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Beyond Fact-Checking:
Lexical Patterns as Lie Detectors in Donald Trump's Tweets

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Journalists often debate whether to call Donald Trump's falsehoods "lies" or stop short of implying intent. This article proposes an empirical tool to supplement traditional fact-checking methods and address the practical challenge of identifying lies. Analyzing Trump's tweets with a regression function designed to predict true and false claims based on their language and composition, it finds significant evidence of intent underlying most of Trump's false claims, and makes the case for calling them lies when that outcome agrees with the results of traditional fact-checking procedures.

Keywords: Donald Trump, fact-checking, journalism, lying, Twitter, truth-default theory

According to *The Washington Post*'s Fact Checker, Donald Trump has uttered more than 20,000 false or misleading statements since taking office (Kessler, Rizzo, & Kelly, 2020b). Several fact-checks of his political rallies have found that between two thirds and three quarters of his claims are false or baseless (Rizzo, 2020). Because false claims are a hallmark of the Trump presidency (Kessler, Rizzo, & Kelly, 2020a), there has been no shortage of news organizations willing to call at least one of Trump's false statements a "lie," and some publications have made liberal use of that term. But discerning honest mistakes from "willful, deliberate attempt[s] to deceive" (Baker, 2017, para. 12) requires a degree of judgment, and some newsrooms have been reluctant to infer intent. For example, *The New York Times* ran "President Trump's Lies: The Definitive List" (Leonhardt & Thompson, 2017) under Opinion (Barkho, 2018). Fact-checkers in particular have expressed concern about calling Trump's falsehoods lies (Mena, 2019, p. 668). Neither PolitiFact nor FactCheck.org makes it a regular practice to use the term (Wemple, 2017), nor does *The Washington Post*'s Fact Checker, explaining that "it is difficult to document whether the president knows he is not telling the truth" (Kessler, 2018a, para. 7).

Critics of this approach argue that failing to call a lie a lie is also misleading (Reich, 2018), making it more difficult to "evaluate the motive the president might have for telling it in the first place, and then persisting in it later" (Pierce, 2018, para. 10). For example, Trump's tweets calling CNN "fake news" often

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corresponded to developments in special counsel Robert Mueller's investigation into Russian meddling in the 2016 election (Davis & Sinnreich, 2018), a connection that went unexplored in much of the coverage. And exposing the motive for political lies is important because false information can have dire civic consequences, depriving voters of the best information available (Bok, 1989), and resulting in corrupt or incompetent governments (Hollyer, Rosendorff, & Vreeland, 2019) and bad public policies (Stolberg, 2017). Trump's falsehoods about COVID-19, for instance, helped exacerbate the pandemic (Shear, Weiland, Lipton, Haberman, & Sanger, 2020).

Given this discursive minefield surrounding Trump's public speech, the process of differentiating mere factual errors from certifiable lies, which have such "a unique forcefulness in the pantheon of synonyms for untruth" (Holan, 2018, para. 4), is a challenge that journalists will continue to face long after Donald Trump leaves office. In this article, we propose an empirical tool to supplement traditional fact-checking procedures and help resolve the debate about when to call a falsehood a lie. While journalistic fact-checking methods focus on confirming or refuting checkable claims, our focus are the lexical dimensions of truth claims. Analyzing almost 4,000 @realDonaldTrump tweets for predictable variations in the president's language that correspond to false information, we explore the potential for automated deception detection to support reasonable judgments that public officials are lying. Making those judgments could promote greater emphasis in news reporting on the strategic functions of deceptive communications, and provide voters with a clearer picture of the motives behind disinformation campaigns.

Fact-Checking Trump

Though "public figures seem to stretch the truth more or less as a matter of course" (Graves, 2016, p. 87) and certain circumstances could require presidents "to dissemble, to utter falsehoods, and to conceal their actions from both the people and Congress" (Mervin, 2000, p. 26), Trump's falsehoods merit special recognition for two reasons. First, their sheer magnitude. Trump unleashes "a tsunami of lies," media columnist Margaret Sullivan (2019a) wrote when *The Washington Post* reported that Trump had surpassed 10,000 false statements as president. "It's a deluge, a torrent, a rockslide, a barrage, an onslaught, a blitzkrieg" (para. 2). According to *The New York Times*, Trump made more false claims during his first month in office than Barack Obama had during his entire eight-year tenure (Leonhardt, Prasad, & Thompson, 2017). Second, their impact. To the extent that his administration's "alternative facts" have provided a counternarrative to mainstream journalism (Cooke, 2017), Trump has become perhaps the most "accomplished and effective liar" in American politics (McGranahan, 2017, p. 243).

Some organizations take a neutral approach to fact-checking the president. For example, the Associated Press prefers to present the facts and let readers decide for themselves whether false statements are intentional (Bauder, 2018). One AP fact-check of Trump's appearance at the 2019 Conservative Political Action Conference cited "a dizzying number of false statements" in a speech "laced with fabrication" (Freking, Yen, & Woodward, 2019, para. 1), but declined to label those statements lies. Others use a range of devices to suggest the president is lying without making the explicit accusation. For example, PolitiFact designates the biggest falsehoods "Pants on Fire" with a GIF image of its Truth-O-Meter in flames. And in December 2018, *The Washington Post* Fact Checker introduced a new rating for instances in which public officials are engaging in disinformation campaigns (Kessler, 2018b). Four-Pinocchio statements repeated more than 20 times now receive the "bottomless Pinocchio," a mountain of cartoon Pinocchio heads equivalent to the number of times a false claim has been made. Trump's list of bottomless Pinocchios includes a claim he has repeated more than 250 times—that the U.S. has started building a wall on the Mexican border (Kessler & Fox, 2020).

To be sure, such an abundance of caution stems from the complexities of fact-checking, or "reporting dedicated to assessing the truth of political claims" (Graves, Nyhan, & Reifler, 2016, p. 102). One challenge is discerning fact from opinion. Neither is difficult to define in theory. Weddle (1985), for instance, argues that facts are "states of affairs" and opinions are "human claims *about* states of affairs" (p. 19, emphasis in original). Facts are also verifiable (Graves, 2016), via either consensus definitions or empirical evidence (Schell, 1967), and are "considered to be true" (Rabinowitz et al., 2013, p. 243). Opinions, on the other hand, "incorporate varying degrees of speculation, confidence, and judgment" (Schell, 1967, p. 5). But "the line between factual claims and statements of opinion can be difficult to draw" (Graves, 2016, p. 92) in practice. For one thing, most statements resist strict categorization. For example, some are "opinionated factual statements" (Schell, 1967, p. 9), such as Trump's tweets about what a "great honor" it is to welcome guests to the White House (Trump, 2017j, 2018n); others peddle misinformation as questions rather than truth claims: "Did Hillary Clinton ever apologize for receiving the answers to the debate? Just asking!" (Trump, 2017e); and others weave misinformation into "otherwise truthful statements" (Clementson, 2016, p. 253), such as Trump's claim to have "created" a million jobs as president when employment rates had been trending upward throughout Obama's second term (Kessler, 2017b).

Trump and "Truth-Default Reporting"

Another challenge of fact-checking, one that raises both practical and political concerns, is determining the motive behind a false claim: honest mistake or strategic misrepresentation? Because "assessing the intent or subtext behind a piece of partisan rhetoric" is standard fact-checking procedure (Graves, 2016, p. 114) and subjectivities are intrinsic to news reporting (Gutsche, 2018), some feel justified inferring intent to deceive from Trump's penchant for spreading misinformation despite repeated corrections (Farhi, 2019; Pickman, 2017). But journalism is a "discipline of verification" (Kovach & Rosenstiel, 2007, p. 5), and calling false statements "lies" is a factual and moral judgment (Baker, 2017) that others believe opens the door to unintended consequences like editorial overreach and accusations of bias (Greenberg, 2017).

Levine's (2014) truth-default theory that people presume others are honest after "failure to obtain sufficient affirmative evidence for deception" (p. 380) helps explain this latter brand of truth-default reporting, in which the standard for identifying objective lies is so difficult to meet that some journalists default, more often than not, to terms that encompass other possibilities. This does not suggest that journalists believe or indicate the statements are true, but that false information is attributed to error or intentional deception, leaving open the prospect that speakers are sharing honest, if inaccurate, perceptions. From a practical standpoint, this approach ensures that reports are accurate if sources misspeak or believe their own erroneous comments. For example, White House aides have challenged media calling several of Trump's statements lies on the grounds that Trump did not know he was sharing misinformation (Blake, 2019b; Johnson, 2016).

Truth-default reporting works because "most communication is honest most of the time" (Levine, 2014, p. 379). For example, 75% of Barack Obama's fact-checked claims as president were true (or at least half-true), according to PolitiFact (PolitiFact, 2019a). But what if a source is dishonest most of the time? What if, like Trump, three quarters of their claims are false (PolitiFact, 2019b)? Levine (2014) argues that potent triggers, such as suspicion of malicious intent and concrete proof of it, can result first in abandoning the truth-default state and second in inferring deception. In Trump's case, many journalists seem to have crossed the former threshold, "no longer bothering to grant Trump the benefit of the doubt" (Farhi, 2019, para. 3) that his pronouncements are true (although a significant number of major news outlets continue, at the time of writing, to publish headlines and social media posts quoting or restating Trump's claims without evaluating or clarifying their truth status). But crossing the second threshold, from suspecting lies to inferring and calling them out, requires "a higher standard of proof" (Kathleen Hall Jamieson at John F. Kennedy Library, 2017, 30:00).

Defining and Detecting Lies

What makes a lie, and how do fact-checkers distinguish lies from other kinds of deception? Some argue that lies are "outright falsehood[s]" told with intent to deceive (Levine, 2014, p. 380); others contend that "lying does not require an intention to deceive" (Fallis, 2009, p. 54), but rather the assertion of something one believes to be false under conditions in which the truth is expected (Fallis, 2009). Other definitions require that speakers believe their false statements will be persuasive to others (Chisholm & Feehan, 1977), though critics note such definitions would absolve habitual liars of their attempts at deception (Fallis, 2009). Lies are different from spin, which puts a favorable bias on factual information ("Spin," n.d.); from equivocation, which draws on vague language "to avoid a direct answer" (Alhuthali, 2018, p. 69); and from bullshit, which can be true or false (Frankfurt, 2005; Phillips, 2019) and aims to "create a certain impression" about the source (John, 2019, p. 12).

What most definitions have in common is the presumption that a lie is a conscious statement of false information. Past research has found "extensive evidence of cognitive processes" in the composition of lies (Bond et al., 2017, p. 674). Liars bear greater cognitive loads than truth-tellers (Bond et al., 2017; Levitan, Maredia, & Hirschberg, 2018) because lying involves "the manipulation of language and the careful construction of a story that will appear truthful" (Newman, Pennebaker, Berry, & Richards, 2003, p. 671). This distinguishes liars from both truth-tellers and bullshitters who believe their own bullshit, since belief "limit[s] the cognitive load of the person making a misleading claim" (Spicer, 2020, p. 14). Despite the effort liars put into creating the appearance of truth, however, lying can result in unconscious changes to a person's language (Dilmon, 2009), and research suggests that "their underlying state of mind may leak out through the language they use" (Newman et al., 2003, p. 672).

Working from the premise that lies require intent, semantic scholars have discovered rhetorical patterns that demonstrate a cognitive differential between true and false statements. In practice, this has often been achieved through automated deception detection (Braun, Van Swol, & Vang, 2015; Hancock, Curry, & Goorha, 2008; Levitan et al., 2018; Newman et al., 2003; Rubin & Lukoianova, 2014; Zhou, Burgoon, Nunamaker, & Twitchell, 2004) in which predictable variations in a person's word choice are shown to correspond to the presentation of false information. And empirical research has demonstrated a range of different lexical markers at work. For example, some studies have found that liars use fewer words than truth-tellers (Hauch, Blandon-Gitlin, Masip, & Sporer, 2015; Pennebaker, 2011), and others have found the opposite (Braun et al., 2015; Hancock et al., 2008; Hancock, Curry, Goorha, & Woodworth, 2004; Van Swol, Braun, & Malhotra, 2012; Zhou et al., 2004); some have found that liars use more negative emotion words (Newman et al., 2003), and others have found the opposite (Hancock et al., 2008; Hauch et al., 2015); some have found that liars use more third-person pronouns (Dilmon, 2009; Hancock et al., 2008; Hancock et al., 2004; Hauch, 2015; Pennebaker, 2011; Van Swol et al., 2012), and others have found no effects around pronoun use (Braun et al., 2015). In fact, some scholars have questioned whether a "classification of specific words to predict deception" exists (Hancock et al., 2004, p. 540). Amid such varied results, a dependable formula for automated lie-detection has yet to emerge, denying fact-checkers an empirical factor for characterizing false statements as lies.

Research Question

To determine whether text analysis can provide empirical evidence of cognitive function associated with intent to deceive, and therefore complement traditional fact-checking procedures in the evaluation of truth claims, this article will answer the following questions:

RQ1: *Does Donald Trump's language differ when he shares true and false information, and if so, to what extent?*

Results will demonstrate the potential of this approach, or lack thereof, for fact-checking Trump and other public officials.

Method

Building on Newman and colleagues' (2003) assertion that one method for determining intent to deceive is "to look at the language people use" (p. 665), our mixed-method approach aims to triangulate Trump's intent through an analysis of lexical markers associated with his true and false claims. We chose to focus on the president's statements via Twitter because, unlike his statements at rallies and news conferences, these are smaller, more efficient, and perhaps somewhat more premeditated units of analysis.

Tweets posted to the @realDonaldTrump account during the 18 months between January 20, 2017, and July 20, 2018, were downloaded using Export Tweet. This produced a data set of 3,956 tweets, which were then coded into one or more of three categories: true, false, and unverifiable. Those containing false information were identified using *The Washington Post*'s Fact Checker site. Fact Checker maintains a database of false or misleading claims that Trump has made since taking office, including those that appear in his Twitter posts. Fact Checker employs a "reasonable person" standard to evaluate claims and classifies individual statements using up to four Pinocchios: one for "some omissions and exaggerations," two for "significant omissions or exaggerations" leading to a false impression, three for "significant factual error," and four for "whoppers" (Kessler, 2017a).

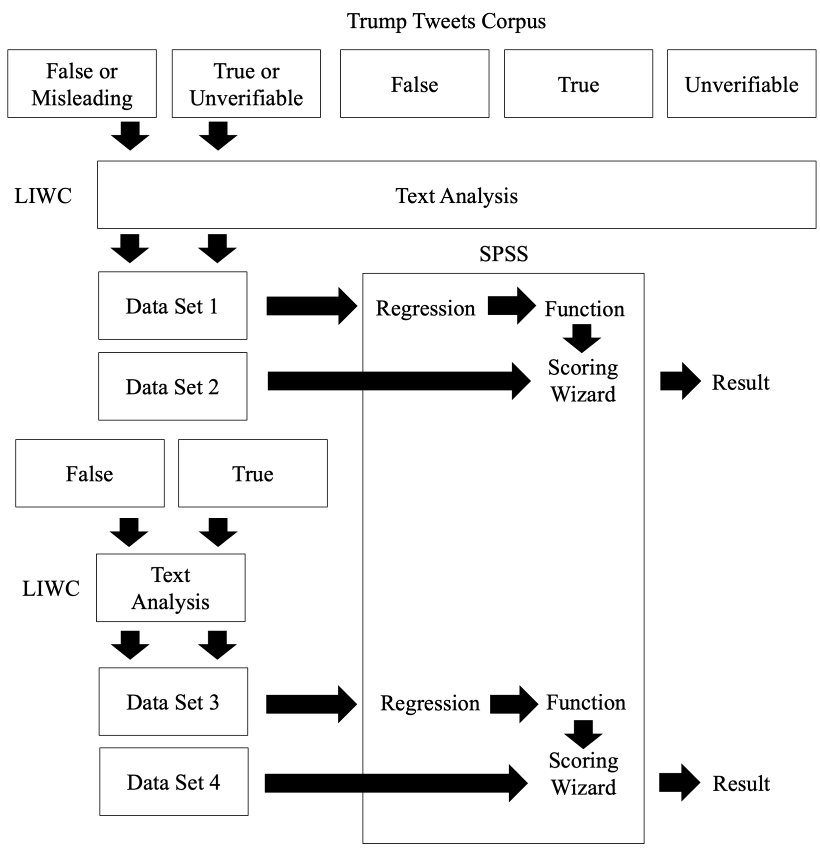

Figure 1. Workflow schematic.

Using a search feature, Fact Checker data were filtered for statements published to the president's @realDonaldTrump Twitter account and used to separate 833 tweets containing false or misleading information from the rest of the corpus. These two batches of tweets, one comprised of Trump's tweets containing false or misleading information and the other comprised of the remaining tweets, were run through Linguistic Inquiry and Word Count (LIWC; Pennebaker, Boyd, Jordan, & Blackburn, 2015), which analyzes text across almost 100 lexical dimensions, from parts of speech to cognitive, perceptual, or biological processes, time orientations, and more. Other deception-detection studies have used this program to code words into variables for predictive statistics because deviation from a speaker's typical word choice is considered an indicator of the cognitive load associated with lying (Braun et al., 2015; Hancock et al., 2008; Newman et al., 2003).

From here, the authors created two data sets, each composed of half the tweets containing false or misleading claims and half the remaining tweets. Data Set 1 was uploaded to SPSS and a forward logistical regression was performed using 36 variables derived from LIWC: 29 based on previous research (Newman et al., 2003) and, because "linguistic cues to deception are sensitive to contextual factors" (Hauch et al., 2015, p. 330), seven more to account for lexical traits common to Trump's tweets, including question marks, exclamation points, and special characters such as hash tags and @ signs. The resulting regression function was then applied to Data Set 2 using SPSS Scoring Wizard to determine whether Trump's word choice would predict the presence of false information (see Figure 1).

Because most of the tweets contained a mixture of true, false, and unverifiable claims, and that had the potential to obscure rhetorical differences between true and false statements, the authors also conducted a second, more focused analysis omitting all tweets that contained both true and false information, or whose principle claims were opinion or speculation. Adopting Fact Checker's "reasonable person" standard to make those distinctions, we determined tweets were true if their principle claims were accurate in a common-sense reading. Flourishes of opinion were acceptable if we considered the main point of the tweet factual. So, for example, true tweets included personnel or event announcements like "Just named General H. R. McMaster National Security Advisor" (Trump, 2017b) or "Going to CPAC!" (Trump, 2017c); partisan swipes like "Karen Handel's opponent in #GA06 can't even vote in the district he wants to represent…" (Trump, 2017k); statements of gratitude or recognition like "Congratulations to Roy Moore and Luther Strange for being the final two and heading into a September runoff in Alabama. Exciting race!" (Trump, 2017o); and issue statements like "President Xi and I are working together to give massive Chinese phone company, ZTE, a way to get back into business, fast. Too many jobs lost in China. Commerce Department has been instructed to get it done!" (Trump, 2018e).

We also included claims about impending events that were neither prediction nor speculation like "I will be interviewed by @MariaBartiromo at 6 A.M. @FoxBusiness. Enjoy!" (Trump, 2017f). When in doubt, these claims were checked in quick Internet searches. We eliminated uncheckable claims like "FAIR TRADE!" (Trump, 2018j), "MAKE AMERICA GREAT AGAIN!" (Trump, 2017i), and "A vote to CUT TAXES is a vote to PUT AMERICA FIRST" (Trump, 2017q). That distilled the data set to true tweets like the examples above and false tweets from Fact Checker's database like "Study what General Pershing of the United States did to terrorists when caught. No more Radical Islamic Terror for 35 years!" (Trump, 2017p). We then created two more data sets, each composed of half the true tweets and half the false tweets, and repeated the regression procedure on Data Set 3 and Data Set 4 to get better sense of whether Trump's word choice when he shares false information suggests the cognitive function associated with lying.

Results

Data Sets 1 and 2 were each composed of tweets coded true, false, unverifiable, or a combination of the three. These presented a challenge for machine sorting because of their lexical similarities. For example, some of the president's uncheckable claims used the kinds of negative words that past studies have associated with lying: "Some people HATE the fact that I got along well with President Putin of Russia. They would rather go to war than see this. It's called Trump Derangement Syndrome!" (Trump, 2018p). Others mixed truth and opinion: "@jimmyfallon is now whimpering to all that he did the famous 'hair show' with me," Trump wrote after *The Tonight Show* host expressed regret for playing with his coif during a "humanizing" late-night interview. "He called and said 'monster ratings.' Be a man Jimmy!" (Trump, 2018m). And others blended all three categories: "Many countries in NATO, which we are expected to defend, are not only short of their current commitment of 2% (which is low), but are also delinquent for many years in payments that have not been made. Will they reimburse the U.S.?" (Trump, 2018p). Regardless of the combination though, their varying shades of truthfulness made them difficult for the algorithm to discern from one another. Our analysis yielded no significant results, and no usable algorithm for scoring Data Set 2.

Data Sets 3 and 4 were each composed of verifiable claims. These tweets were easier for statistical programs to parse, and results show clear differences in the lexical traits of Trump's true and false statements. For starters, interrogative words (how, what, when), third-person plural pronouns, and question marks all appeared in larger percentages among false statements. For example, Trump once tweeted of Mueller's team: "When will the 13 Angry Democrats (& those who worked for President O) reveal their disqualifying Conflicts of Interest? It's been a long time now! Will they be indelibly written into the Report along with the fact that the only Collusion is with the Dems, Justice, FBI & Russia?" (Trump, 2018h). This resonates with the findings of prior research that liars use more interrogatives than truth-tellers (Levitan et al., 2018), reference others more often (Dilmon, 2009; Hancock et al., 2008; Hauch et al., 2015; Newman et al., 2003; Van Swol et al., 2012) and ask more questions (Hancock et al., 2008).

The use of terms such as "true" and "truth" were more common among false statements as well, which is consistent with Trump's offline habit of professing candor while presenting dubious information (e.g., Blake, 2019a). Facing widespread disapproval of his Twitter habits (Langer, 2017), for instance, Trump responded: "Only the Fake News Media and Trump enemies want me to stop using Social Media (110 million people). Only way for me to get the truth out!" (Trump, 2017m).

Significant distinctions emerged from analyzing individual tweets. For Data Set 3, SPSS discerned true and false tweets 92% of the time, identifying 96% of true tweets and 75% of false ones. It also produced a regression function composed of nine LIWC categories: prepositions, negative emotions, cognitive processes, discrepancies, past focus, space, commas, parentheses, and special characters (see Table 1).

Table 1. Regression Function and Outputs for Data Set 3.

Algorithm entry	Example	Beta	*p*	Exp(B)	Lower CI	Upper CI
Prepositions	to, with	−0.135	0.002	0.874	0.804	0.950
Negative emotions	hurt, ugly	−0.303	0.000	0.739	0.650	0.840
Cognitive processes	cause, know	−0.127	0.001	0.881	0.817	0.950
Discrepancies	should, would	−0.337	0.001	0.714	0.584	0.873
Past focus	ago, did	−0.232	0.000	0.793	0.710	0.886
Space	down, in	0.079	0.019	1.082	1.013	1.156
Parentheses		−0.276	0.004	0.759	0.627	0.918
Special characters	#, @	0.225	0.000	1.252	1.131	1.386
Commas		−0.099	0.019	0.905	0.833	0.984
Constant		4.555	0.000	95.116		

This algorithm was then used to score Data Set 4, for which it discerned true and false tweets 92% of the time, including 96% of true tweets and 69% of false ones (see Table 2). This improves on average lie-detection rates for human analysts (Bond & DePaulo, 2006), and lands on par with past attempts at automated lie detection (e.g., Newman et al., 2003).

Table 2. Examples of Scoring Wizard Results.

@realDonaldTrump tweets	Prediction	Confidence	Accuracy
True statements			
I promised that my policies would allow companies like Apple to bring massive amounts of money back to the United States. Great to see Apple follow through as a result of TAX CUTS. Huge win for American workers and for the USA! (Trump, 2018a)	True	83%	✓
A great honor to host and welcome leaders from around America to the @WhiteHouse Infrastructure Summit. (Trump, 2017j)	True	100%	✓
False statements			
WITCH HUNT! (Trump, 2018g)	False	100%	✓
Hard to believe that with 24/7 #Fake News on CNN, ABC, NBC, CBS, NYTIMES & WAPO, the Trump base is getting stronger! (Trump, 2017n)	True	87%	X
The Fake News Washington Post, Amazon's "chief lobbyist," has another (of many) phony headlines, "Trump Defiant As China Adds Trade Penalties." WRONG! Should read, "Trump Defiant As U.S. Adds Trade Penalties, Will End Barriers and Massive I.P. Theft." Typically bad reporting! (Trump, 2018c)	False	95%	✓

Discrepancies had the biggest effect size in predicting Trump's false tweets (b = −.337, p = .001 OR = .714, 95% CI [.584, .873]). Appearing over six times more often in false tweets, discrepancies including "could," "should," and "would" were the hinges of the president's conditional claims like "The failing @NYTimes would do much better if they were honest!" (Trump, 2017d). Negative emotion words had the next-biggest effect size (b = −.0337, p = 0.001, OR = 0.714, 95% CI [0.584, 0.873]), consistent with the results of previous studies (Dilmon, 2009; Newman et al., 2003). Liars tend to use more negative words out of frustration at having to practice deception (Dilmon, 2009). In Trump's case, negative emotions often manifested as shots at the Mueller investigation, like "A complete Witch Hunt!" (Trump, 2018d). The strongest effect size among factors predicting true tweets belonged to special characters (b = .225, p = .000, OR = 1.252, 95% CI [1.31, 1.386]). These often took the form of @ signs tagging other Twitter accounts: "Earlier today, @FLOTUS Melania and I were honored to welcome King Felipe VI and Queen Letizia of Spain to the @WhiteHouse!" (Trump, 2018l). Special characters also included hash tags: "Join me tomorrow in Duluth, Minnesota for a #MAGA Rally!" (Trump, 2018k). This suggests that hailing other people or groups tended to ground Trump's tweets in fact. Indeed, most true tweets either announced White House events, campaign rallies, personnel changes, and media interviews, or congratulated or thanked constituents or other world leaders. Few were related to policy.

Discussion and Limitations

Trump's election ushered in "perhaps the most important shift in the culture and practice of news reporting in the last century" (Russell, 2018, p. 203). Lots of news media have embraced "lie" as an apt descriptor for Trump's blatant or persistent falsehoods, and some have tweaked their methods to mitigate the effects of his deception. CNN, a frequent target of Trump's "fake news!" accusations, does a combination of both, calling out Trump's lies on opinion shows, and using chyrons to fact-check Trump in real time on the news (Mantzarlis, 2016). Though "liar" is perhaps "the most-used descriptor linked to this president" (Egan, 2019, para. 10), professional journalists remain conflicted about using the term, and euphemized coverage of the Trump administration reflects that. For example, Trump's claim that millions of noncitizens had voted in the 2016 presidential election was characterized in various headlines as "unsubstantiated," "false," "wrong," "debunked," "bogus," and "unconfirmed" (LaFrance, 2017, para. 11). *The New York Times* fact-checked and called Trump's claim about doctors "executing babies" an "inaccurate refrain" (Cameron, 2019, para. 2). And Associated Press fact checks accused the president of spreading "untruths" about the Mueller report (Yen & Woodward, 2019) and a "recitation of falsehoods that never quit" about federal aid to Puerto Rico (Woodward & Yen, 2019, para. 3).

But euphemisms blur the distinctions among differing kinds of falsehoods and obscure the speaker's motives for telling them. Though most people seem to understand that Trump is not a reliable source (Kessler & Clement, 2018), the president's accumulation of lies serves strategic functions apart from persuading voters to believe individual falsehoods. Deception "is the means to some other ends" (Levine, 2014, p. 386), and there is ample evidence that Trump's "avalanche of falsehoods" (Sullivan, 2019a, para. 2) is meant to distract from political realities the president does not like and to advance his own agenda. In 2018, for instance, Trump's lies spiked from a couple hundred a month to more than 1,000 during the month before the midterm elections (Melber, 2018), in what appears to have been an effort "to use dishonesty as a campaign strategy" (Daniel Dale, quoted in Hart, 2019, para. 10). That month alone, Trump claimed without evidence that Democrats had talked about revoking health insurance coverage for preexisting conditions (Jacobson, 2018a), opposed efforts to secure the Mexican border (Valverde, 2018), and wanted to give out free cars to undocumented immigrants (Jacobson, 2018b). Because Trump makes false claims for various reasons, not the least of which is distraction (Jurecic & Wittes, 2020), "lying works to his advantage" (Dale, quoted in Hart, 2019, para. 21) when newsrooms hesitate to call him out on it. As Sullivan (2019a) argues, it is not enough to fact-check the president; journalists have to drop the euphemisms and bring new tools and attitudes to political coverage.

Our research looked for predictable changes in Trump's language on Twitter that corresponded to false information. We found evidence of cognitive function associated with lying in more than two thirds of Trump's false claims, some of which have persisted despite dozens of fact checks. For example, Trump has claimed more than 90 times that Robert Mueller's investigative team were Democrats with partisan conflicts of interest (Kessler & Fox, 2020), including tweets like "Why aren't the 13 Angry and heavily conflicted Democrats investigating the totally Crooked Campaign of totally Crooked Hillary Clinton. It's a Rigged Witch Hunt, that's why!" (Trump, 2018i). We were able to predict that it would be false. And we detected evidence of cognitive load underlying three more of Trump's "bottomless Pinocchios": that Democrats had colluded with Russia during the 2016 campaign (Trump, 2018b); that the United States loses "hundreds of billions of dollars" on trade with China and other countries (Trump, 2018f); and that "the economy of the United States is stronger than ever before!" (Trump, 2018o), which Trump has repeated more than 360 times (Kessler et al., 2020b).

Our emphasis on Trump's statements via Twitter raises two important questions: First, does it matter that Trump's staff wrote some of his tweets? While varied styles of differing authors could mimic the semantic shifts associated with lying, it makes little practical difference who wrote which tweet. Journalists hold politicians accountable for their claims regardless of authorship. *The Washington Post* fact-checks Trump's retweets, for instance. Furthermore, lexical shifts resulting from the contributions of staff sharing true information and Trump sharing falsehoods would suggest that one or more people posting to Trump's Twitter account can distinguish between the two. Whether or not coauthors of Trump's account post falsehoods themselves or intend for Trump's posts to deceive readers, their knowing assertions of false information, when readers expect the truth, amounts to Fallis's (2009) definition of lying.

The second question that springs from our focus on Twitter is whether this mode of analysis is generalizable to other kinds of speech. While we found that hash tags and @ signs were strong predictors of true claims, lexical markers of true and false information are context dependent. In speech that includes neither of these features, other markers emerge, as previous studies demonstrate. We also see a number of similarities between Trump's tweets and his public statements that suggest his Twitter voice echoes his off-line rhetoric. For example, many of Trump's tweets like "Today, I signed an Executive Order on Improving Accountability and Whistleblower Protection at the @DeptVetAffairs" (Trump, 2017h) have comparable syntax to claims he makes at public events like "Earlier today, I signed an executive order . . . to prohibit the hoarding of vital medical equipment and supplies such as hand sanitizers, face masks, and personal protective equipment" (White House, 2020, para. 28). Other tweets comprised verbatim remarks the president has delivered at the White House or elsewhere, like his statement (White House, 2017) and subsequent tweet (Trump, 2017r) about moving the U.S. Embassy in Israel from Tel Aviv to Jerusalem. Trump also repeats a lot of the same false claims on Twitter that he does in spoken comments, suggesting that he takes an active role in the production of those tweets, and that his political persona on Twitter is similar to the one he constructs off-line.

Given both the significance of the results and the need to corroborate them with fact-checked information, our work makes a case for abandoning truth-default reporting and presuming willful deceit when evidence of cognitive load underlies claims confirmed to be false through other fact-checking procedures. Journalists can "make explicit evaluations and judgments, so long as such interpretations are grounded in fact, logic, or other objective tests" (Ward, 1999, p. 8). For example, the Associated Press has called out Trump's "racist" tweets (Whack & Bauer, 2019). Taking that approach to fact-checking Trump and other public officials could help avoid the false equivalencies between truth and lies that permeate some political reporting (Sullivan, 2019b) and focus coverage on the strategies and tactics behind the lying. We have seen good examples of this. CNN, for instance, explained that some of Trump's lies about COVID-19 were an effort to "erase" his administration's slow response to the pandemic (Dale, Cohen, Subramaniam, & Lybrand, 2020). Whether it changes votes among a polarized electorate, this paradigm shift from whether officials are lying to why they are lying could make it harder for politicians to wage unchallenged disinformation campaigns or promote policies based on disingenuous claims.

Our work follows several innovations in automated fact-checking. For example, one application can determine which statements include checkable facts and retrieve information to support or refute them from a database of fact-checked claims (Hassan, Arslan, Li, & Tremayne, 2017). Another can generate evidence to support or refute unchecked claims (Miranda et al., 2019). This article introduces another approach: using evidence of cognitive load in conjunction with the results of traditional fact-checking procedures to triangulate a speaker's intent. Because our findings differ in some respects from those of other studies (Braun et al., 2015; Hauch et al., 2015; Pennebaker, 2011) about the kinds of words liars tend to use, our work also confirms Hancock and associates' (2004) suspicions that no one set of lexical markers is the telltale sign of deception, and suggests that our approach could be helpful for identifying the lying words of differing subjects. Switching the focus from tweets to other modes of speech, this technique could be used in newsrooms to evaluate checked claims for evidence of intent to deceive in other kinds of communications. For example, a campaign beat reporter could break text from a candidate's past debates into units, run it through the programs modeled here to develop an algorithm, and use that function to determine the likelihood that false statements the candidate makes at future debates are lies. However, the need for a database of checked claims to train the algorithm and compare against the results limits its application to candidates or public officials for whom that information is available.

There are several other limitations as well. The coding process, for instance, is fraught: *The Washington Post*'s list of false or misleading statements includes true ones that Fact Checker labels "flip-flops" for giving false impressions of Trump's previous views. For example, in several tweets, Trump celebrated new stock market highs (Trump, 2017a, 2017l) after having dismissed high market value as a "bubble" throughout his campaign (Kessler & Kelly, 2017). And our procedure to distinguish between true and unverifiable statements had subjective elements as well. Rather than adopting Schell's (1967) view of truth as consensus (i.e., The capital of the United States is Washington, DC), for instance, we made room for ritual communications (Carey, 2009) that include elements of judgment such as "HAPPY BIRTHDAY to our @FLOTUS, Melania!" (Trump, 2017g). Furthermore, Trump himself is not the author of all @realDonaldTrump tweets, although comparing Fact Checker results to @TrumpOrNotBot's (McGill, 2017), estimates of the likelihood that Trump wrote a tweet suggests that he is responsible for most of the false claims published from that account. Finally, our findings here are limited to checkable claims. Our unsuccessful attempt to run a regression on Trump's unverifiable statements confirmed that "we cannot depend upon language structure to provide reliable clues to help distinguish between facts and opinions" (Schell, 1967, p. 7), and that while "automated reporting tools can handle important journalism tasks that reduce editorial workloads" (Adair, Stencel, Clabby, & Li, 2019, p. 4), human judgment remains an essential component of the verification process (Graves, 2018).

Conclusion

This research introduces a novel approach to answering the central question underpinning much analysis of the president's false statements: Are news media justified in calling them lies? Our goal here was not to prove that Trump makes false statements on purpose, but to demonstrate through established deception-detection techniques that Trump's false claims via Twitter coincide with predictable changes in the language he uses, a well-documented characteristic of lying. We argue, based on our findings here, that intent to deceive is a reasonable inference from most of Trump's false tweets, and that drawing that conclusion when the evidence warrants could help scholars and journalists alike better explain the strategic functions of political falsehoods. We acknowledge, however, that future work will have to refine this method for practical implementation in other contexts. If "presidential lies cut the legs out from under democratic processes" (Sunstein, 2020, para. 21), then it is incumbent on the press to call out disinformation, and to reveal the motives of the people who spread it. We hope our work contributes to that effort.

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Trump, D. [@realDonaldTrump]. (2017k, June 19). *Karen Handel's opponent in #GA06 can't even vote in the district he wants to represent. . . .* [Tweet]. Retrieved from https://twitter.com/realdonaldtrump/status/876900944444837890

Trump, D. [@realDonaldTrump]. (2017l, July 31). *Highest Stock Market EVER, best economic numbers in years, unemployment lowest in 17 years, wages rising, border secure, S.C.: No WH chaos!* [Tweet]. Retrieved from https://twitter.com/realdonaldtrump/status/891998881009061888

Trump, D. [@realDonaldTrump]. (2017m, August 1). *Only the Fake News Media and Trump enemies want me to stop using Social Media (110 million people). Only way for me to get the truth out!* [Tweet]. Retrieved from https://twitter.com/realdonaldtrump/status/892383242535481344

Trump, D. [@realDonaldTrump]. (2017n, August 7). *Hard to believe that with 24/7 #Fake News on CNN, ABC, NBC, CBS, NYTIMES & WAPO, the Trump base is getting stronger!* [Tweet]. Retrieved from https://twitter.com/realDonaldTrump/status/894518002795900928

Trump, D. [@realDonaldTrump]. (2017o, August 16). *Congratulation to Roy Moore and Luther Strange for being the final two and heading into a September runoff in Alabama. Exciting race!* [Tweet]. Retrieved from https://twitter.com/realdonaldtrump/status/897764432369070080

Trump, D. [@realDonaldTrump]. (2017p, August 17). *Study what General Pershing of the United States did to terrorists when caught. There was no more Radical Islamic Terror for 35 years!* [Tweet]. Retrieved from https://twitter.com/realdonaldtrump/status/898254409511129088

Trump, D. [@realDonaldTrump]. (2017q, November 29). A vote to CUT TAXES is a vote to PUT AMERICA FIRST. It is time to take care of OUR WORKERS, to protect OUR COMMUNITIES, and to REBUILD OUR GREAT COUNTRY! [Tweet]. Retrieved from https://twitter.com/realdonaldtrump/status/936014271858831361

Trump, D. [@realDonaldTrump]. (2017r, December 6). *I have determined that it is time to officially recognize Jerusalem as the capital of Israel. I am also directing the State Department to begin preparation to move the American Embassy from Tel Aviv to Jerusalem . . .* [Tweet]. Retrieved from https://twitter.com/realdonaldtrump/status/938517073508163584

Trump, D. [@realDonaldTrump]. (2018a, January 17). *I promised that my policies would allow companies like Apple to bring massive amounts of money back to the United States. Great to see Apple follow through as a result of TAX CUTS. Huge win for American workers and the USA!* [Tweet]. Retrieved from https://twitter.com/realdonaldtrump/status/953771038114045954

Trump, D. [@realDonaldTrump]. (2018b, March 11). . . . *have shown conclusively that there was no Collusion with Russia..just excuse for losing. The only Collusion was that done by the DNC, the Democrats and Crooked Hillary. The writer of the story, Maggie Haberman, a Hillary flunky, knows nothing about me and is not given access* [Tweet]. Retrieved from https://twitter.com/realdonaldtrump/status/972832210222043137

Trump, D. [@realDonaldTrump]. (2018c, April 5). *The Fake News Washington Post, Amazon's "chief lobbyist," has another (of many) phony headlines, "Trump Defiant As China Adds Trade Penalties." WRONG! Should read, "Trump Defiant as U.S. Adds Trade Penalties, Will End Barriers And Massive I.P. Theft." Typically bad reporting!* [Tweet]. Retrieved from https://twitter.com/realdonaldtrump/status/981881669593559040

Trump, D. [@realDonaldTrump]. (2018d, April 22). *A complete Witch Hunt!* [Tweet]. Retrieved from https://twitter.com/realdonaldtrump/status/988106076028653568

Trump, D. [@realDonaldTrump]. (2018e, May 13). *President Xi of China, and I, are working together to give massive Chinese phone company, ZTE, a way to get back into business, fast. Too many jobs in China lost. Commerce Department has been instructed to get it done!* [Tweet]. Retrieved from https://twitter.com/realdonaldtrump/status/995680316458262533

Trump, D. [@realDonaldTrump]. (2018f, May 16). *The Washington Post and CNN have typically written false stories about our trade negotiations with China. Nothing has happened with ZTE except as it pertains to the larger trade deal. Our country has been losing hundreds of billions of dollars…* [Tweet]. Retrieved from https://twitter.com/realdonaldtrump/status/996739372723638272

Trump, D. [@realDonaldTrump]. (2018g, May 23). *WITCH HUNT!* [Tweet]. Retrieved from https://twitter.com/realdonaldtrump/status/999282325316866048

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Trump, D. [@realDonaldTrump]. (2018i, May 29). *Why aren't the 13 Angry and heavily conflicted Democrats investigating the totally Crooked Campaign of totally Crooked Hillary Clinton. It's a Rigged Witch Hunt, that's why! Ask them if they enjoyed her after election celebration!* [Tweet]. Retrieved from https://twitter.com/realdonaldtrump/status/1001420270094168064

Trump, D. [@realDonaldTrump]. (2018j, May 31). *FAIR TRADE!* [Tweet]. Retrieved from https://twitter.com/realdonaldtrump/status/1002298565299965953

Trump, D. [@realDonaldTrump]. (2018k, June 19). *Join me tomorrow in Duluth, Minnesota for a #MAGA Rally! Tickets: http://donaldjtrump.com/rallies/duluth-mn-june-2018* [Tweet]. Retrieved from https://twitter.com/realdonaldtrump/status/1009094070638084118

Trump, D. [@realDonaldTrump]. (2018l, June 19). *Earlier today, @FLOTUS Melania and I were honored to welcome King Felipe VI and Queen Letizia of Spain to the @WhiteHouse!* [Tweet]. Retrieved from https://twitter.com/realdonaldtrump/status/1009258943175168002

Trump, D. [@realDonaldTrump]. (2018m, June 24). *.@jimmyfallon is now whimpering to all that he did the famous "hair show" with me (where he seriously messed up my hair), & that he would have now done it differently because it is said to have "humanized" me-he is taking heat. He called & said "monster ratings." Be a man Jimmy!* [Tweet]. Retrieved from https://twitter.com/realdonaldtrump/status/1011036519812030467

Trump, D. [@realDonaldTrump]. (2018n, July 2). *Today, it was my great honor to welcome Prime Minister Mark Rutte of the Netherlands, to the @WhiteHouse!* [Tweet]. Retrieved from https://twitter.com/realdonaldtrump/status/1013902140409040897

Trump, D. [@realDonaldTrump]. (2018o, July 17). *The economy of the United States is stronger than ever before!* [Tweet]. Retrieved from https://twitter.com/realdonaldtrump/status/1019230023897833479

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