RUNNING HEAD: WHO FALLS FOR FAKE NEWS?

Who falls for fake news? The roles of bullshit receptivity, overclaiming, familiarity, and analytic thinking

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Abstract

Inaccurate beliefs pose a threat to democracy and fake news represents a particularly egregious and direct avenue by which inaccurate beliefs have been propagated via social media. Here we present three studies (MTurk, N = 1,606) investigating the cognitive psychological profile of individuals who fall prey to fake news. We find consistent evidence that the tendency to ascribe profundity to randomly generated sentences – pseudo-profound bullshit receptivity – correlates positively with perceptions of fake news accuracy, and negatively with the ability to differentiate between fake and real news (media truth discernment). Relatedly, individuals who overclaim regarding their level of knowledge (i.e. who produce bullshit) also perceive fake news as more accurate. Conversely, the tendency to ascribe profundity to prototypically profound (non-bullshit) quotations is not associated with media truth discernment; and both profundity measures are positively correlated with willingness to share both fake and real news on social media. We also replicate prior results regarding analytic thinking – which correlates negatively with perceived accuracy of fake news and positively with media truth discernment – and shed further light on this relationship by showing that it is not moderated by the presence versus absence of information about the new headline's source (which has no effect on perceived accuracy), or by prior familiarity with the news headlines (which correlates positively with perceived accuracy of fake and real news). Our results suggest that belief in fake news has similar cognitive properties to other forms of bullshit receptivity, and reinforce the important role that analytic thinking plays in the recognition of misinformation.

1. Introduction

Fake news has been in the news recently. According to one analysis, Facebook engagement (likes, comments, shares) was *greater* for the most viral fake news stories than the most viral real news stories in the three months leading up to the 2016 Presidential election (Silverman, Strapagiel, Shaban, & Hall, 2016). Similarly, a recent study found that, among articles that have been subject to fact-checking, false news stories actually spread faster and wider than do true news stories (Vosoughi, Roy, & Aral, 2018). Here we seek to shed light on this phenomenon by exploring the cognitive factors that allow readers to weed out the untrue in favor of the true.

1.1. The psychology of fake news

Fake news is not a new phenomenon. Tabloid magazines have been around since the beginning of the 20th century and fake news, for example, played a role in America becoming involved in World War I (Lippmann, 1946, c/o Lazer et al., 2017). Nonetheless, fake news as it has been discussed recently (e.g., Allcott & Gentzkow, 2017; Shane, 2017) seems a new category of misinformation. Lazer et al. define fake news as:

> "… information that mimics the output of the news media in form, but not in organizational process or intent—e.g., lacking editorial norms and processes to weed out the untrue in favor of the true. Fake news is thus a subgenre of the broader category of misinformation—of incorrect information about the state of the world."

Given that the creators of fake news are not beholden to editorial norms, it is important to understand the cognitive factors that allow readers to weed out the untrue in favor of the true. In a classic study of wartime rumors, Allport and Lepkin (1945) found that individuals who had previously heard of a rumor were far more likely to believe it. This finding coincides with research on the illusory truth effect in which the repetition of, for example, obscure trivia

statements increases perceptions of accuracy (Dechene, Stahl, Hansen, & Wanke, 2010; Fazio, Brashier, Payne, & Marsh, 2015; Hasher, Goldstein, & Toppino, 1977). Extending work on the illusory truth to the domain of fake news, Pennycook, Cannon, and Rand (2018) found that simply reading a fake news headline *once* is sufficient to increase later perceptions of its accuracy. It is perhaps surprising that familiarity plays an important role in belief about fake news, given that fake news content is often quite implausible. For example, the headline "Trump to Ban All TV Shows that Promote Gay Activity Starting with Empire as President" was only rated as accurate by 5% of Pennycook et al.'s (2017) sample upon first exposure. A single prior exposure *doubled* the fraction of participants rating it as accurate - and these effects compounded with a subsequent exposure and were still present in a follow-up session one week later.

The dominant explanation for this illusory truth effect is that repetition facilitates rapid and fluent processing, which is then taken to imply that the repeated statement is true (Alter & Oppenheimer, 2009; Begg, Anas, & Farinacci, 1992; Fazio et al., 2015; Reber, Winkielman, & Schwarz, 1998; Unkelbach, 2007; Wang, Brashier, Wing, Marsh, & Cabeza, 2016; Whittlesea, 1993). Pennycook et al.'s (2018) fake news experiment indicates that this low-level fluency heuristic plays a role in accuracy judgments for even highly implausible, intensely partisan, and entirely fabricated news stories. This conclusion was supported by three notable lines of evidence: 1) The effect of repetition on accuracy judgments persisted even in cases where participants incorrectly forgot having seen the fake news item previously (i.e., the effect does not depend on explicit memory); 2) The effect of repetition was evident even in cases where participants were given political fake news stories that did *not* coincide with their political ideology (i.e., they had additional reason to reject the fake news stories apart from mere

implausibility); and 3) Explicitly warning participants that fake news stories have been disputed by third-party fact-checkers (an intervention previously used by Facebook to curb fake news) (Mosseri, 2016) did not undermine (or even interrupt) the effect of repetition. Interestingly, recent evidence indicates that the magnitude of the illusory truth effect was not moderated by an individual's cognitive style or ability (even in the context of fake news) (De keersmaecker, Roets, Pennycook, & Rand, 2018).

These findings indicate that perceptions of fake news accuracy are influenced by low-level cognitive processing mechanisms (e.g., fluency) that are not apparently interrupted by high-level reasoning processes. However, Pennycook et al. also found that participants were generally skeptical of fake news stories, and were quite effective at distinguishing real from fake news. Moreover, Pennycook et al. found that giving participants an additional reason to be skeptical of fake news (in the form of an explicit warning) *did* decrease later perceptions of fake news accuracy – it just did not interact with the boosting effect of familiarity. Thus, it appears that general skepticism may play an important role in whether people believe fake news, despite the apparent fact that familiarity increases perceptions of accuracy. Indeed, fake news may be a case where the mere propensity to think in a skeptical and analytic way is a meaningful determinant of belief and, perhaps, social media engagement.

1.2. Analytic thinking and political ideology

According to dual-process theory, human cognition can be characterized by a distinction between autonomous, intuitive (Type 1) processes and deliberative, analytic (Type 2) processes (De Neys, 2012; Evans & Stanovich, 2013; Kahneman, 2011; Pennycook, Fugelsang, & Koehler, 2015b). In an application of the broad dual-process theoretical framework, a surge of recent research has linked the propensity to engage deliberative reasoning processes (rather than relying

on “gut feelings” or intuitions) with a variety of beliefs and behaviors (Pennycook, Fugelsang, & Koehler, 2015a). Consider the following problem from the Cognitive Reflection Test (CRT; Frederick, 2005):

> A bat and ball cost $1.10 in total. The bat costs $1.00 more than the ball. How much does the ball cost?

The problem elicits a fast, intuitive response (10 cents) that, upon reflection, is obviously wrong (if the ball cost 10 cents, the bat would have to cost $1.10 and they would total $1.20). Nonetheless, the incorrect intuitive response is typically the modal response (e.g., 65% in Pennycook, Cheyne, Koehler, & Fugelsang, 2016), indicating an overall failure to engage in reflective reasoning processes (Pennycook & Ross, 2016).

It has been argued that the bat-and-ball problem – and others of its type – reflect a crucial aspect of our cognitive architecture: the willingness or propensity to think analytically (Pennycook et al., 2015). Humans are cognitive misers, in that resource-demanding cognitive processes are typically avoided (Fiske & Taylor, 2013; Stanovich, 1999; Stanovich & West, 2000). Nonetheless, some are less miserly than others and participants who do well on the CRT also perform better on rational thinking tests (Toplak, West, & Stanovich, 2014; Toplak, West, & Stanovich, 2011). Moreover, despite only consisting of three items, CRT performance predicts a wide range of psychological factors (for various theoretical reasons) – including, for example, religious and paranormal disbelief (Gervais & Norenzayan, 2012; Pennycook, Cheyne, Seli, Koehler, & Fugelsang, 2012; Pennycook, Ross, Koehler, & Fugelsang, 2016; Shenhav, Rand, & Greene, 2012), moral judgments and values (Baron, Scott, Fincher, & Metz, 2015; Paxton, Ungar, & Greene, 2012; Pennycook, Cheyne, Barr, Koehler, & Fugelsang, 2014; Royzman, Landy, & Goodwin, 2014; Royzman, Landy, & Leeman, 2015; Yilmaz & Saribay, 2017), attitudes toward science (Gervais, 2015; Shtulman & McCallum, 2014; but see Kahan et al.,

2012), altruism (Arechar, Kraft-Todd, & Rand, 2017), and smartphone use (Barr, Pennycook, Stolz, & Fugelsang, 2015), to name a few (see Pennycook, Fugelsang, et al., 2015 for a review). CRT performance predicts various outcomes even after controlling for individual differences in cognitive ability (e.g., intelligence, working memory capacity, see: Pennycook, Fugelsang, et al., 2015, Shenhav et al., 2012).

This research is consistent with a "classical reasoning" or "reflectionist" perspective wherein analytic thinking is an influential component of everyday cognition (Pennycook, 2018). However, many of the known correlates of analytic thinking consist of fully formed beliefs and preferences (e.g., religious beliefs). Less work has investigated the role of analytic thinking in the assessment of novel information – such as in the domain of fake news – which lies outside of standard judgment and decision-making tasks (but see Bouvet & Bonnefon, 2015). Moreover, the acceptance of political fake news – the category that has captured the majority of the public's attention – may be driven primarily by partisanship. For example, in the context of risk perceptions about climate science, there is evidence that the propensity to think analytically *increases* political polarization (Kahan et al., 2012; see also Drummond & Fischhoff, 2017). Similar results are found in the realm of gun control (Kahan, Peters, Dawson, & Slovic, 2017; but see Ballarini & Sloman, 2017) and selective exposure to political information (Knobloch-Westerwick, Mothes, & Polavin, 2017). Moreover, political misconceptions may be resistant to explicit corrections (Berinsky, 2015; Nyhan & Reifler, 2010; but see Ecker, Hogan, & Lewandowsky, 2017; Swire, Ecker, & Lewandowsky, 2017). In keeping with these results, and contrary to the hypothesis offered above, Kahan (2013) argues that cognitive reflection *increases* the propensity to engage in ideologically motivated reasoning – a conclusion that predicts a

positive correlation between CRT performance and perceptions of politically consistent fake news headlines.

To differentiate between these two cognitive accounts of fake news susceptibility – the classical reasoning account wherein Type 2 processing supports accurate belief formation in the context of news content and Kahan's (2017) motivated reasoning account wherein Type 2 processing is employed by political partisans to convince themselves that fake news stories that are congenial with their ideology are accurate – Pennycook and Rand (2018b) assessed the role of analytic thinking in susceptibility to fake news. In support of the classical reasoning account (and contrary to the motivated reasoning account), Pennycook and Rand found that individuals who perform better on the CRT are better able to discern between fake (false) and real (true) news headlines in the context of accuracy judgments – regardless of whether the news headlines were consistent or inconsistent with the participants' political ideology. Furthermore, media truth discernment was actually *stronger* among headlines that individuals had an ideological predisposition to accept as true.

This research indicates that fake news susceptibility is more a matter of non-reflectiveness than of political partisanship. However, it is unclear how, exactly, analytic thinking supports media truth discernment. One possibility is that individuals assess the content of the headlines and make judgments about plausibility (Pennycook & Rand, 2018b). However, another possibility is that analytic individuals use a simple source-heuristic – that is, relative to more intuitive individuals, they think fake news is less accurate because they are more likely to pay attention to the fact that fake news stories do not come from trusted sources (something that people are good at discerning, when asked; Pennycook & Rand, 2018a). There is considerable evidence that source credibility plays a role in persuasion (Landrum, Lull, Akin, Hasell, &

Jamieson, 2017; Pornpitakpan, 2004), including in political domains (Swire, Berinsky, Lewandowsky, & Ecker, 2017). It is possible that analytic thinking interacts with source credibility in the prediction of perceptions of news accuracy.

1.3. Fake news and bullshit

As noted above, fake news stories are entirely fabricated – that is, they are constructed with the goal of going "viral" on social media, and therefore (obviously) without regard for the truth. This coincides with Frankfurt's (2005) highly influential distinction between bullshit and lying: Whereas lying involves a deliberate attempt at concealing the truth, which implies a concern for the truth, bullshit is constructed absent concern for the truth. Bullshit, such as in the case of fake news, is constructed to garner attention or achieve some sort of social or political gain (regardless of its truthfulness). This distinction between lying and bullshitting is important, if understudied, as it implies that one's receptivity toward bullshit (both in terms of consuming it and generating it) may be a unique psychological factor with consequences for what people believe and how they behave (Petrocelli, 2018).

In an initial investigation of this issue, Pennycook, Cheyne, Barr, Koehler, and Fugelsang (2015) presented participants with randomly generated sentences filled with abstract buzzwords ("Hidden meaning transforms unparalleled abstract beauty") and asked them to rate how profound they thought the sentences to be. These bullshit sentences, by virtue of being random, were literally constructed without concern for the truth. Pennycook et al. found that people do, in fact, rate the sentences as at least somewhat profound and, more importantly, this tendency was associated with a variety of conceptually related variables. Specifically, bullshit receptivity was associated with increased belief in religious, paranormal, conspiratorial, and dubious health-related claims. More importantly, individuals who perform better on tests of analytic thinking,

such as the CRT, as well as intelligence measures, were less receptive to bullshit. Pennycook et al. argued that this indicates that analytic individuals are better able to detect pseudo-profound bullshit. An open question, then, is whether the association between the detection of fake news and analytic thinking is explained by bullshit receptivity (or vice versa). Or, alternatively, does bullshit receptivity play a unique role in susceptibility to fake news independent of analytic thinking?

We also set out to investigate another measure that is conceptually related to bullshit receptivity and fake news susceptibility: Overclaiming (Paulhus, Harms, Bruce, & Lysy, 2003). Overclaiming refers to the tendency for some individuals to "self-enhance" when asked about familiarity with general knowledge questions. For example, participants may be presented with a list of historical names that includes a few items that are entirely made up. Participants who overclaim indicate that they are familiar with something that does not exist. It is possible that overclaiming also plays a role in the willingness to rate fake news as accurate and to rate bullshit as profound. Moreover, analytic thinking may help guard against all three of these tendencies.

1.3. Current work

We report three studies that shed light on the relationship between susceptibility to fake news and other forms of bullshit, as well as the role that the propensity to think analytically plays in such a potential relationship. In Study 1, we establish a positive correlation between pseudo-profound bullshit receptivity, overclaiming, and perceptions of fake news accuracy, and test whether CRT mediates this relationship. In Study 2, we investigate the possibility that finding bullshit profound is merely linked with overall credulity toward news headlines, rather than fake news specifically, by including true ("real") news headlines (and again assessing the mediating role of CRT). We also shed light on *how* analytic thinking impacts fake news by investigating

whether the source of the news story and/or prior familiarity with the headline play a role in the association between CRT performance and the ability to differentiate real from fake news (as well as checking for main effects of source information and familiarity). Finally, in Study 3, we replicate Study 2's results regarding the link between pseudo-profound bullshit receptivity and selectively believing fake news by conducting a novel analysis of a previously published dataset (from Pennycook & Rand 2018).

2. Study 1

As an initial test of the potential correlation between perceptions of fake news accuracy, bullshit receptivity, and cognitive reflection, we selected six fake news items from Snopes.com, a well-known fact-checking website. The headlines were presented in the format of a Facebook post – namely, with a picture accompanied by a headline, byline, and a source (e.g., "countercurrentnews.com"). Given that much of the public's engagement with news on social media involves only reading article headlines (Gabielkov, Ramachandran, & Chaintreau, 2016), we focus on judgments about news headlines and not full articles. Bullshit receptivity was measured using the scale developed by Pennycook, Cheyne, Barr, Koehler, and Fugelsang (2015), and overclaiming was measured using a shortened version of the questionnaire developed by Paulhus, Harms, Bruce, and Lysy (2003). We predicted that perceptions of fake news accuracy would correlate negatively with performance on the Cognitive Reflection Test (CRT) and positively with bullshit receptivity and overclaiming.

2.1. Method

We report how we determined our sample size, all data exclusions, all manipulations, and all measures in the study. Our data is available online (https://osf.io/8xbhu/).

2.1.1. Participants

Our target sample for Study 1 was 400 participants from Amazon Mechanical Turk. We completed the study in two batches, separated by a week (participants could not complete the study more than once)[1]. In total, 447 participants completed some portion of the study. We had complete data for 402 participants (45 participants dropped out). The final sample (Mean age = 37.7) included 205 males and 196 females (1 did not respond to the gender question).

2.1.2. Materials

We presented participants with six news headlines that have all been deemed to be false by an independent fact-checker (snopes.com). Our news items can be found in Supplementary Materials (SM). Participants were asked the following question for each item: "To the best of your knowledge, how accurate is the claim in the above headline". They responded on the following scale: 1 – Not at all accurate, 2 – Not very accurate, 3 – Somewhat accurate, 4 – Very accurate. The order of the fake news items was randomized for each participant.

Participants completed seven items from two versions of the Cognitive Reflection Test (CRT). First, they received a reworded version of the original Frederick (2005) CRT (via Shenhav, Rand, & Greene, 2012). Second, we administered the 4-item non-numeric CRT from Thomson and Oppenheimer (2016). The two versions were strongly correlated, $r(381) = .52$, and the full 7-item CRT had acceptable reliability, Cronbach's $\alpha = .77$.

For the pseudo-profound bullshit receptivity task, participants were presented with 10 randomly generated sentences filled with abstract buzzwords (e.g., "We are in the midst of a high-frequency blossoming of interconnectedness that will give us access to the quantum soup itself") and were asked to rate how profound they took them to be on a 5-point scale (from "not

[1] The first wave was completed on April Fool's Day (April 1st) and the second was completed a week after. We ran two waves to test the hypothesis that people would be more discerning of bullshit content on April Fool's Day. There were no significant differences between our samples and they are therefore combined here.

at all profound" to "very profound"). The items were taken from Pennycook, Cheyne, Barr, Koehler, and Fugelsang (2015), Study 1.

The overclaiming questionnaire was adapted from Paulhus, Harms, Bruce, and Lysy (2003). Participants were asked to rate their familiarity with a set of items on a questionnaire using a scale from "0 – Never heard of it" to "6 – Very familiar". They were given the following instructions: "For example, if the item said 'Bill Clinton' or 'Mexico', or 'the Bible', you would probably write a '6' beside it because it is very familiar. However, if the item said 'Fred Gruneberg' (my next door neighbor) you would write a '0' to indicate you never heard of him. In other words, the difficulty of the items ranges from easy to impossible. We want to determine if individuals who are knowledgeable about one area are also knowledgeable about other areas." They were then given two lists: 1) Historical names and events, and 2) Topics in physical sciences. Participants were presented with 15 items for each, three of which were entirely made-up. Responses were recoded such that any indication of familiarity was given a "1" and "never heard of it" was scored as "0". Following Paulhus et al. (2003), we computed an overclaiming accuracy score by subtracting false alarms (indicating familiarity with something that does not exist) from hits (indicating familiarity with a genuine target).

Demographic questions came at the end of the survey. These included age, sex, education, proficiency in English, political party (Democratic, Republican, Independent, other), and two questions about the 2016 election. For this, participants were first asked to indicate who they voted for (given the following options: Hillary Clinton, Donald Trump, Other Candidate (such as Jill Stein or Gary Johnson), I did not vote for reasons outside my control, I did not vote but I could have, and I did not vote out of protest. Participants were then asked "If you absolutely

had to choose between only Clinton and Trump, who would you prefer to be the next President of the United States?".

2.1.3. Procedure

We varied the order of presentation in two respects: 1) The CRT was either presented as the very first task or following the fake news and pseudo-profound bullshit task (this had no effect), and 2) The fake news task was either before or after the pseudo-profound bullshit task. The overclaiming questionnaire was always after the three primary tasks and followed directly by demographics.

2.2. Results and discussion

Correlations among primary variables can be found in Table 1 (descriptive statistics can be found in SM). As predicted, perceived accuracy of fake news was negatively correlated with CRT performance, and positively correlated with receptivity to pseudo-profound bullshit, and the willingness to overclaim. Moreover, all four variables were independently associated with each other (Table 1, above diagonal).

Table 1. Correlations among primary variables in Study 1. Zero-order correlations (Pearson's *r*) are shown below the diagonal. Partial correlations r_p (i.e., the correlation between stated variables while controlling for the other two variables) are italicized and shown above the diagonal. $N = 402$.

	1	2	3	4
1. Fake News (perceived accuracy)	-	*-.15***	*.17****	*-.27****
2. Cognitive Reflection Test	-.30***	-	*-.14***	*.28****
3. Bullshit Receptivity	.30***	-.27***	-	*.18****
4. Overclaiming (accuracy)	-.39***	.38***	-.33***	-

$^{***}p < .001$, $^{**}p < .01$, $^{*}p < .05$

3. Study 2

Study 2 extends the findings of Study 1 in numerous ways. A limitation of Study 1 was that we only presented participants with fake news stories, and thus could not tell whether the correlations we observed were reflective of belief in news stories in general, rather than specifically about falling for fake news. To investigate this possibility, in Study 2 we included a contemporary set of real news stories (also in "Facebook format"). Similarly, we differentiated between a general tendency to see statements as profound and a particular proclivity towards pseudo-profound bullshit by including a bullshit receptivity control (Pennycook, Cheyne, Barr, Koehler, & Fugelsang, 2015). For this, participants were asked to rate the profundity of both pseudo-profound bullshit (random sentences comprised primarily of buzzwords) and prototypically profound (non-bullshit) sentences (e.g., "The first step towards getting somewhere is to decide that you are not going to stay where you are"). Together, these two extensions allowed us to investigate whether bullshit receptivity *per se* predicts perceptions of fake news accuracy *per se*. That is, profundity ratings for random sentences (i.e., bullshit receptivity) should positively predict perceived accuracy of fake news even after taking into account profundity ratings for prototypically profound sentences (i.e., the baseline tendency to rate actually profound things as profound) – but the same should not be true for perceived accuracy of real news.

In addition to these deeper investigations of the relationship between falling for fake news and pseudo-profound bullshit, Study 2 also shed further light on how cognitive reflection protects against belief in fake news. There are at least two broad ways in which this can be accomplished. First, analytic individuals may be assessing the content of the headlines and making judgments about plausibility. Second, analytic individuals may be using a simple source-

heuristic – that is, they think fake news is less accurate than more intuitive individuals because they are more likely to pay attention to the fact that fake news stories do not come from trusted sources. There is considerable evidence that source credibility plays a role in persuasion (Landrum et al., 2017; Pornpitakpan, 2004), including in political domains (Swire, Berinsky, et al., 2017). To test whether more analytic individuals rely on the source to make judgments about news accuracy, we removed the source of the news stories (both fake and real) for half of the participants. This manipulation allows us to test for an interaction between CRT and presence of the source (as predicted by the source-heuristic account of CRT-based discernment), as well as assessing the more basic question of whether showing the source makes people better at discerning fake versus real news more generally.

Furthermore, as discussed above, prior work on fake news susceptibility indicates that familiarity is used as a heuristic to infer accuracy (Pennycook et al., 2017). Thus, it is possible that analytic individuals are less susceptible to fake news because they are less likely to judge accuracy based on familiarity. To assess this possibility, we asked participants to indicate whether they were familiar with the news articles. If the negative correlation between analytic thinking and perceptions of fake news accuracy is driven by high-level assessments of plausibility, the correlation should be evident for both familiar and unfamiliar fake news stories. To facilitate this analysis, we used a set of particularly viral fake news stories (via Silverman, Strapagiel, Shaban, & Hall, 2016). This also allows us to look for a main effect of familiarity, and thereby to test whether the link between familiarity and accuracy which was been demonstrated experimentally by Pennycook et al. (2018) extends to naturally occurring familiarity judgments.

Finally, we also asked participants to indicate whether they would be willing to share the news stories on social media (e.g., Facebook, Twitter). This allows us to extend our investigation of all of the various characteristics described above from accuracy judgments to sharing intentions.

3.1. Method

We report how we determined our sample size, all data exclusions, all manipulations, and all measures in the study. Although we did create a preregistration for this experiment (which is available, along with our data, at https://osf.io/8xbhu/), it was our first time using preregistration. As a result, we did not do a particularly good job of fully and precisely articulating our analysis plan. Therefore, we will essentially ignore the analysis preregistration for Study 2, and use independent replications in Study 3 as evidence of the validity of the results.

3.1.1. Participants

Our preregistered sample for Study 2 was 400 participants from Amazon Mechanical Turk. In total, 416 participants completed some portion of the study. We had complete data for 402 participants (14 participants did not finish). The final sample (Mean age = 36.4) included 208 males and 191 females (3 did not respond to the gender question).

3.1.2. Materials

We presented participants with five stories that were factually accurate (*real news*) and five that were entirely untrue (*fake news*). Fake news stories were taken from a previous analysis of some of the most widely circulated during the 2016 Presidential election (along with contemporary real news stories) (Silverman, Strapagiel, Shaban, & Hall, 2016). Headlines were presented in a random order for each participant. All news stimuli can be found in SM. For each headline, participants answered three questions (in the following order): “Have you seen or heard

about this story before?" (response options: no / unsure / yes), 2) "To the best of your knowledge, how accurate is the claim in the above headline?" (response options: not at all accurate / not very accurate / somewhat accurate / very accurate), and 3) "Would you consider sharing this story online (for example, through Facebook or Twitter)?" (response options: I would never share something political online (data removed), no, maybe, yes).

Participants completed the CRT and bullshit receptivity tasks from Study 1. Following Pennycook, Cheyne, Barr, Koehler, and Fugelsang (2015), participants were also presented with 10 prototypically profound sentences and 10 mundane sentences (e.g., "Human cultures often differ from each other quite a bit"). The former are intended as a control for the baseline tendency to rate things as profound. The mundane sentences are filler items and will not be analyzed here.

Demographic questions came at the end of the survey and were identical to Study 1, with two exceptions: 1) The dichotomous choice between Clinton and Trump was not included, and 2) Participants were asked to indicate their political ideology with respect to economic and social issues (in two separate questions).

3.1.3. Procedure

Participants were randomly assigned to one of two conditions: 1) News stories included a source (e.g., "nytimes.com", "uconservative.com"), as in Study 1, or 2) No source was listed (we merely deleted the source from the image).

3.2. Results and discussion

As in Study 1, we found evidence for a positive association between pseudo-profound bullshit receptivity and perceptions of fake news accuracy (see Table 2). Moreover, the association between bullshit receptivity and perceived accuracy of fake news is driven by

bullshit *detection* (as opposed to a general tendency to find things profound): A regression with mean fake news accuracy judgment as the dependent variable and profundity ratings for bullshit and prototypically profound items as separate predictors found that profundity ratings for both types of items emerged as significant independent predictors: Bullshit sentences, $\beta = .12$, $SE = .04$, $p = .031$; Prototypically profound sentences, $\beta = .16$, $SE = .05$, $p = .006$. Thus, perceptions of fake news accuracy were uniquely predicted by both the tendency to fall prey to pseudo-profound bullshit and the tendency to rate things as profound. Moreover, in a second regression with media truth discernment (i.e., z-score of real news perceived accuracy minus z-score of fake news perceived accuracy; Pennycook & Rand, 2018b) as the DV, profundity ratings for bullshit sentences was a significant predictor, $\beta = -.14$, $SE = .07$, $p = .015$, but there was no such association for prototypically profound sentences, $\beta = .04$, $SE = .09$, $p = .517$.

Participants rated the real news headlines as substantially more accurate ($M = 2.64$) than the fake news headlines ($M = 1.95$), $t(401) = 20.9$, $p < .001$, $d = 1.04$ – that is, participants were fairly good are discerning fake from real. Replicating the findings of Pennycook and Rand (2018b), the type of headline (fake vs real) interacted with analytic thinking, such that CRT performance was associated with lower perceptions of fake news (but not real news) accuracy (Table 2; descriptive statistics can be found in SM). In contrast, removing the source from the news stories had no effect on perceptions of accuracy (Source: $M = 2.31$; No Source: $M = 2.27$), regardless of CRT (i.e., no main effect or interactions, F's < 1). Thus, although even particularly intuitive individuals were able to discern real from fake news overall, they were apparently not relying on a simple look-at-the-source heuristic. Rather, the correlation between the propensity to think analytically and perceptions of fake news accuracy indicates that – at least in this context –

an active reasoning strategy is (to some extent) an effective inoculation against political disinformation.

Similarly, although familiar headlines were rated as more accurate (M = 2.96) than unfamiliar ones (M = 2.15)[2], $F(1, 153) = 185.29$, $p < .001$, $\eta^2 = .55$, this familiarity effect did not interact with CRT performance (nor was there a three-way interaction between CRT, familiarity, and type of headline), $F's < 1$. That is, CRT was negatively correlated with fake news that was both familiar, $r(175) = -.23$, $p = .002$, and unfamiliar, $r(400) = -.25$, $p < .001$. There was also no association between CRT and familiarity with fake, $r(402) = -.06$, $p = .274$, or real, $r(402) = .03$, $p = .553$, news headlines. Thus, resistance to fluency effects does not appear to drive the correlation between CRT and media truth discernment. (This observation is in line with a previously observed lack of interaction between CRT and manipulated familiarity (De keersmaecker et al., 2018). Interestingly, there was an interaction between familiarity (familiar, unfamiliar) and type of news (fake, real), $F(1, 153) = 17.53$, $p < .001$, $\eta^2 = .10$, such that media truth discernment (higher ratings of accuracy for real relative to fake) was greater for headlines that participants were familiar with ($M = .82$) than for unfamiliar headlines ($M = .43$), $t(153) = 4.19$, $p < .001$, $d = .34$. (Note that the smaller degrees of freedom for these analyses is because of missing data for participants who were unfamiliar or familiar with all fake or real news items).

[2] Those who indicated being "unsure" about seeing a headline previously were coded as unfamiliar.

Table 2. Correlations (Pearson *r*) among primary variables in Study 2. Media truth discernment scores were computed by subtracting z-scores for fake news (false alarms) from z-scores for real news (hits). Participants who indicated an unwillingness to ever share political news on social media were removed from the social media sharing analysis[3]. Perceived accuracy: $N = 402$. Social media sharing: $N = 283$.

	1	2	3	4	5	6	7	8	9
1. Fake News (perceived accuracy)	-								
2. Real News (perceived accuracy)	.32***	-							
3. Media Truth Discernment (accuracy)	-.58***	.58***	-						
4. Fake News (social media sharing)	.56***	.20**	-.30***	-					
5. Real News (social media sharing)	.38***	.37***	-.02	.73***	-				
6. Media Truth Discernment (sharing)	-.24***	.22***	.39***	-.37***	.37***	-			
7. Cognitive Reflection Test	-.26***	.02	.24***	-.19**	-.13*	.08	-		
8. Bullshit Receptivity	.20***	.06	-.12*	.21**	.13*	-.10	-.27***	-	
9. Prototypically Profound Quotations	.22***	.18***	-.04	.21**	17**	-.05	-.17**	.52***	-

***$p < .001$, **$p < .01$, *$p < .05$

[3] Participants who indicated that they "would never share something political online" on the majority of items did not contribute data to the social media variables. Thus, these variables measure the willingness to share the news stories given that the individual is willing to share political news online. This led to the removal of 119 participants. Interestingly, participants who indicated a willingness to share political news online scored lower on the CRT ($M = .53$, $SD = .29$) than those who indicated that they would never share something political online ($M = .59$, $SD = .28$), $t(400) = 2.16$, $p = .031$.

Bullshit receptivity was associated with more fake news sharing on social media, whereas CRT performance was associated with a lowered willingness to share fake news (see Table 2). However, unlike for perceptions of accuracy, bullshit receptivity and CRT performance were also associated with the willingness to share real news, and neither were related to sharing discernment (real minus fake). These CRT results replicate what was found by Pennycook and Rand (2018b).

4. Study 3

Study 3 provides a replication of the results of Study 2 regarding the relationship between pseudo-profound bullshit receptivity and media truth discernment, using a different set of stimuli that were politically balanced between liberal and conservative slants (see Pennycook & Rand, 2018b).

4.1. Method

Study 3 is a novel analysis of a dataset that has been published previously as Study 1 of Pennycook & Rand, 2018b (for data and preregistration, see https://osf.io/8xbhu/). Bullshit receptivity and familiarity measures were collected in that study, but have not been previously analyzed (all analyses presented here are novel). As discussed above, we use Study 3 to assess the replicability of the bullshit and familiarity related results of Study 2 by replicating these analyses using the Pennycook & Rand, 2018b dataset.

4.1.1. Participants

Our preregistered sample for Study 3 was 800 participants from Amazon Mechanical Turk. In total, 843 participants completed some portion of the study. We had complete data for 802 participants (41 participants did not finish). The final sample (Mean age = 37.2) included 387 males and 414 females (3 did not respond to the gender question).

4.1.2. Materials and Procedure

We presented participants with 15 fake and 15 real news headlines. As mentioned, the stories were selected to be Democrat-consistent, Republican-consistent, or politically neutral (see Pennycook & Rand, 2018b for details about the pretest). Headlines were presented in a random order for each participant. Participants were asked the same three questions as in Study 2. All news stimuli can be found in SM.

Participants completed the CRT and bullshit receptivity tasks from Study 2. Demographic questions came at the end of the survey and included all political ideology questions from Studies 1 and 2.

4.2. Results and discussion

As in Studies 1 and 2, participants who rated bullshit sentences as more profound were more likely to judge fake news to be accurate (Table 3). Although there was also a slight tendency for individuals who are more receptive to bullshit to rate real news as accurate, media truth discernment (the difference between real and fake) was negatively associated with bullshit receptivity. Furthermore, profundity ratings for prototypically profound quotations were positively associated with perceived accuracy for both fake and real news – and, in fact, did not significantly associate with media true discernment. To analyze this in a different way, fake news accuracy was entered as a DV in a multiple regression model with profundity ratings for bullshit and prototypically profound items as separate predictors. Contrary to Study 2 where both scales were independent predictors, only ratings of bullshit sentences significantly predicted perceptions of fake news accuracy, $\beta = .24$, $SE = .04$, $p < .001$, whereas ratings of prototypically profound sentences did not, $\beta = .02$, $SE = .05$, $p = .560$. Interestingly, a second regression with media trust discernment as the DV found that profundity ratings for bullshit sentences was a

significant predictor, β = -.20, *SE* = .05, $p < .001$ (as in Study 2), but contrary to Study 2 there was a *positive* association for prototypically profound sentences, β = .13, *SE* = .07, $p = .001$. Thus, if anything, those who rated prototypically profound statements as profound were *better* at discerning between fake and real news once profundity rating for bullshit sentences were taken into account. Finally, as in Studies 2, bullshit receptivity was positively associated with the willingness to share both fake and real news on social media. Thus, the findings from Study 3 provide strong support for the conclusions of Study 2 regarding pseudo-profound bullshit receptivity.

Table 3. Correlations (Pearson's *r*) among primary variables in Study 3. For correlations between CRT performance and perceptions of news accuracy see Pennycook and Rand (2018b). Participants who indicated an unwillingness to ever share political news on social media were removed from the social media sharing analysis. Perceived accuracy: $N = 801$. Social media sharing: $N = 667$.

	1	2	3	4	5	6	7	8
1. Fake News (perceived accuracy)	-							
2. Real News (perceived accuracy)	.25***	-						
3. Media Truth Discernment (accuracy)	-.61***	.61***	-					
4. Fake News (sharing)	.55***	.04	-.41***	-				
5. Real News (sharing)	.26***	.25***	-.03	.68***	-			
6. Media Truth Discernment (sharing)	-.36***	.26***	.48***	-.41***	.41***	-		
7. Bullshit Receptivity	.25***	.08*	-.13***	.30***	.29***	-.02	-	
8. Prototypically Profound Quotations	.14***	.18***	.03	.23***	.29***	.08	.49***	-

***$p < .001$, **$p < .01$, *$p < .05$

Familiarity was again a strong determinant of accuracy judgments for news headlines. As in Study 2, familiar headlines were rated as more accurate (M = 3.02) than unfamiliar ones (M = 2.19), $F(1, 338) = 672.47$, $p < .001$, $\eta^2 = .67$. However, this familiarity effect did not interact with CRT performance (nor was there a three-way interaction between CRT, familiarity, and type of headline), $F's < 1.3$, $p's > .250$. There was again an interaction between familiarity (and type of news, $F(1, 338) = 11.23$, $p = .001$, $\eta^2 = .03$. However, contrary to Study 2, media truth discernment was greater for headlines that participants were *unfamiliar* with ($M = .75$) than for *familiar* headlines ($M = .59$), $t(338) = 3.35$, $p = .001$, $d = .18$. (Note that the smaller degrees of freedom for these analyses is because of missing data for participants who were unfamiliar or familiar with all fake or real news items).

5. General Discussion

Across three studies with 1606 participants, we find consistent support for an association between perceived accuracy of fake news and the tendency to rate random pseudo-profound sentences (e.g., "Wholeness quiets infinite phenomena") as profound. Furthermore, the tendency to overclaim was also associated with perceived accuracy of fake news. Although all three of these factors were also negatively correlated with the disposition to think analytically (as indexed by the Cognitive Reflection Test), all such associations were statistically independent. Thus, we provide evidence for three related factors that predict who falls for fake news: Analytic thinking, bullshit receptivity, and the tendency to overclaim.

In addition, we extend previous work showing a negative association between the tendency to think analytically and fake news susceptibility (Pennycook & Rand, 2018b). Specifically, we showed that this association was evident regardless of whether the news source was present or absent (which had no effect), and for both familiar and unfamiliar headlines

(despite familiar headlines being rated as more accurate than unfamiliar ones). These findings support the idea that analytic thinking facilitates the recognition of fake news via considerations of headline *content*, such as implausibility (Pennycook & Rand, 2018b).

5.1. Bullshit receptivity and overclaiming

According to Frankfurt (2005), bullshit is defined as something constructed without *concern* for the truth. It is in this way that bullshit is distinct from lying: Whereas the liar cares deeply about the truth (in order to subvert it), the bullshitter is relatively unconstrained. This is a very broad definition and, as a consequence, there are surely many different types of bullshit. What is less clear is whether there is a common psychological factor (or factors) that link receptivity or susceptibility to accepting different types of bullshit together. The evidence presented here suggests that this is indeed the case. Notably, the pseudo-profound bullshit investigated by Pennycook, Cheyne, et al. (2015) , which comes in the form of abstract buzzwords (common in new age publishing) that are arranged randomly in a sentence that retains syntactic structure (e.g., "We are in the midst of a high-frequency blossoming of interconnectedness that will give us access to the quantum soup itself") are quite different from fake news headlines, which do not consist of random sentences and certainly do not rely on abstract buzzwords. Nonetheless, fake news is bullshit in that it is characterized by a lack of concern or regard for the truth. Consistent with this characterization, the propensity to rate random bullshit sentences as profound was positively correlated with perceived accuracy of fake (but not real) news. In contrast, prototypically profound (non-bullshit) sentences did not consistently correlate with fake news accuracy judgments once bullshit receptivity was taken into account. Moreover, although CRT performance was negatively correlated with susceptibility to both types of bullshit, they were nonetheless independently associated with each other. This

suggests that some individuals may be better able to detect bullshit over and above their capacity or willingness to think analytically.

We also found a strong positive association between overclaiming (Paulhus et al., 2003) and perceptions of fake news accuracy. The tendency to indicate prior knowledge about fabricated historical names/events and topics in physical sciences was positively associated with perceptions of fake news accuracy (along with analytic thinking and bullshit receptivity). It seems that what Pennycook, Cheyne, et al. (2015) referred to as *reflexively* open-minded thinking – that is, being overly open and agreeable toward ideas or claims that, with some consideration, might be considered wanting – may an important underlying factor that bridge all of these different dimensions of bullshit. Indeed, recent work has also linked actively (i.e., *reflectively*) open-minded thinking with the ability to discern between fake and real news (Bronstein, Pennycook, Bear, Rand, & Cannon, 2018), although it is yet to be seen whether this mediates the associations between overclaiming, bullshit receptivity, and analytic thinking more generally.

5.2. Source credibility

In Study 1, we varied whether the source of the news articles was present or absent. This allowed us to investigate whether more analytic individuals were basing their judgments on the content of the headlines or the credibility of the news source. Not only was there no interaction between CRT performance and the source manipulation, but removing the sources from news articles had no effect whatsoever on perceptions of accuracy or social media sharing. This is surprising given the wealth of evidence that source credibility plays an important role in persuasion (Hovland & Weiss, 1951; Landrum et al., 2017; Pornpitakpan, 2004), and that people find reputable news outlets more trustworthy than outlets which produce fake news (Pennycook

& Rand, 2018a). It is unclear whether the null result we observe here is the consequence of the format of news articles on Facebook (i.e., it may be that the source is not noticeable enough to have an impact) or if people tend to disregard the source when making judgments about news headlines. Regardless, this represents a pragmatic problem for social media platforms and more work is required to develop ways to increase the influence of source information since it conveys relevant signals about accuracy and editorial norms. More theoretically, the lack of interaction between CRT performance and our source manipulation indicates that the difference between analytic and intuitive people in terms of media truth discernment is not driven by a simple source heuristic. Rather, it seems that features of the content of fake versus real news, such as *prima facie* implausibility (Pennycook & Rand, 2018b), determine the impact of analytic thinking on perceptions of accuracy.

5.3. Familiarity

In a classic study of wartime rumors, Allport and Lepkin (1945) found that people were more likely to believe rumors that they were familiar with. Later experiments using uncertain content, such as difficult trivia statements, found that repetition is sufficient to increase later perceptions of accuracy (either in the same session or after multiple weeks) (Dechene, Stahl, Hansen, & Wanke, 2010; Hasher, Goldstein, & Toppino, 1977). More recently, Fazio, Brashier, Payne, and Marsh (2015) found that repeated exposure even increases perceptions of accuracy for trivia statements that participants are able to later identify as false. Our results indicate, consistent with a recent experiment on prior exposure (Pennycook et al., 2018), that familiarity is also a strong determinant of perceptions of accuracy even for entirely fabricated (and quite implausible) news headlines. Interestingly, the difference between familiar and unfamiliar headlines observed in our study in terms of perceived accuracy did not interact with analytic

thinking performance. This is consistent with recent work showing that cognitive style and ability measures do not interact with the effect of experimentally induced familiarity (i.e. repeated exposure) on accuracy (De keersmaecker et al., 2018). This supports the idea that the influence of prior exposure is driven by low-level cognitive processes, such as fluency (Alter & Oppenheimer, 2009; Begg, Anas, & Farinacci, 1992; Unkelbach, 2007; Whittlesea, 1993).

5.4. Social media sharing

Our results indicate that the willingness to share fake news on social media was positively associated with pseudo-profound bullshit receptivity. However, unlike for perceptions of accuracy, sharing real news on social media was also (and similarly) positively associated with bullshit receptivity. This implies that, at least for real news stories, perceptions of accuracy and social media sharing are not two versions of the same judgment. Indeed, the correlation between social media sharing and perceptions of real news accuracy was relatively modest (e.g., $r = .38$ in Study 2). Evidently, sharing intentions in our studies are not driven primarily by perceived accuracy. Given the social aspect of social media sharing, we speculate that the decision to share a news article – whether it is fake or real – is driven by concerns about reputation or virtue signaling (Jordan, Sommers, & Bloom, 2017; Nowak & Sigmund, 2005). Importantly, however, the social media sharing intentions indicated by subjects in our studies may have been influenced by the fact that they were simultaneously asked about accuracy and familiarity for each story. Thus, the correlation between bullshit receptivity and sharing intentions observed here may not generalize. Naturally, more research is needed.

6. Conclusion

Who falls for fake news? We can offer some initial answers to this question. First, as in past work (Pennycook & Rand, 2018b), individuals who are better at overriding incorrect intuitive responses on the Cognitive Reflection Test are less likely to believe fake news (but no less likely to believe real news). Second, individuals who are more receptive to bullshit, as indexed by profundity ratings for random sentences filled with buzzwords, were more likely to fall for fake news (and, to a lesser extent, real news). Third, individuals who tend to overclaim – that is, they feign knowledgeable about content that is made-up – are also more likely to believe fake news. Fourth, cases where individuals had prior exposure to fake (and real) news were associated with increased perceptions of accuracy. Finally, contrary to our expectation, individuals apparently do *not* use the source of the headline to determine perceived accuracy. Collectively, these results point to a constellation of factors that may be parsimoniously described as failures of critical thinking. This suggests that there is hope for education or training to improve the tendency of individuals to fall for fake news and other types of bullshit.

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References

Allport, F. H., & Lepkin, M. (1945). Wartime rumors of waste and special privilege: why some people believe them. *The Journal of Abnormal and Social Psychology*, *40*(1), 3–36. https://doi.org/10.1037/h0058110

Alter, A. L., & Oppenheimer, D. M. (2009). Uniting the tribes of fluency to form a metacognitive nation. *Personality and Social Psychology Review*, *13*(3), 219–235. https://doi.org/10.1177/1088868309341564

Arechar, A., Kraft-Todd, G., & Rand, D. (2017). Turking overtime: how participant characteristics and behavior vary over time and day on Amazon Mechanical Turk. *Journal of the Economic Science*. Retrieved from https://link.springer.com/article/10.1007/s40881-017-0035-0

Ballarini, C., & Sloman, S. A. (2017). Reasons and the " Motivated Numeracy Effect ." *Proceedings of the 39th Annual Meetiing of the Cognitive Science Society*, 1580–1585.

Begg, I. M., Anas, A., & Farinacci, S. (1992). Dissociation of processes in belief: Source recollection, statement familiarity, and the illusion of truth. *Journal of Experimental Psychology: General*, *121*(4), 446–458. https://doi.org/10.1037/0096-3445.121.4.446

Berinsky, A. A. J. (2017). Rumors and Health Care Reform: Experiments in Political Misinformation. *British Journal of Political Science*, (47), 241–246. https://doi.org/10.1017/S0007123415000186

Bronstein, M., Pennycook, G., Bear, A., Rand, D. G., & Cannon, T. (2018). Reduced Analytic and Actively Open-Minded Thinking Help to Explain the Link between Belief in Fake News and Delusionality, Dogmatism, and Religious Fundamentalism. *SSRN Working Paper*. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3172140

De keersmaecker, J., Roets, A., Pennycook, G., & Rand, D. G. (2018). Is the Illusory Truth Effect Robust to Individual Differences in Cognitive Ability, Need for Cognitive Closure, and Cognitive Style? *SSRN Working Paper*. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3164151

De Neys, W. (2012). Bias and Conflict: A Case for Logical Intuitions. *Perspectives on Psychological Science*, *7*(1), 28–38. https://doi.org/10.1177/1745691611429354

Dechene, A., Stahl, C., Hansen, J., & Wanke, M. (2010). The Truth About the Truth: A Meta-Analytic Review of the Truth Effect. *Personality and Social Psychology Review*, *14*(2), 238–257. https://doi.org/10.1177/1088868309352251

Drummond, C., & Fischhoff, B. (2017). Individuals with greater science literacy and education have more polarized beliefs on controversial science topics. *Proceedings of the National Academy of Sciences*, *114*, 9587–9592. https://doi.org/10.1073/pnas.1704882114

Ecker, U., Hogan, J., & Lewandowsky, S. (2017). Reminders and Repetition of Misinformation: Helping or Hindering Its Retraction? *Journal of Applied Research in Memory and Cognition*, *6*, 185–192.

Evans, J. S. B. T., & Stanovich, K. E. (2013). Dual-process theories of higher cognition:

Advancing the debate. *Perspectives on Psychological Science*, *8*(3), 223–241. https://doi.org/10.1177/1745691612460685

Fazio, L. K., Brashier, N. M., Payne, B. K., & Marsh, E. J. (2015). Knowledge Does Not Protect Against Illusory Truth. *Journal of Experimental Psychology. General*, *144*(5), 993–1002. https://doi.org/http://dx.doi.org/10.1037/xge0000098

Frankfurt, H. (2005). *On bullshit*. Princeton: Princeton University Press.

Frederick, S. (2005). Cognitive Reflection and Decision Making. *Journal of Economic Perspectives*, *19*(4), 25–42. https://doi.org/10.1257/089533005775196732

Hasher, L., Goldstein, D., & Toppino, T. (1977). Frequency and the conference of referential validity. *Journal of Verbal Learning and Verbal Behavior*, *16*(1), 107–112. https://doi.org/10.1016/S0022-5371(77)80012-1

Hovland, C., & Weiss, W. (1951). The influence of source credibility on communication effectiveness. *Public Opinion Quarterly*. Retrieved from https://academic.oup.com/poq/article-abstract/15/4/635/1923117

Jordan, J., Sommers, R., & Bloom, P. (2017). Why Do We Hate Hypocrites? Evidence for a Theory of False Signaling. *Psychological Science*. Retrieved from http://journals.sagepub.com/doi/abs/10.1177/0956797616685771

Kahan, D. M. (2017). Misconceptions, Misinformation, and the Logic of Identity-Protective Cognition. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.2973067

Kahan, D. M., Peters, E., Wittlin, M., Slovic, P., Ouellette, L. L., Braman, D., & Mandel, G. (2012). The polarizing impact of science literacy and numeracy on perceived climate change risks. *Nature Climate Change*, *2*(10), 732–735. https://doi.org/10.1038/nclimate1547

Kahan, D., Peters, E., Dawson, E., & Slovic, P. (2017). Motivated numeracy and enlightened self-government. *Behavioural Public Policy*, *1*(1), 54–86.

Kahneman, D. (2011). *Thinking, fast and slow*. New York, NY: Farrar, Straus and Giroux.

Knobloch-Westerwick, S., Mothes, C., & Polavin, N. (2017). Confirmation Bias, Ingroup Bias, and Negativity Bias in Selective Exposure to Political Information. *Communication Research*, 009365021771959. https://doi.org/10.1177/0093650217719596

Landrum, A. R., Lull, R. B., Akin, H., Hasell, A., & Jamieson, K. H. (2017). Processing the papal encyclical through perceptual filters: Pope Francis, identity-protective cognition, and climate change concern. *Cognition*, *166*, 1–12. https://doi.org/10.1016/j.cognition.2017.05.015

Lazer, D., Baum, M., Benkler, J., Berinsky, A., Greenhill, K., Metzger, M., … Zittrain, J. (2018). The science of fake news. *Science*, *9*, 1094–1096.

Nowak, M., & Sigmund, K. (2005). Evolution of indirect reciprocity. *Nature*, *437*, 1291–1298. Retrieved from http://pure.iiasa.ac.at/7763/

Nyhan, B., & Reifler, J. (2010). When corrections fail: The persistence of political

misperceptions. *Political Behavior*, *32*(2), 303–330. https://doi.org/10.1007/s11109-010-9112-2

Paulhus, D. L., Harms, P. D., Bruce, M. N., & Lysy, D. C. (2003). The over-claiming technique: Measuring self-enhancement independent of ability. *Journal of Personality and Social Psychology*, *84*(4), 890–904. https://doi.org/10.1037/0022-3514.84.4.890

Pennycook, G. (2018). *The new reflectionism in cognitive psychology: Why reason matters*. New York, NY: Routledge.

Pennycook, G., Cannon, T. D., & Rand, D. G. (2018). Prior Exposure Increases Perceived Accuracy of Fake News. *Journal of Experimental Psychology: General*. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2958246

Pennycook, G., Cheyne, J. A., Barr, N., Koehler, D. J., & Fugelsang, J. A. (2015). On the reception and detection of pseudo-profound bullshit. *Judgment and Decision Making*, *10*(6), 549–563. https://doi.org/10.3389/fpsyg.2013.00279

Pennycook, G., Fugelsang, J. A., & Koehler, D. J. (2015). What makes us think? A three-stage dual-process model of analytic engagement. *Cognitive Psychology*, *80*, 34–72. https://doi.org/10.1016/j.cogpsych.2015.05.001

Pennycook, G., & Rand, D. G. (2018a). Crowdsourcing Judgments of News Source Quality. *SSRN Working Paper*. Retrieved from https://www.ssrn.com/abstract=3118471

Pennycook, G., & Rand, D. G. (2018b). Susceptibility to Partisan Fake News is Explained More by a Lack of Deliberation than by Willful Ignorance. *SSRN Working Paper*. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3165567

Petrocelli, J. V. (2018). Antecedents of bullshitting. *Journal of Experimental Social Psychology*, *76*, 249–258. https://doi.org/10.1016/J.JESP.2018.03.004

Pornpitakpan, C. (2004). The Persuasiveness of Source Credibility: A Critical Review of Five Decades' Evidence. *Journal of Applied Social Psychology*, *34*(2), 243–281. https://doi.org/10.1111/j.1559-1816.2004.tb02547.x

Shenhav, A., Rand, D. G., & Greene, J. D. (2012). Divine intuition: Cognitive style influences belief in God. *Journal of Experimental Psychology. General*, *141*(3), 423–8. https://doi.org/10.1037/a0025391

Silverman, C., Strapagiel, L., Shaban, H., & Hall, E. (2016). Hyperpartisan Facebook pages are publishing false and misleading information at an alarming rate. *Buzzfeed News*. Retrieved from https://www.buzzfeed.com/craigsilverman/partisan-fb-pages-analysis

Swire, B., Berinsky, A. J., Lewandowsky, S., & Ecker, U. K. H. (2017). Processing political misinformation: comprehending the Trump phenomenon. *Royal Society Open Science*, *4*(3), 160802. https://doi.org/10.1098/rsos.160802

Swire, B., Ecker, U. K. H., & Lewandowsky, S. (2017). The Role of Familiarity in Correcting Inaccurate Information. *Journal of Experimental Psychology: Learning, Memory, and Cognition*. https://doi.org/10.1037/xlm0000422

Thomson, K. S., & Oppenheimer, D. M. (2016). Investigating an alternate form of the cognitive reflection test. *Judgment and Decision Making*, *11*(1), 99–113.

Unkelbach, C. (2007). Reversing the Truth Effect : Learning the Interpretation of Processing Fluency in Judgments of Truth. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *33*, 219–230. https://doi.org/10.1037/0278-7393.33.1.219

Vosoughi, S., Roy, D., & Aral, S. (2018). The spread of true and false news online. *Science*, *359*(6380), 1146–1151. https://doi.org/10.1126/science.aap9559

Whittlesea, B. W. a. (1993). Illusions of familiarity. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *19*(6), 1235–1253. https://doi.org/10.1037/0278-7393.19.6.1235

Supplementary Materials

for

Who falls for fake news? The roles of bullshit receptivity, overclaiming, familiarity, and analytic thinking

Gordon Pennycook & David G. Rand

Contents

1. Study 1

Table S1.
Descriptive statistics for Study 1. *N* = 402.

Measure	Scale	*Mean*	*SD*	Skew[1]	Kurtosis[2]
Fake news (perceived accuracy)	1-4	1.82	.55	.34	-.72
Cognitive Reflection Test (accuracy)	0-1	.55	.30	-.23	-1.14
Bullshit receptivity	1-5	2.53	.83	.11	-.46
Overclaiming (hits)	0-1	.77	.20	-1.00	.80
Overclaiming (false alarms)	0-1	.38	.33	.60	-.83
Overclaiming (accuracy [hits – false alarms])	0-1	.39	.29	-.07	-1.00
Overclaiming (bias [hits + false alarms])	0-2	1.15	.46	.18	-.53

[1] SE = .12
[2] SE = .24

2. Study 2

Preregistration explanation

Hypotheses

We preregistered our primary hypotheses (along with some secondary hypotheses, see full preregistration, https://aspredicted.org/blind.php?x=ax6v9q):

1) Analytic thinking makes people less susceptible to fake news.

2) People who are more receptive to bullshit are more susceptible to fake news.

Results – Primary Analyses

The primary correlational analyses (Table 2 in main text) were preregistered:

1) Correlate CRT with mean accuracy rating for both fake and real news. Should correlate negatively with fake news (more analytic -> more likely to say fake news is inaccurate) and positively with real news (more analytic -> more likely to say real news is accurate). More analytic individuals should also be less likely to share fake news on social media.

2) Correlate BSR [bullshit receptivity] with mean accuracy rating for both fake and real news. Should correlate positively with fake news (more receptive to BS -> more likely to say fake news is accurate). No prediction for real news. Those more receptive to BS should be more likely to share fake news on social media.

We also preregistered the comparison between source/no-source condition:

3) Independent samples t-tests comparing source and no-source conditions on accuracy and social media DVs.

However, in the main text, we use an ANOVA to compare the potential effect of source on fake and real news as a function of CRT performance (based on a median split). Source has no effect regardless of how the data are analyzed and the ANOVA is reported because it is the most succinct.

Results – Secondary Analyses

We also preregistered a couple of secondary analyses:

1) Does BSR mediate the association between CRT and fake news accuracy judgments?

As mentioned in the main text, we report an alternative model where CRT mediates the association between bullshit receptivity and fake news accuracy judgments

2) Comparison of fake and real news using condition, CRT, and BSR as interacting variables.

We report this analysis, but excluding BSR as an interacting variable for the sake of expediency.

Table S2.
Descriptive statistics for Study 2. Participants who indicated an unwillingness to ever share political news on social media were removed from the social media sharing analysis. Perceived accuracy: *N* = 402. Social media sharing: *N* = 283.

Measure	Scale	*Mean*	*SD*	Skew[1]	Kurtosis[2]
Cognitive Reflection Test (accuracy)	0-1	.54	.29	-.20	-.99
Bullshit receptivity	1-5	2.47	.93	.13	-.72
Motivational quotation (profundity rating)	1-5	3.03	.76	-.09	-.27
Fake news (perceived accuracy)	1-4	1.95	.60	.43	-.10
Real news (perceived accuracy)	1-4	2.64	.53	-.15	.22
Fake news (social media sharing)	1-3	1.25	.39	1.93	3.56
Real news (social media sharing)	1-3	1.35	.46	1.42	1.34
Fake news (familiarity)	1-3	1.40	.42	1.19	1.33
Real news (familiarity)	1-3	1.82	.47	.10	-.68

[1] SE = .12 (social media = .15)
[2] SE = .24 (social media = .29)

Re-analysis using dichotomous measure

In the main text, it was noted that the following was preregistered: “Accuracy ratings will be scored 0 if ‘not at all accurate’ or ‘not very accurate’ are selected and 1 if ‘somewhat accurate’ or ‘very accurate’ are selected. Social media ratings will be scored 0 if ‘no’ is selected and 1 if ‘maybe’ or ‘yes’ is selected”. The following is a re-analysis of the key results using the preregistered coding.

Table S3.
Correlations (Pearson *r*) among primary variables in Study 2 using dichotomous variable coding. Media truth discernment scores were computed by subtracting z-scores for fake news (false alarms) from z-scores for real news (hits). Participants who indicated an unwillingness to ever share political news on social media were removed from the social media sharing analysis. Perceived accuracy: $N = 402$. Social media sharing: $N = 283$.

	1	2	3	4	5	6	7	8	9
1. Fake News (perceived accuracy)	-								
2. Real News (perceived accuracy)	.30***	-							
3. Media Truth Discernment (accuracy)	-.59***	.59***	-						
4. Fake News (social media sharing)	.58***	.22**	-.30***	-					
5. Real News (social media sharing)	.37***	.38***	.01	.69***	-				
6. Media Truth Discernment (sharing)	-.27***	.20**	.39***	-.39***	.39***	-			
7. Cognitive Reflection Test	-.21***	.04	.21***	-.21***	-.11	.12*	-		
8. Bullshit Receptivity	.21***	.06	-.13*	.23**	.11	-.15*	-.27***	-	
9. Prototypically Profound Quotations	.24***	.08	-.13**	.22**	15*	-.09	-.32***	.27***	-

***$p < .001$, **$p < .01$, *$p < .05$

3. Study 3

Preregistration explanation

Hypotheses

We preregistered our primary hypotheses (along with some secondary hypotheses, see full preregistration, https://aspredicted.org/blind.php?x=tj6un6):

> 2) People who are more receptive to bullshit are more susceptible to fake news.

Results – Primary Analyses

The primary correlational analyses were preregistered along with the separation of Clinton/Trump supporters (which always refers to preference for one over the other when forced to choose between them):

> 2) Correlate BSR with mean accuracy rating for both fake and real news. Should correlate positively with fake news (more receptive to BS -> more likely to say fake news is accurate). No prediction for real news. Those more receptive to BS should be more likely to share fake news on social media.

Results – Secondary Analyses

The following are analyses preregistered as secondary and reported in the paper.

> 3) Comparison of real vs. fake news accuracy ratings as a function of familiarity (mean of familiar and unfamiliar news items) using repeated measures ANOVA.
>
> Use of CRT as an interacting variable in the ANOVA's described in point 3 above.

Table S4.
Descriptive statistics for Study 3. Participants who indicated an unwillingness to ever share political news on social media were removed from the social media sharing analysis. Perceived accuracy: *N* = 802. Social media sharing: *N* = 667.

Measure	Scale	*Mean*	*SD*	Skew[1]	Kurtosis[2]
Cognitive Reflection Test (accuracy)	0-1	.53	.29	-.23	-1.01
Bullshit receptivity	1-5	2.50	.90	.09	-.63
Motivational quotation (profundity rating)	1-5	3.08	.74	-.35	.25
Fake news (perceived accuracy)	1-4	1.83	.42	.47	.22
Real news (perceived accuracy)	1-4	2.76	.43	-.70	1.50
Fake news (social media sharing)	1-3	1.24	.32	1.77	3.23
Real news (social media sharing)	1-3	1.40	.39	.92	.18

[1] SE = .08 (social media = .10)
[2] SE = .17 (social media = .19)

Re-analysis using dichotomous measure

In the main text, it was noted that the following was preregistered: "Accuracy ratings will be scored 0 if 'not at all accurate' or 'not very accurate' are selected and 1 if 'somewhat accurate' or 'very accurate' are selected. Social media ratings will be scored 0 if 'no' is selected and 1 if 'maybe' or 'yes' is selected". The following is a re-analysis of the key results using the preregistered coding. As is evident from Table S5, the results are very similar using dichotomous coding.

Table S5.
Correlations (Pearson's *r*) among primary variables in Study 3 using dichotomous variable coding. For correlations between CRT performance and perceptions of news accuracy see Pennycook and Rand (2018b). Participants who indicated an unwillingness to ever share political news on social media were removed from the social media sharing analysis. Perceived accuracy: $N = 801$. Social media sharing: $N = 667$.

	1	2	3	4	5	6	7	8
1. Fake News (perceived accuracy)	-							
2. Real News (perceived accuracy)	.28***	-						
3. Media Truth Discernment (accuracy)	-.60***	.60***	-					
4. Fake News (sharing)	.59***	.05	-.45***	-				
5. Real News (sharing)	.33***	.22***	-.09*	.69***	-			
6. Media Truth Discernment (sharing)	-.32***	.22***	.44***	-.37***	.42***	-		
7. Bullshit Receptivity	.23***	.09*	-.12**	.30***	.28***	-.01	-	
8. Prototypically Profound Quotations	.16***	.16***	-.01	.21***	.27***	.08*	.49***	-

***$p < .001$, **$p < .01$, *$p < .05$

4. News Items – Study 1

FBI Director Comey Just Proved His Bias By Putting Trump Sign On His Front Lawn

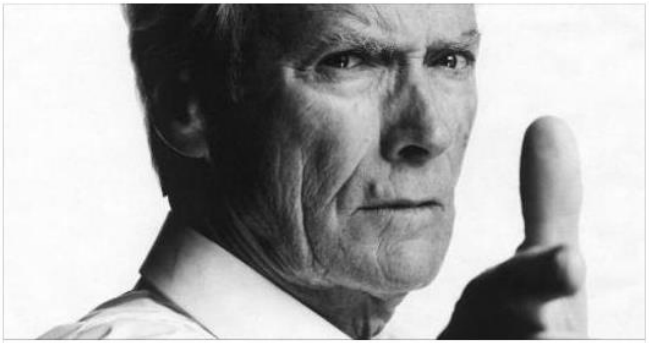
As if we actually needed any more evidence that FBI director James Comey was working behind the scenes to manipulate the election in favor of Republican nominee Donald…

COUNTERCURRENTNEWS.COM

Pennsylvania Federal Court Grants Legal Authority To REMOVE TRUMP After Russian Meddling

The Russian government's interference in the Presidential election could provide legal…

BIPARTISANREPORT.COM | BY GEORGIA BRISTOW



Clint Eastwood Refuses to Accept Presidential Medal of Freedom From Obama, Says "He is not my president" - Usa News

INCREDIBLEUSANEWS.COM

Trump to Ban All TV Shows that Promote Gay Activity Starting with Empire as President – The #1 Empowering Conscious Website In The World

COLOSSILL.COM

Donald Trump Sent His Own Plane To Transport 200 Stranded Marines

After hearing about 200 Marines left stranded after returning home from Operation Desert Storm back in 1991, Donald J.Trump came to the aid of those Marines by sending one…

UCONSERVATIVE.COM

Trump on Revamping the Military: We're Bringing Back the Draft

Trump unveiled his plan to 'make the military great again,' saying he intends to reinstate…

REALNEWSRIGHTNOW.COM | BY R. HOBBUS, JD

5. News Items – Study 2

Note: For half of the participants, the headlines were removed (via simple deletion). Only the original versions with headlines are presented below.

Fake

FBI Director Comey Just Proved His Bias By Putting Trump Sign On His Front Lawn

As if we actually needed any more evidence that FBI director James Comey was working behind the scenes to manipulate the election in favor of Republican nominee Donald…

COUNTERCURRENTNEWS.COM

FBI Agent Suspected in Hillary Email Leaks Found Dead in Apparent Murder-Suicide

Walkerville, MD – An FBI agent believed to be responsible for the latest email leaks "pertinent to the investigation" into Hillary Clinton's private email server while she was…

ENABON.COM

Pope Francis Shocks World, Endorses Donald Trump for President, Releases Statement

Pope Francis Shocks World, Endorses Donald Trump for President, Releases Statement …

CHANNEL16NEWS.COM

Donald Trump Protester Speaks Out: "I Was Paid $3,500 To Protest Trump's Rally"

PHOENIX A.Z. (AP) — For months now, rumors have circulated the Internet that individuals were being paid to protest at rallies held by presidential hopeful Donald Trump. Today a…

ABCNEWS.COM.CO

Donald Trump Sent His Own Plane To Transport 200 Stranded Marines

After hearing about 200 Marines left stranded after returning home from Operation Desert Storm back in 1991, Donald J.Trump came to the aid of those Marines by sending one…

UCONSERVATIVE.COM

Real

Donald Trump Says He'd 'Absolutely' Require Muslims to Register

Donald J. Trump, who earlier in the week said he was open to requiring Muslims in the United States to register in a database, said in Iowa on Thursday night that he "would…

NYTIMES.COM

House Speaker Ryan praises Trump for maintaining congressional strength

House Speaker Paul Ryan says Donald Trump's victory was the "most incredible feat" he…

CNBC.COM

Rudy Giuliani calls Hillary Clinton 'too stupid to be President'

Giuliani brought up the Monica Lewinsky scandal when talking to reporters after the debate about whether Trump is a feminist.

NYDAILYNEWS.COM

Donald Trump on refusing presidential salary: "I'm not taking it"

While running for president, Trump made several promises when it came to business and salary…

CBSNEWS.COM

At GOP Convention Finale, Donald Trump Vows to Protect LGBTQ Community

Four years ago, Mitt Romney never uttered the word "gay," much less the full acronym…

FORTUNE.COM

6. News Items – Study 3

Fake – Democrat-Consistent

Sarah Palin Calls To Boycott Mall Of America Because "Santa Was Always White In The Bible"

"Next thing we know, we're going to be having Arab Santa Clauses that are going to be teaching our kids how to make IEDs out of Christmas lights"

POLITICONO.COM

Mike Pence: Gay Conversion Therapy Saved My Marriage

Vice President-elect Mike Pence claims that a 1983 conversion therapy saved him.

NCSCOOPER.COM | BY RANDALL FINKELSTEIN

Pennsylvania Federal Court Grants Legal Authority To REMOVE TRUMP After Russian Meddling

The Russian government's interference in the Presidential election could provide legal…

BIPARTISANREPORT.COM | BY GEORGIA BRISTOW

Trump to Ban All TV Shows that Promote Gay Activity Starting with Empire as President – The #1 Empowering Conscious Website In The World

COLOSSILL.COM

Trump on Revamping the Military: We're Bringing Back the Draft

Trump unveiled his plan to 'make the military great again,' saying he intends to reinstate…

REALNEWSRIGHTNOW.COM | BY R. HOBBUS, JD

Fake – Republican-Consistent

BLM Thug Protests President Trump With Selfie...Accidentally Shoots Himself In The Face ⋆ Freedom Daily

Cant fix Stupid...

FREEDOMDAILY.COM

NYT David Brooks: "Trump Needs To Decide If He Prefers To Resign, Be Impeached Or Get Assassinated" - US Politics

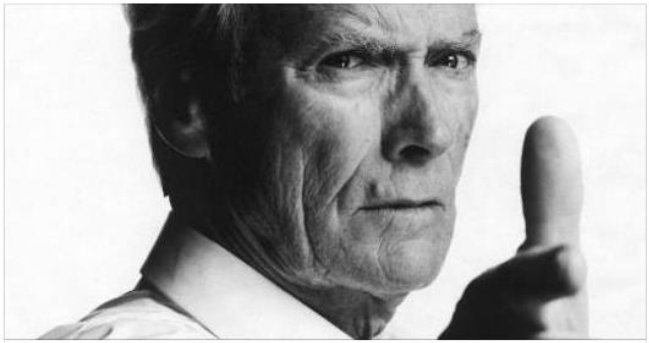
In his Friday column, New York Times columnist David Brooks speculates about a new political dichotomy and writes that President-elect Donald Trump will "resign or be…

UNITEDSTATES-POLITICS.COM

Election Night: Hillary Was Drunk, Got Physical With Mook and Podesta

According to Todd Kincannon of the Kincannon Show, he spoke to a CNN reporter about…

DAILYHEADLINES.NET



Clint Eastwood Refuses to Accept Presidential Medal of Freedom From Obama, Says "He is not my president" - Usa News

INCREDIBLEUSANEWS.COM

Obama Was Going To Castro's Funeral–Until Trump Told Him This...

Obama just had the rug pulled out from under him.

THELASTLINEOFDEFENSE.ORG

Fake – Politically Neutral

Billionaire founder of Corona beer brewery makes EVERYONE in his village a MILLIONAIRE in his will

THE billionaire founder of Corona beer has reportedly made his entire home village…

THESUN.CO.UK

The Controversial Files: Fake Cigarettes are Being Sold and Killing People, Here's how to Spot Counterfeit Packs

Scammers have recently been targeting those who have the already expensive habit by placing cheap cigarettes in name-brand cartridges, and gas stations are selling them at a…

THECONTROVERSIALFILES.NET

Because Of The Lack Of Men, Iceland Gives $5,000 Per Month To Immigrants Who Marry Icelandic Women!

Breaking news about Iceland country incredible but true if you are interested read the full story Iceland team was able to achieve an unprecedented achievement in the European…

HOWAFRICA.COM

Man Kicked Out Golden Corral After Eating 50LBS Of Food; Sues For $2-Million

A man from Massachusetts is suing Golden Corral Corporation for 2 million dollars, for false advertising, after being literally thrown out of one of the chain's restaurants by the…

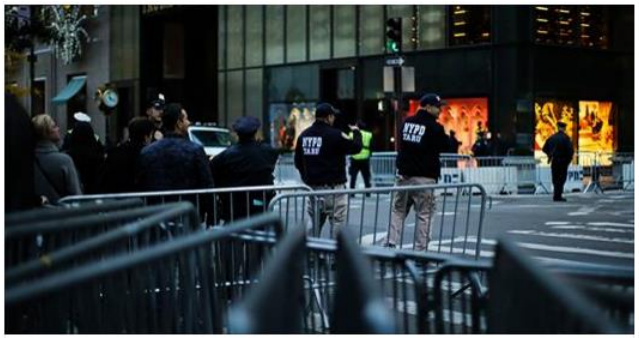
DEMICMEDIA.COM

Yellowstone Evacuated: Experts Claim 'Super Volcano' Could Erupt Within Weeks

Yellowstone National Park has been hastily evacuated as fear of the Yellowstone…

GLOBALNETWORK.INFO

Real – Democrat-Consistent



The Small Businesses Near Trump Tower Are Experiencing a Miniature Recession

Tina's Cuban Cuisine, a small deli and diner on West 56th Street between Fifth and Sixth avenues in Manhattan, is one of those easy-to-overlook restaur ...

SLATE.COM

North Carolina Republicans Push Legislation To Hobble Incoming Democratic Governor

The bills are "petty," one Democratic state lawmaker said.

HUFFINGTONPOST.COM | BY JULIA CRAVEN

Vladimir Putin 'personally involved' in US hack, report claims

Russian president made key decisions in operation seen as revenge for past criticisms by Hillary Clinton, says NBC

THEGUARDIAN.COM

Trump Questions Russia's Election Meddling on Twitter — Inaccurately

President-elect Donald J. Trump was back on Twitter, questioning Russian hacking, lashing out at Vanity Fair and cryptically defending his business interests.

NYTIMES.COM | BY MAGGIE HABERMAN, THOMAS KAPLAN AND JEREMY W. PETERS

Trump Lashes Out At Vanity Fair, One Day After It Lambastes His Restaurant

Trump has had a long-running feud with the magazine's editor, who once termed him a "short-fingered vulgarian."

NPR.ORG

Real – Republican-Consistent

Companies are already canceling plans to move U.S. jobs abroad

President-elect Donald Trump's threat of retribution against companies that move jobs out of the U.S. is already having the effect he probably intended: some business leaders are…

MSN.COM

Dems scramble to prevent their own from defecting to Trump

Senate Democrats have been scrambling to prevent two of their members from taking a post in the Trump administration, trying to prevent any...

FOXNEWS.COM

Majority of Americans Say Trump Can Keep Businesses, Poll Shows

Two-thirds of U.S. adults think Donald Trump needs to choose between being president or a businessman, but slightly more -- 69 percent -- believe it goes too far to force him and his…

BLOOMBERG.COM

Donald Trump Strikes Conciliatory Tone in Meeting With Tech Executives

Prominent tech executives began arriving at Trump Tower in New York for a summit with…

WSJ.COM | BY JACK NICAS

She claimed she was attacked by men who yelled 'Trump' and grabbed her hijab. Police say she lied.

Yasmin Seweid claimed three drunk men attacked her because of her faith. Police investigated and people rallied to support her. But it may have all been a fabrication.

WASHINGTONPOST.COM

Real – Politically Neutral

Depression symptoms are common among active airline pilots, international survey reveals

Behind the self-confident gait, the friendly greeting and the air of superb competence, as many as 13% of the nation's commercial airline pilots may be suffering from depression,...

LATIMES.COM | BY MELISSA HEALY

Woman who had ovary frozen in childhood gives birth

She is believed to be the first woman in the world to have a baby after having ovarian tissue frozen before the onset of puberty

CBSNEWS.COM

Hitler's Austrian birthplace will be home for disability charity - BBC News

The house where Adolf Hitler was born will remain standing, Austrian MPs have decided.

BBC.COM

Gnarly! 6-story wave is revealed as biggest ever recorded

Scientists attributed the enormous surge to combination of a "very strong cold front" in the North Atlantic Ocean.

NBCNEWS.COM | BY NBC NEWS

Yahoo Suffers World's Biggest Hack Affecting 1 Billion Users

Yahoo has discovered a 3-year-old security breach that enabled a hacker to compromise more than 1 billion user accounts, breaking the company's own humiliating record for the biggest security breach in history. The digital heist disclosed Wednesday occurred in...

ABCNEWS.GO.COM | BY ABC NEWS