean frequency changes to $f^{(2)}$ (State 2). Model fitting amounts to categorizing dates as either belonging to State 1 or State 2. These are subsets of T , with the State 1’s dates denoted $T^{(1)}$ and State 2’s dates denoted $T^{(2)}$:

$$T^{(2)} = \{t \in T : t_{first}^{(2)} \leq t \leq t_{last}^{(2)}\}$$

and

$$T^{(1)} = T \setminus T^{(2)}.$$

To fit parameters $t_{first}^{(2)}$ and $t_{last}^{(2)}$ to the model to minimize error, we used Bayesian multi-model inference, which allowed us to quantify the likelihood that alternate parameterizations would better fit the observed data [30]. Specifically, to determine the best-fitting model, we use Bayesian multimodel inference to infer which parameters are most likely to best represent the system dynamics [30]. Choosing a model with minimum AIC when all models have the same number of parameters is equivalent to selecting the model with minimum error, or maximum log-likelihood. Using the AIC allows us to calculate the relative likelihood of different parameterizations. Once the minimum AIC is found, call it AIC_{min} , the relative likelihood that model parameterization i outperforms the model with minimum AIC is $\exp(\frac{AIC_{min} - AIC_i}{2})$. The AIC on its own tells us nothing about how well the model matches the data, only how well the model performs relative to other models. An added feature of using this inference approach is that it reveals more about the system dynamics than if

we were to simply select and use the model that minimized error. It also provides a foundation for future work that considers more complex metaphorical violence language dynamics.

Given a model we can calculate the fractional change in frequency, which we denote by *delta*:

$$delta = \frac{f^{(2)} - f^{(1)}}{f^{(1)}}. \quad (2)$$

Delta, $t_{first}^{(2)}$, and $t_{last}^{(2)}$ enable us to compare changes in metaphorical violence language frequency across the networks and over time.

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