

Media Truth Discernment, Depression, and Social Media Disorder

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Introduction

Approximately 3.6 billion individuals use the internet and social media on a regular basis (Statista, 2020). This number is projected to increase steadily to over 4.4 billion by the year 2025. With nearly half the world's population consistently spending time online, ideas and information are able to spread faster than ever before. However, much of the information shared is inaccurate; sometimes purposefully. This purposeful misinformation is referred to as *Fake News*. Fake news is not a new idea, as tabloid magazines, which purposely place false yet eye-catching information on their front page, have been in existence for decades. Rather, fake news has gained more attention due to the increased prevalence, efficacy, and new primary domain: politics. One such story had real-life consequences in 2016 when a man walked into a pizza shop in Washington, D.C. with an assault rifle in hand. His aim was to self-investigate the supposed child sex ring run by Bill and Hillary Clinton. The man went as far as to actually fire the weapon. This story, as described by Samuelson (2016), emphasizes the potential adverse consequences fake news is capable of causing. Thus, research has sought to examine how fake news spreads, how fast it spreads, and who is susceptible to falling for falsehoods online. The current study sought to investigate the extent to which mental disorders such as social media disorder and depression interact with individuals' ability to accurately identify true and fake news.

Misinformation, Disinformation, and Fake News

Overall, misinformation, disinformation, and fake news are all versions of the same category. However, these particular terms vary in breadth and criteria according to the University of Washington Bothell & Cascadia College (2020). Specifically, misinformation can be used to refer to any false information spread online whereas disinformation and fake news possess more narrow definitions. Misinformation pertains to false information that is spread, typically online, regardless of the intentions of the creator. The largest distinction between misinformation and disinformation is the purpose. Jokes about current political events can be categorized as misinformation; however, the purpose is for entertainment. Conversely, disinformation is purposely manipulated in an attempt to point its audience in the wrong direction. Finally, fake news is essentially disinformation 'dressed up' as stories from major news outlets (i.e. CNN, Fox, NPR, etc.).

As Lazer et al. (2018) explains, fake news has migrated toward the political realm. This migration increased drastically in the time before the 2016 Presidential election so that the average American was exposed to a notable number of fake news stories (Allcott & Gentzkow, 2017). This may be, in part, due to the speed at which fake news spreads throughout these online outlets. Vosoughi et al. (2018) found that the spread of information on social media sites such as Twitter is not the same across objective veracity. Instead, information that is false is retweeted by a significant larger amount of people, and spreads significantly faster as compared to objectively true stories. This finding is especially true when the information in question is regarding politics (Vosoughi et al., 2018). The disproportionate speed at which misinformation spreads is explained, in part, by the use of 'bots' (i.e. automated accounts posing as real users). Bots increase the level of exposure for any particular piece of information through likes and shares (Lazer et al., 2018). As of 2017, Facebook estimated that 60 million bots are active on their platform (Senate Judiciary Committee, 2017) whereas an estimated 9 to 15% of Twitter's accounts are bots (Varol et al., 2017). This being said, the prevalence of fake news shows no sign of slowing, which is especially problematic given that 47% of Americans say they get their news 'often' or 'sometimes' from social media, and two-thirds of all Americans say they have at some point in time (Shearer & Gottfried, 2017).

Due to each individuals' ability to not only consume content on social media, but also create content, news has become increasingly 'fractionalized' (Lewandowski et al., 2012). As more individuals create content, there are more specific and narrow options any individual may choose to consume. Lewandowski et al. (2012) refers to this tunnel-visioned news-consumption behavior as *selective exposure*, which has been seen to contribute to increasing overall political polarization (McCright, 2011; Stroud, 2010).

Misinformation has the power to influence individuals to make decisions against their own interests. This can happen at a societal or individual level. For instance, countless parents decided not to vaccinate their children after seeing an article in a 1998 issue of the *Lancet*. The findings of the article drew an association between the MMR vaccine and autism in children. Despite the fact that the article was redacted, and the lead author is no longer permitted to practice medicine (due to malpractice in

research; namely, the article in question), this vaccine hesitancy still exists decades later. As a result, many countries are seeing emerging cases of previously borderline eradicated diseases such as measles and mumps.

One important distinction to make is that misinformation is not equal to ignorance. As Lewandowsky et al. (2012) discuss, misinformation is far more detrimental due to the inherent conviction. Individuals who are ignorant about a subject matter are typically aware of their lack of familiarity which, in turn, can create a sense of uncertainty. This cognitive uncertainty is what then employs heuristics in the decision-making process. And as Lewandowsky et al. (2012) highlight, under the preferable conditions, these heuristics can be highly effective at producing positive outcomes. Because of the underlying uncertainty, those who are ignorant typically have lower confidence in such decisions (De Neys, Cromheeke, & Osman, 2011; Glöckner & Bröder, 2011). On the other hand, those basing decisions and beliefs off of misinformation feel as if they are fully informed. In turn, this leads to stronger conviction and support for the cause in question. For example, those who believe climate change is not real also feel they are best informed (Leiserowitz, Maibach, Roser-Renouf, & Hmielowski, 2011).

Individual Differences

Clearly, the majority of the world is influenced by fake news. An intriguing question then is who is at risk for falling prey to such misinformation? Much of the established literature highlights individual differences that help explain or predict susceptibility to fake news. Existing literature has identified a number of individual factors that help explain fake news susceptibility such as Cognitive Reflection and overall intelligence (Pennycook & Rand, 2018).

Pennycook & Rand (2018) sought to investigate how individual differences influenced susceptibility to information that is nonsense. To do this, participants were presented with sentences that are randomly generated using buzzwords that are aimed at creating a statement that sounds legitimate; however, that are objectively nonsense. For example, one sentence reads, "We are in the midst of a high-frequency blossoming of interconnectedness that will give us access to the quantum soup itself" (Pennycook & Rand, 2018). As one can see, these sentences utilize words that create an aura of an intelligent argument or statement, but in actuality contain no substance whatsoever. For each, participants were asked to evaluate the profundity on a 5-point scale ranging from 1 (not at all profound) to 5 (very profound). These measures were taken from Pennycook et al. (2015). Participants were also

tasked with evaluating the accuracy of multiple news stories that are objectively false. Results revealed a significant positive correlation between perceived accuracy of fake news and receptivity to the meaningless sentences (Pennycook & Rand, 2018).

Pennycook & Rand (2018) also measured covariates such as Cognitive Reflection (CRT). Results showed significant relationships between receptivity to the meaningless sentences and CRT measures so that those who scored lower on CRT measures had higher receptivity to the meaningless sentences as well as greater perception of accuracy among fake news stories. That is to say, those lower in CRT were observed to be worse at discerning true from false news media content.

The individualistic differences observed to be associated with the ability to discern true from fake news in Pennycook & Rand (2018) have to do with information processing. The question then is how do mental disorders influence this information processing? Those with mental health disorders are typically thought to respond to stimuli and process information differently than the typical individual. This being said, the differing process by which one makes sense of information may play a significant role in one's ability to distinguish truth from fiction.

Social Media Disorder (SMD)

Within the realm of 'Internet addiction', social media use has emerged as one of the main components that illicit compulsive and addictive behavior (Van Rooij et al., 2010; found in Eijnden et al., 2016). However, a number of publications have identified the use of social networking sites (SNS) as a potential addiction (Pantic, 2014). Social Media Disorder is under-researched, in part, due to its novelty. In addition, the lack of SMD in the DSM-5 has allowed for doubt that SMD is a legitimate disorder. And is further supported by the fact that many persons preoccupy themselves with social media to the extent that detrimental effects on other aspects of life appear (Pantic, 2014). This uncontrollable preoccupation seems to be a product of *deficient self-regulation* according to Ryan et al. (2014). Specifically, it seems that individuals who are not able to control their SNS usage tend to engage online in order to escape negative emotions (e.g. loneliness, anxious) This then enables *mood alteration* which then reinforces the SNS usage (Ryan et al., 2014).

SNS use has been correlated with a number of negative cognitions. For example, SNS use has been significantly associated with lower self-esteem (Mehdizadeh, 2010). This is consistent with Objective Self-Awareness Theory which argues that any stimulus that directs attention to the self will result in a

diminished impression of the self (Pantic, 2014). Additionally, there was a link found between Facebook use and a greater belief that other users were happier and that 'life is not fair' (Chou & Edge, 2012). Pantic (2014) discusses that these correlates are not direct leads to depression, those with predispositions or comorbidities to depression can experience a worsened state of mental health as a result of such cognitions.

Arguments against the classification of SMD as a stand-alone disorder are sourced from the fact that most research on SMD is rooted in research on already established mental disorders such as anxiety and depression. Because of this intertwining of research, a case is made that SMD is not a disorder in and of itself, but rather a part of, or interacting with, pre-established mental health problems. Andreassen et al. (2016) found that in their sample of over 23,500 individuals, that Attention Deficit Hyperactive Disorder, Obsessive Compulsive Disorder, and anxiety all explained a significant amount of variability in social media use. These findings suggest that social media use and mental disorders, at the very least, interact. However, more research is needed to determine the status of SMD as a whole.

In order to better research SMD, van den Eijnden et al. (2016) created a 27-item Social Media disorder scale. The criteria are broken into nine different categories: Preoccupation, Tolerance, Withdrawal, Persistence, Escape, Problems, Deception, Displacement, and Conflict. For the full scale, refer to Appendix A. This scale has since been validated by Fung (2019) in a cross-cultural study.

Depression (CESD)

In contrast to a novel disorder such as SMD, we were also interested in examining how depression influences one's ability to successfully discern true from fake news. In other words, is this discernment more so influenced by preoccupation (i.e. SMD) or negative affect as seen in those who are depressed? Depressed individuals typically view the world, and experience stimuli, in a much more negative aura as compared to those without such disorder. In other words, the way in which depressed individuals process incoming information is existentially different. Space & Cromwell (1980) found that those who are depressed exhibit more mixed self-construing thoughts while also seeing themselves as significantly more different from others (i.e. greater self-other distance) as compared to the control groups. Additionally, depressed adolescents have been observed to exhibit significantly lower self-esteem, greater pessimism, and greater external locus of control (Hammond & Romney, 1995). Montesano et al. (2017) describe that this tendency to view oneself and one's environment in a more negative light is enabled by deficits and biases in information

processing (Beck et al., 1979; Ingram et al., 1998; found in Montesano et al., 2017).

The question, then, is whether or not this negative self-ideology can be generalized to external stimuli. In other words, do depressed individuals view only themselves in a negative light, or the environment, and information as well?

Overall, we hypothesized that participants will produce significantly greater veracity evaluations when presented with true news stories as opposed to fake news stories. We hypothesized that the content of the stimuli would have a significant effect on veracity evaluations such that veracity evaluations would significantly differ between political and nonpolitical news stories. Additionally, we hypothesized that this ability to discern true from fake news would be significantly diminished when participants were given the source of the news. Lastly, we hypothesized that those with depression and/or SMD would not significantly differ between true and fake news stories, indicating that these individuals are significantly less capable at correctly discerning true from fake news online.

Method

Participants

Participants ($N = 130$; 40 female, 27 non-disclosed) persons were recruited via Cloud Research, an online data collection platform and were compensated \$3.00 for their participation. Participants' ages ranged from 20 to 72 years ($M = 38.14$). Participants' data was excluded if they spent less than 8.00 minutes to complete the study. Additionally, participants' data was excluded if the duration of participation fell more than three standard deviations from the mean. Final analyses included $N = 100$ participants; 39 of which were female.

Materials

The study was programmed online in Qualtrics XM. Stimuli contained 16 snapshots of news stories on Facebook. These stories included the headline, an accompanying photograph, and a brief paragraph describing the details of the news story. Of these 16 stories, 8 were true and 8 were false, or 'Fake News.' The veracity of each story was checked by the respected Snopes.com. For instance, a true news story in a political context showed attendees at a Trump campaign rally wearing a shirt that stated, "I'd rather be a Russian than a Democrat", see Table 1. Additionally, the source of the stories was manipulated to be either from CNN or Fox news. Lastly, the content of the stories was manipulated to be either political or nonpolitical. For example stimuli for each of the four treatment conditions, refer to Table 1. For a full list of news stories and their respective manipulations, refer to Table 2.

Table 1. *Example Stimuli*

	True	False
Political		
Non-Political		

Table 2. *Experimental Stimuli*

Case	Story	Veracity	Source	Content
1	Trump Report Card	False	Fox	Political
2	Nancy Pelosi	False	CNN	Political
3	Mein Kampf	False	Fox	Political
4	Clinton Crowd	False	CNN	Political
5	Trump Smirnoff	True	Fox	Political
6	Rather Russian	True	Fox	Political
7	Obama Popularity	True	CNN	Political
8	Obama Cages	True	CNN	Political
9	FEMA Vaccine	False	Fox	Nonpolitical
10	Rosemary	False	Fox	Nonpolitical
11	Teeth	True	Fox	Nonpolitical
12	Smallpox	True	CNN	Nonpolitical
13	Texting and Driving	False	CNN	Nonpolitical
14	Zip Ties	False	CNN	Nonpolitical
15	Hockey Pucks	True	CNN	Nonpolitical
16	Lion Poachers	True	Fox	Nonpolitical

The scale used to measure SMD was taken from van den Eijnden et al. (2016). It is a 27-item scale in which participants indicate 'yes' or 'no' to each of the statements. For instance, one statement reads, "During the past year, have you often found it difficult not to look at messages on social media when you were doing something else (e.g. school work)?" For the full scale, see Appendix A. Scoring was done by the sum of each 'yes' given with 15 as the cut-off point for one to be classified as a disordered social media user.

The Center for Epidemiological Studies – Depression scale (CESD), originally created by Radloff (1977), was used in order to measure levels of depression in participants. This 20-item scale tasks participants with indicating how often they have experienced each item in the past week. Items include things such as restless sleep and feeling lonely, for example. Ratings are on a 0-3 scale with 0 being indicative of Rarely or none of the time, 1 being indicative of some or little of the time, 2 being indicative of Moderately or much of the time, and 3 being indicative of Most or Almost all of the time (APA, 2011). The sum of all 20 ratings is the final

measure, with higher scores indicating more severe symptoms of depression. Additionally, the CESD specifies a threshold that identifies those who are clinically depressed. This threshold is a total score of 16. In other words, those who score greater than, or equal to, 16 on the CESD are clinically depressed (APA, 2011).

Procedure

Upon receiving informed consent, participants were then presented with each of the news story one at a time. The order of presentation was randomized. Participants were tasked to evaluate the extent to which they believed each story was true or false on the following 5-item Likert type scale:

- 1 = *False*
- 2 = *Mostly False*
- 3 = *Mixed True and False Content*
- 4 = *Mostly True*
- 5 = *True*

The data reported within the current study was part of a larger experiment that also examined the effects of automatic veracity evaluations. However, the current study will solely focus on controlled veracity evaluations.

After completion of all 16 veracity ratings, participants were asked to provide their political affiliation by indicating Democrat, Republican, or Other/Prefer not to specify.

Participants were then asked to complete the SMD and CESD scales as described above. Lastly, participants were asked to provide demographic data, including age, sex, and education via self-report.

Results

Experimental Approach

In order to test each hypothesis, the data were submitted to a 2 (Veracity: True, False) × 2 (Source: CNN, Fox) × 2 (Content: Political, Nonpolitical) repeated measures ANOVA with all factors entered as within-subject variables.

The data produced a significant main effect for veracity such that stories that were objectively true ($M = 3.605$; $SE = .068$) were viewed as being significantly truer as compared to objectively false stories ($M = 2.648$; $SE = .081$), $F_{(1,98)} = 134.056$, $p < .001$, $\eta^2 = .578$. The data also produced a significant main effect for source such that news stories from Fox news ($M = 3.272$; $SE = .070$) were rated as significantly truer than those sourced from CNN ($M = 3.016$; $SE = .068$), $F_{(1,98)} = 21.724$, $p < .001$, $\eta^2 = .181$. However, the data failed to produce a significant main effect for content, $F_{(1,98)} = 0.100$, $p = .753$.

The data revealed a number of interactions. Firstly, veracity significantly interacted with the source in so

that the difference in veracity ratings in the Fox condition were significantly larger than in the CNN condition, $F_{(1,98)} = 5.876$, $p = .017$, $\eta^2 = .057$. Veracity also significantly interacted with the story content in so that veracity ratings between true and false stories differed significantly more in a political context as compared to a nonpolitical context, $F_{(1,98)} = 28.994$, $p < .001$, $\eta^2 = .228$. The data also revealed a significant interaction between source and content in so that veracity ratings between CNN and Fox stories varied significantly in political context but did not significantly differ in a nonpolitical context, $F_{(1,98)} = 15.287$, $p < .001$, $\eta^2 = .135$.

Lastly, a significant three way interaction between veracity, source, and content was observed, $F_{(1,98)} = 68.605$, $p < .001$, $\eta^2 = .412$. For a graphical representation, see Figure 1 and Figure 2.

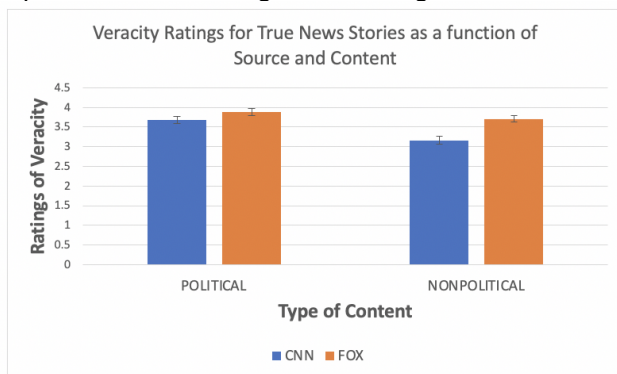


Figure 1. Participants were significantly more likely to judge a news story from CNN as fake when it was in a nonpolitical context as opposed to a political context despite all the stories being objectively true.

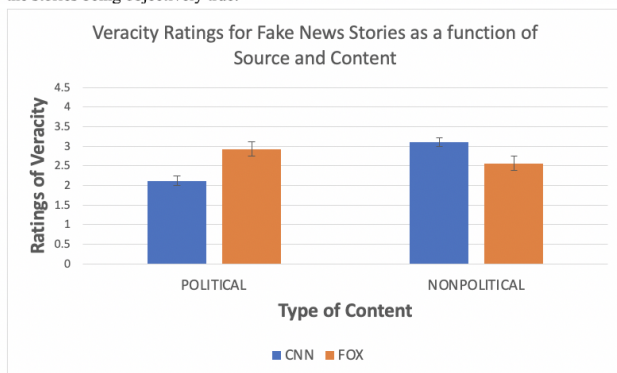


Figure 2. In regard to fake news stories, participants were significantly more likely to produce higher veracity ratings for Fox news when the stories were in a political context. Conversely, participants were significantly more likely to produce higher veracity ratings for CNN when the story was in a nonpolitical context.

Social Media Disorder

In order to test the hypothesis that SMD will interact with accuracy of veracity evaluations, the data were submitted to a 2 (Veracity: True, False) $\times$ 2 (Source: CNN, Fox) $\times$ 2 (Content: Political, Nonpolitical) mixed model repeated measures ANOVA with veracity, source, and content entered as within-subject factors and a binary SMD variable entered as a between-subject factor.

The data produced a significant interaction between SMD and veracity such that veracity ratings produced

by participants with SMD did not significantly differ whereas true news stories received significantly higher veracity ratings than fake news stories among participants without SMD, $F_{(1,98)} = 19.425$, $p < .001$, $\eta^2 = .165$. See Figure 3 for a graphical representation.

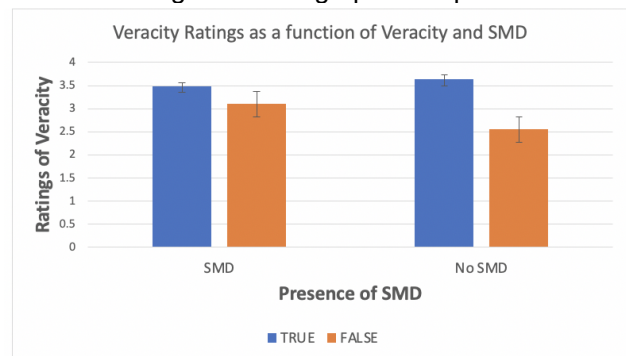


Figure 3. Veracity ratings between true and false news did not significantly differ among participants with SMD whereas participants without SMD produced significantly higher veracity ratings for true news as compared to fake news.

SMD also significantly interacted with the source of the news such that participants rated both CNN and Fox as relatively the same veracity whereas veracity ratings for Fox were significantly higher among participants without SMD, $F_{(1,98)} = 8.390$, $p = .005$, $\eta^2 = .079$. See Figure 4 for a graphical representation.

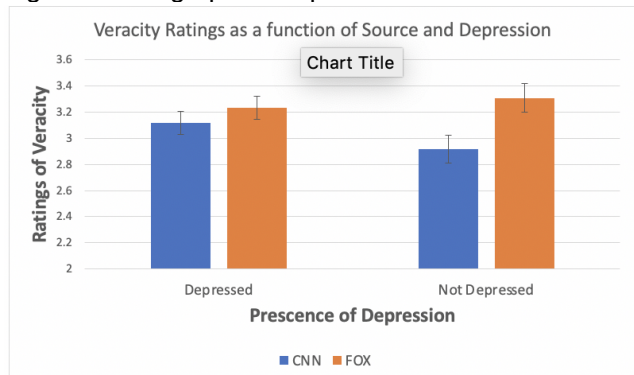


Figure 4. Veracity ratings between CNN and Fox did not significantly differ among participants with SMD whereas participants without SMD produced significantly higher veracity ratings for Fox news compared to CNN.

The data failed to produce a significant interaction between SMD and content, $F_{(1,98)} = .003$, $p = .958$.

Depression

In order to test the hypothesis that the presence of depression would significantly decrease participants' ability to correctly identify true and fake news, the data were submitted to a 2 (Veracity: True, False) $\times$ 2 (Source: CNN, Fox) $\times$ 2 (Content: Political, Nonpolitical) mixed model repeated measures ANOVA with veracity, source, and content entered as within-subject factors and a binary CESD variable entered as a between-subject factor.

The data produced a significant interaction between CESD and veracity such that veracity ratings across true and fake news were identical among clinically depressed participants whereas veracity ratings for true news stories were significantly higher compared to fake news stories among participants

who are not depressed, $F_{(1,98)} = 4.727$, $p = .032$, $\eta^2 = .046$. For a graphical representation, see Figure 5.

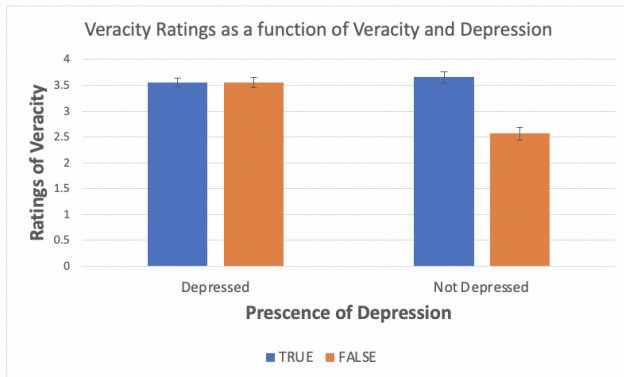


Figure 5. Veracity ratings were significantly higher for true news stories compared to fake news stories among participants without depression whereas veracity ratings across news legitimacy were identical among clinically depressed participants.

The data also produced a significant interaction between depression and the source of the news story. Specifically, depressed participants rated true news significantly less true than fake news whereas there was no significant difference in veracity ratings among the non-depressed participants, $F_{(1,98)} = 6.255$, $p = .014$, $\eta^2 = .060$. See Figure 6 for a graphical representation.

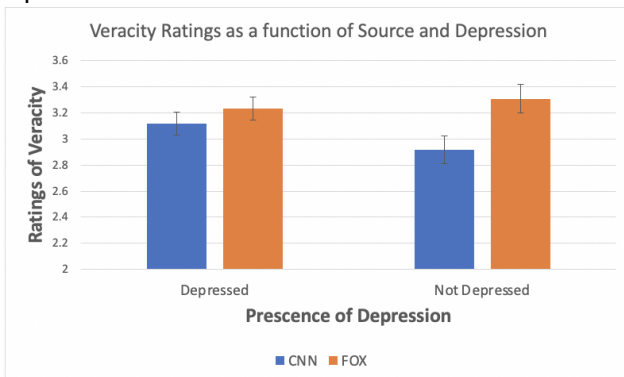


Figure 6. Veracity ratings between CNN and Fox did not significantly differ among depressed participants whereas veracity ratings for Fox were significantly higher than those for CNN among participants without depression.

The data failed to reveal a significant interaction between depression and content, $F_{(1,98)} = 0.121$, $p = .753$.

Discussion

Overall, participants in the current study assigned significantly higher veracity ratings to true news stories than to fake news stories. Thus, the results provide evidence that participants are significantly better at correctly identifying true news as true than they are at correctly identifying fake news as fake. Veracity ratings were significantly higher for Fox news as compared to CNN sourced news in all conditions except for fake nonpolitical news. Here, veracity ratings across sources flipped and CNN received significantly higher veracity ratings. The current study also observed that,

perhaps counter to intuition, that individuals who exhibit symptoms of SMD are significantly less capable of correctly discerning true from false news. Similarly, participants who exhibited symptoms of depression, on average, assigned true and fake news identical veracity ratings whereas their nondepressed counterparts were able to correctly discern true from fake news.

It is worth noting that participants in the current study were under no time constraint, thus enabling controlled cognitive processing and deliberate thought when evaluating news veracity. It is possible that this ability to deliberate may have led to the significant biasing observed in respect to the source. Typically, CNN is associated with liberal and democrat political attitudes whereas Fox News is associated with conservative and republican political attitudes. It is possible that these underlying notions about each of the two news sources fueled the biasing observed. Nonetheless, participants varied a large amount in how much time they took to complete the study. Therefore, while some participants may have employed this slow, controlled process to make an evaluation, others may have based their evaluations on quick, intuitive judgements. In other words, some participants may have employed automaticity even though they did not have to. Future research may benefit from deliberately slowing participants down and requiring controlled information processing.

The results of the current study shed light on how political and nonpolitical content influences individuals' ability to discern truth from fiction within news. As seen in Figure 2, participants were significantly worse at media truth discernment when the content was political as opposed to nonpolitical content. It is possible that this is, in part, due to in-group preferences and preconceived attitudes about political figures each participant likely possesses. However, data in the current experiment did not produce a significant interaction between the source of news and participants' political affiliation. With 47% of conservatives identifying Fox news as their primary source of news and 15% of liberals naming CNN as their primary source (Mitchell et al., 2014), this lack of an interaction points to a limitation in measurement methodology; specifically, in the measurement of participant political affiliation. The current study included a binary measure between Republican and Democrat as opposed to a continuous measure. This binary measurement limits the ability to investigate the strength of which each participant affiliates with either party. Future research may benefit from utilizing a continuous measure such as a Likert-type to measure participant political affiliation. Using this method as opposed to the binary measure utilized in the current

study allows for further, and more in-depth, analysis of how political affiliation influences veracity evaluations. It is also possible that participants categorize these political figures with both a political party/ideology and a particular news source (i.e. Nancy Pelosi with CNN and Donald Trump with Fox) which may influence evaluations to utilize automaticity as opposed to deliberate control; thus allowing for more bias and ultimately ignoring indicators of objective veracity. This finding creates a potential explanation as to why fake news is spread significantly faster, as observed by Vosoughi et al. (2018). Future research may benefit in examining the power of news source biasing. In the current study, knowledge of the source of the news story had a profound effect on participants' ability to discern true from fake. That being said, in-group preferences for particular media sources should potentially be examined alongside the possibility of the connection to political ideology and affiliation.

Results of the current study supply information on individuals' susceptibility to falsehoods online. As social media is the largest medium for misinformation today, and with the growing number of individuals who receive their news from online sources and social media (Shearer & Gottfried, 2017), companies such as Twitter and Facebook have begun to implement new measures to limit the spread and impact of such misinformation. For instance, Twitter has implemented disclaimers describing the falsehood of the information within the tweet that users then have to click past in order to view the tweet itself. Additionally, Twitter removes all flagged tweets from the recommendation algorithm. This being said, results of the current study shed light on which of these users may benefit from extra intervention when it comes to fake news consumption (Bond, 2020).

Future research may benefit from examining the mechanism behind the findings of the current study. Specifically, the finding that those with SMD are significantly worse at correctly identifying true and fake news. This is perhaps counterintuitive. Typically, as one is exposed to more, or practices a skill more, they become better at said skill. However, the findings of the current study suggest otherwise; that the more one is online, the worse they are at discerning true from false.

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