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The Effects of Counterfactual Priming on Belief in Fake News

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The Effects of Counterfactual Priming on Belief in Fake News

By
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Masters Candidate, Sean Bogart, has successfully defended and made the required modifications to the text of the master's thesis for the M.S. during this Spring Semester 2019.

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Abstract

Fake news overwhelmed social media platforms, like Twitter and Facebook, during the 2016 U.S. presidential election. This new, digital brand of fake news that can be spread much more rapidly than older forms, is coupled with a lack of academic research into its effects, the reasons that certain individuals trust its veracity, and methods of decreasing overall belief in fake news. Confirmation bias is one of several reasons why individuals fall victim to fake news; although there are a few strategies that can be used to combat the negative effects of confirmation bias; counterfactual reasoning is one that has demonstrated success. In the current study, participants were assigned to either a counterfactual priming scenario or a non-counterfactual scenario, before assessing the accuracy of a series of images that all contained verified fake news. Results showed little evidence that the counterfactual prime lowered accuracy judgments about politically congruent images for both left- and right-leaning individuals, but it seemed to be effective with respect to judgments about politically incongruent images. Individual political leaning was the biggest predictor of overall belief in fake news for politically congruent images. The findings overall provide an understanding about how decisions are made about the veracity of politically congruent or politically incongruent fake news.

Introduction

The history of false and misleading news reports is relatively rich and lengthy. Moreover, the usage of these reports have been primarily used in the political, religious, or profit-driven settings to manipulate beliefs. Throughout this introduction, not only will there be discussion of a foundation of this historical usage both in the United States and abroad, but also a discussion of the cognitive mechanisms that allow many of us to fall victim to fake news. I will discuss cognitive biases that lend themselves to shortcuts in decision-making processes (e.g., in-group and confirmation bias) as factors that can predict vulnerability to fake news belief. There are a few methodologies that have been used in previous research to mitigate the effects of these biases, but one, counterfactual reasoning, is discussed in detail, along with an overview of the current study.

History of False News Reports

The advent of misleading news reports dates to the creation of the printing press in 1439 (Soll, 2016). The majority of early misleading news reports were religiously driven, and with no other sources to verify the details, much of what was printed was assumed to be true. False news reports later expanded into the realms of the mythical and spectacular, but also remained heavily influenced by political and religious motives (Soll, 2016). Most of these plagued European nations at the time; however, the beginning of American politics was not immune to the use of misleading information. Ben Franklin once used this tool to his advantage to create fear of American Indians and King George to increase enlistment in the war for independence; a presidential candidate once wrote false reports of his opponent's death to increase votes (Soll, 2016). Thus, false news reports have long been used in many different realms, often with religious or political underpinnings, and that trend continues today.

Fake News and Partisanship

One of the more common settings for fake news is politics, and the 2016 U.S. Presidential election was no stranger to its effects. In fact, since the 2016 election cycle, the term 'fake news' rose in

usage by almost 365% and was named the 2017 word of the year (Harper & Baguley, 2019). Even with the massive uptick, not much academic data has been collected on the current state of fake news; in an exception, Buzzfeed News collected data in the months leading up to the Presidential election. Using the content analysis tool, BuzzSumo, keyword searches on election names (e.g., Trump, Clinton) and phrases (e.g., Russia collusion, Pizza-Gate) were conducted, in addition to searches of a list of known fake news websites used to access viral stories. According to the data collected by Buzzfeed (2016), from August 2016 to the date of the U.S. election (November 8, 2016), the top five fake news stories about the election were shared a total of 3,771,000 times on Facebook, almost one million more times than the top five real stories. Moreover, the proliferation of fake news appeared to be biased toward the right. In a separate analysis of over 150 fake news articles, a total of 115 were pro-Trump or anti-Clinton (30 million shares), whereas only 41 were pro-Clinton or anti-Trump (7.6 million shares; Allcott & Gentzkow, 2017).

The reason for this apparent partisan imbalance is multi-faceted. One explanation came from providers of fake news themselves, claiming that there was a higher demand for the pro-Trump/anti-Clinton stories (Sydell, 2016). A second explanation could be a reported decline in overall trust of mainstream media by Republicans during the run-up to the election, so these individuals turned to more obscure sources (Allcott & Gentzkow, 2017). However, the level of partisanship could be due to an underdog mentality, a way of bolstering the losing party or derailing the majority one. Although there is little academic research on the surge of fake news, many news outlets, including Snopes (a prominent fact-checking website), have indicated an increase in pro-Democrat fake news stories since the election (Levin, 2017; Meyer, 2017). Moreover, recent research does suggest across three studies that individuals on both sides of the political spectrum fall victim to fake news information (Harper & Baguley, 2019). This would be an indication that the motivation to believe fake news, especially politically driven fake news, is not simply a result of certain political ideologies being more susceptible.

Fake News Consumption

Similar to the partisanship seen in the overall frequency and sharing of fake news, a political divide also seems to exist among individuals who consume false news stories. Narayanan and colleagues (2018) found that individuals who identify as "Trump Supporters" share the greatest amount of fake news stories on Twitter, compared with other Twitter users, while far-right pages share the most fake news reports on Facebook, compared with non-right-leaning pages. Not only did right-leaning individuals share fake news stories at a higher rate, on average, but of the total articles consumed by Trump supporters in the final month of the election, an average of 6.2% of them were fake news reports, compared to only .8% by Clinton supporters (Guess, Nyhan, & Reifler, 2018). Although an estimated 27% of U.S. adults visited either a pro-Trump or pro-Clinton fake news site, defined as a news site sharing stories that are fabricated, but presented as if from legitimate sources, and promoted on social media in order to deceive the public for ideological and/or financial gain (Pennycook et al., 2017), in the weeks leading up to the election, the majority of fake news engagement and consumption was among those leaning most strongly to the right (Guess et al., 2018).

Fake News and Social Media Spreading

Beyond the behaviors of social media users lies another problem affecting the fight against the rapid spread of misinformation online: social bots. Social bots are computer-controlled accounts designed in large numbers to perpetuate false or sensationalized news stories to increase views and engagements. The total number of active social bots during the lead-up to the election is unknown; however, one analysis of over 5.7 million distinct Twitter accounts found that an estimated 4.9% of these accounts were Liberal bots and 6.2% were Conservative bots (Badawy, Ferrara, Lerman, 2018). The bots are used as a means of quickly spreading false or propagandized stories on a large scale. In fact, an analysis of over 14 million Twitter posts discussing different topics related to the 2016 election

showed that automated accounts, or social bots, were responsible for sharing misleading or false news stories at a much higher rate than the average Twitter user (Shao, Ciampaglia, Varol, Flammini, & Menczer, 2017). Additionally, Conservative Twitter accounts retweeted suspected Russian troll accounts 31 times more often than did Liberal accounts (Badawy, et al., 2018).

The large-scale spread of fake news, especially through social media, is becoming problematic for sites like Facebook and Twitter. Due to both sites' high number of users, combatting the spread of misinformation is quickly becoming a priority. In addition, the number of U.S. adults obtaining news on social media is increasing. U.S. adults reported a 19% increase in news consumption through Facebook from 2013 to 2016, with 62 percent of U.S. adults reporting that they got at least some news through sites like Facebook and Twitter in 2016 (Gottfried & Shearer, 2016). Although Facebook announced late in 2017 that they would begin actively combatting the sharing of fake news stories (Schwartz, 2018), the effects of this change have yet to be seen. Further, many individual users do not take the time to verify whether the false stories are based in fact. A survey found that a reported 13.3% of individuals exposed to fake news in the last few weeks leading up to the election did not fact-check any article they read, and only about 25% read any fact-checking article at all in the final month of the election (Guess et al., 2018). This large-scale spread, coupled with the increase in U.S. adults obtaining news from social media sites, is increasing the overall exposure to fake news.

Fake News Belief – Exposure

The reason behind belief in fake news is likely multifaceted, and likely the result of many different biases and cognitive mechanisms. One explanation is exposure to or familiarity with a news article. Indeed, the exposure only needs to be to an article headline, and even one exposure is sufficient for individuals to rate the accuracy of an article significantly higher than those with zero exposure (Pennycook, Cannon, & Rand, 2017). In addition, an individual exposed to high levels of fake news and low levels of real news is much more likely to find fake stories accurate than someone exposed to high

levels of both or only real news (Balmas, 2014). This exposure effect may explain why fake news belief ran so rampant in the 2016 U.S. presidential election.

The Pizza-Gate conspiracy theory is an example on how exposure to falsified information can lead to a drastic outcome. This conspiracy theory was predicated on the release by Wikileaks of e-mails stolen from officials related to the Democratic Party. An individual on the social media site, Reddit, fabricated a theory that Hillary Clinton and other high-ranking Democrat officials were operating a child sex ring out of a pizza shop local to Washington D.C. News of this story spread quickly, which led to an armed U.S. citizen driving from South Carolina to the pizza shop, and opening-fire (Hauck, 2017). The Pizza-Gate theory was spread on social media and the shooter acted because of his belief in the story's accuracy.

Fake News Belief - Bias Blind Spot

The Pizza-Gate shooter was exposed to the conspiracy story; however, this exposure may only be a surface-level explanation for why he believed and later acted. We all use mental shortcuts – known as heuristics – when making decisions. These shortcuts are based on social stereotypes and preconceived notions, and often lead to cognitive biases. Individuals, however, are often completely unaware of their own biases, a phenomenon known as the bias blind spot (Pronin, Lin, & Ross, 2002). The bias blind spot works as a more specific function of the concept of naïve realism, or the notion that we view the world objectively, and any individual who disagrees is either incorrect or biased (Ross & Ward, 1997). This lack of awareness of our personal biases and a combined belief in our own objectivity are unaffected even when knowingly using biased decision-making processes (a Democrat only viewing left-leaning news, but believing they have reached an objective conclusion; Hansen, Gerbasi, Todorov, Kruse, & Pronin, 2014). For example, Hansen and colleagues (2014) asked participants to provide feedback on a test where they performed poorly; in one condition, participants were asked to provide only negative feedback about the test they took (biased conclusion) while in another condition, they

were asked to provide both positive and negative feedback (objective conclusion). The researchers found that, although those individuals only providing negative feedback reached conclusions that lacked positive descriptions of the test, individual self-assessments showed these individuals believed they reached an objective conclusion. Although the bias blind spot has yet to be explored in regard to fake news, it has shown that an inability to be objective when making decisions can become problematic, especially in group settings.

Fake News Belief – In-Group Bias

A preference for individuals who are similar to us has been well documented in research. For example, Lydon, Jamieson, and Zanna (1988) found that attitude similarities led to increased feelings of both respect and likeability. This effect occurs in social media environments as well, where Republicans who share their political views on Facebook only have about 18% of friends that are left-leaning, and Democrats only have about 20% of right-leaning friends (Allcott & Gentzkow, 2017). In line with this preference for similarity is one particular type of bias that may be responsible for increased beliefs in fake news: in-group bias. An in-group is a group of individuals who share a common trait or belief. For instance, political in-groups revolve primarily around the party with which an individual identifies. These political in-groups can significantly affect our ability to make deliberate decisions when messages align with our ideological beliefs, making these judgments nearly automatic (Gilead, Sela, Maril, 2018). Moreover, this effect can become especially problematic when deciding upon the accuracy of statements by individuals either in one's in-group or not. A statement is received more positively and judged to be more accurate, on average, when spoken by a member of an in-group, in comparison an out-group member (Mackie, Worth, & Asuncion, 1990). Additionally, this preference for in-group statements, compared to those from out-group members, persists even when a statement from an in-group member contains irrelevant criticism (e.g., U.S. college students were told that international colleges were superior, but based on food quality rather than any educational criterion; Khoo & See,

2014). In other words, there is higher preference for statements given by perceived in-group members than for out-group members, whether the information is directly linked to ideologies or not.

Fake News Belief – Confirmation Bias

Although in-group bias can negatively impact group decision making (e.g., groupthink), in-group bias may only be symptomatic of a larger problem in the fight against fake news: confirmation bias. Confirmation bias, as defined by Nickerson (1998, pg. 1), is the "seeking or interpreting of evidence in ways that are partial to existing beliefs, expectations, or a hypothesis in hand." In other words, confirmation bias serves as a cognitive shortcut through which individuals seek out information that supports their beliefs. Allcott and Gentzkow (2017) found that, in addition to having a higher proportion of similarly aligned friends, individuals also tend to interact more with news that aligns with their ideologies. The effects of confirmation bias extend beyond the information to which one attends, driving the information that one actively seeks out. Several previous findings suggest that individuals will actively seek out information that confirms their beliefs or that confirms their hypotheses (Snyder & Swann, 1978; Galinsky & Moskowitz, 2000; Kray & Galinsky, 2003). One particular study by Lord, Ross, and Lepper (1979) showed that individuals who either supported or opposed capital punishment judged articles confirming their stances as significantly more convincing than those arguments that opposed their personal view. Further, when individuals received congruent threats (e.g., a threat of terrorism followed by a court decision on a terrorism case), they are more likely to search for confirmatory information than when no threat is present than when receiving incongruent threats (e.g., a threat of terrorism followed by a court decision on an economics-based case; Fischer et al., 2011).

Echo Chambers

Social media may only be escalating the problem. Researchers report that sites like Facebook often create echo chambers of news stories, where individuals only see information with which they

agree (Vicario et al., 2015). In fact, regarding the spread of information on social media, social homogeneity, or having a higher proportion of friends with similar beliefs, is the largest predictor of increased content diffusion (Vicario et al. 2016). These echo chambers can lead to social media fostering an environment where false news reports can spread at high rates and with increased beliefs they these reports are accurate.

Reducing Confirmation Bias – Preference-Inconsistent Information

Although confirmation bias is pervasive and can be responsible for creating problems in making accurate judgments and decisions, its effects can be reduced. One mechanism that has been used to decrease the effects of confirmation bias is exposure to preference-inconsistent information. Schwind, Buter, Cress, and Hesse (2012) provided participants with information on a topic that was either aligned with or non-aligned with their beliefs. Those provided with the non-aligned information experienced lower levels of confirmation bias and a more moderate view of the topic (Schwind et al., 2012), on average, than those receiving aligned information. Although researchers have found evidence that this type of contrasting information helps alleviate the effects of confirmation bias, a phenomenon known as the backfire effect contradicts this notion. This effect suggests that when individuals believe false information, presenting them with correcting information can have a reverse effect, where individuals can become more entrenched in their initial beliefs (Nyhan & Reifler, 2010). The backfire effect may also suggest that approaching belief in fake news head on with correct or inconsistent information may not be the most effective means of decreasing belief in fake news.

Reducing Confirmation Bias – Disfluency

Another method shown to decrease the effects of confirmation bias is disfluency, or making an item more difficult to process. Hernandez and Preston (2012) presented individuals with information that either supported or opposed their beliefs on certain topics, such as capital punishment. Individuals

either received this information in presentable and easy to read font (Times New Roman) or in a light gray, difficult-to-read font (Haettenschweiler). They found that those individuals given the more difficult font exited the study with less extreme views, on average, than they held before the study, whereas those given the easier-to-read font left with more extreme views. Researchers suggest that disfluency has this effect on an individual's beliefs because the more-difficult-to-process information prompted analytical thinking to increase as well, in comparison to high fluency groups (Hernandez & Preston, 2012). In fact, higher levels of analytical thinking are positively correlated with a stronger ability to discern between real and fake news articles (Pennycook & Rand, 2017). Although disfluency seems to be effective, there is a lack of empirical research into this method as a reliable form of decreasing the effects on confirmation bias.

Reducing Confirmation Bias – Counterfactual Reasoning

Another method that has garnered attention in more recent research has been the use of counterfactual reasoning. Counterfactual reasoning, a term coined by Hoch (1985), involves the imagining of alternative outcomes, or counterfactuals, to events that have already occurred. Counterfactuals can be made in two directions: upward and downward. Upward counterfactuals involve evaluating how a scenario might have played out more positively had a difference been made (e.g., allowing someone to pass you in line, only for them to win a prize for being, say, the millionth customer at a store). A downward counterfactual would consist of imagining how a particular scenario could have been worse (e.g., in response to receiving a speeding ticket, imagining that one could have lost one's license; Roese, 1997). Although early research on counterfactual thinking focused primarily on its emotional effects (i.e., upward counterfactuals lead to negative affect, downward to positive affect), more recent research has begun to explore how counterfactual priming can counteract the effects of confirmation bias. Counterfactual priming is the usage of a stimulus that elicits a mind-set where

relevant, but alternative outcomes are considered in response to the initial stimulus situation (Galinksy & Moskowitz, 2000).

Among the first researchers to explore the ability of counterfactual priming to fight confirmation bias were Galinsky and Moskowitz (2000). These researchers believed that, by priming counterfactual thoughts, an individual would focus more on alternative explanations in scenarios in which seeking confirmatory information is the typical response. For instance, Galinsky and Moskowitz (2000) primed participants with one of two stories that involved attending a concert in which a particular seat location was chosen to win a trip to Hawaii – either the protagonist switched seats and lost the trip to Hawaii as a result (upward), or won the trip as a result of switching seats (downward). Participants were then told that a confederate in the study was extroverted, and the participants could ask questions to determine whether the confederate truly displayed this trait. The results indicated that those individuals who experienced either an upward or downward counterfactual prime exhibited significantly fewer confirmatory information seeking behaviors, on average, when asked to decide if the confederate was truly extroverted, in comparison to a control stimulus (Galinsky & Moskowitz, 2000). It is important to note that although Galinsky and Moskowitz (2000) found both upward and downward counterfactuals effective, upward counterfactuals led to the strongest mean priming effect, as compared with non-counterfactual primes. Later studies indicated that the use of counterfactual primes also helped fight the effects of confirmation bias when making group decisions, whether these decisions were made in person or through virtual meetings (Kray & Galinsky, 2003; Bartelt, Dennis, Yuan, & Barlow, 2013).

The counterfactual scenarios presented in Galinksy and Moskowitz's research (2000) have also been used in research outside of psychology when combatting confirmation bias. For instance, some researchers have adapted this setup to counter confirmation bias in criminal investigations, especially when negating old hypotheses about the guilty party (O'Brien, 2009) and in design (engineering) research when fighting against mistakes due to time constraints (Hallihan & Shu, 2013). There are

suggestions that using counterfactual primes to diminish confirmation bias is an effective means of accomplishing a decrease in overall belief in fake news across a range of contexts. Because confirmation bias is one of the main mechanisms leading to belief in fake news, it seems that counterfactuals may be one way of fighting against the influence of fake news.

The Current Study

The goal of the current study is to evaluate the effectiveness of a counterfactual prime in reducing the effects of confirmation bias on individuals' beliefs in fake news accuracy. As discussed previously, research has suggested that counterfactual primes are an effective method of fighting the effects of confirmation bias; however, no research, to my knowledge, has assessed the usefulness of this technique in regard to fake news. Further, fake news has recently undergone a change in methods of dispersion, where social media has become the dominant way to share it. As a result, the mechanisms of combatting belief in the newer, social-media-driven fake news lack empirical research, including with respect to the effects of counterfactual priming. Also, with counterfactual thinking being used in studies outside psychology to mitigate the negative effects of confirmation bias, it seems that the effects of counterfactual primes might extend to fake news as well.

In the current study, participants read one of two scenarios: One scenario involved an upward counterfactual, and the second scenario was a control stimulus, where no counterfactual was present. The upward counterfactual scenario was similar to that used in Galinsky and Moskowitz (2000), in which an individual at a concert changes seats and, as a result, does not win the trip to Hawaii that the person who claimed the original seat won. The non-counterfactual scenario involved the individual not moving seats, and not winning the trip to Hawaii. Although Galinsky and Moskowitz (2000) provided a scenario of an upward and a downward counterfactual, the upward counterfactual showed higher reliability and higher mean rates of the development of counterfactual thoughts. For that reason, I used an upward counterfactual in the current study. Participants were also presented with political fake news images

that are either left-leaning or right-leaning in nature, and asked to give a rating of accuracy and confidence in their accuracy judgment.

Hypothesis 1: I hypothesized that participants primed with a counterfactual would report lower average levels of belief in the accuracy of false information, along with lower average levels of confidence in their accuracy judgments, as compared with those not receiving the prime. This hypothesis is based, in part, on the Kray and Galinsky (2003) finding that group decisions primed with counterfactual thoughts showed lower mean levels of confidence than those not primed with counterfactual thoughts.

Hypothesis 2: Those with a political leaning that is congruent with the content of the images will report higher levels of belief in the accuracy of false information, on average, than those where political leaning is incongruent. Relatedly, I hypothesized that they would report higher confidence, on average, in these accuracy judgments, than those who disagree with the content. As Nickerson (1998) mentions, confirmation bias affects not just the information we attend to, but how the information we seek out, and how we interpret ambiguous information. This hypothesis is based on the effects, indicated by Nickerson (1998), that confirmation bias has on an individual's judgment of accuracy and confidence in this judgment.

Hypothesis 3: I predicted an interaction of priming (counterfactual, none), participants' political leaning (left, right, and centrist), and political leaning of the images (left, right) such that participants primed with a counterfactual (compared to no prime) will report lower judgments of accuracy and confidence in those judgments, on average, than those who receive no prime, when their own political leaning is congruent with the content of the presented information in the images. I expect a smaller difference between the two priming groups when participants disagree with the content. This hypothesis is in line with previous findings suggesting that counterfactual primes help mitigate the

effects of confirmation bias, especially in those individuals seeking to confirm information that matches their political ideologies.

Method

To achieve statistical power 0.80 with a medium effect size, an alpha level of 0.05, and a two-tailed test, 128 participants were needed. This was determined by an a priori power analysis run using G*Power (Faul et al., 2007). Participants were recruited from the Seton Hall Department of Psychology participant pool. All undergraduate students over the age of 18 were eligible, and volunteers completed the study for course credit.

Participants were 151 (82% women) undergraduate students at Seton Hall University. All participants were recruited using Seton Hall's SONA research participation pool. All of the participants were over the age of 18, and the majority of participants were either first-year (41%) or sophomore (33%) students in introductory psychology courses.

Stimuli

Prime Scenarios

Two scenarios (one upward counterfactual, one control; Appendix A) describing a protagonist attending a concert and losing a trip to Hawaii were used as a cognitive prime. The scenarios were similar to those used in Galinksy and Moskowitz (2000). The upward counterfactual was chosen as the main cognitive prime because it showed stronger effects in Galinsky and Moskowitz (2000) in comparison to a downward counterfactual. The counterfactual scenario detailed a protagonist, Jane, attending a concert, moving to a better seat, and as a result, losing a potential trip to Hawaii. The control scenario was similar, but Jane never switched seats, and still lost the trip. After reading the scenario, participants listed different thoughts Jane may have had in response to losing the trip.

Cognitive Reflection Test

Scores on the Cognitive Reflection Test (CRT; Frederick, 2005) were used as a covariate in the analysis in order to control for the critical thinking ability of the participants, a skill correlated with fake

news discernment. The questions on the assessment have an intuitive-based, but incorrect, answer, and a reasoning-based, correct answer. An example of one of the questions on the CRT is: “A bat and a ball cost $1.10 in total. The bat costs $1.00 more than the ball. How much does the ball cost?” The intuitive answer is .10 cents, however, the correct answer is .05 cents. Pennycook and Rand (2017) used a 7-item version that included the three questions from the original, and 4 more from a non-numeric version used in research by Thomson and Oppenheimer (2016). An example question from the non-numeric version is: “If you’re running a race and you pass the person in second place, what place are you in?” with “first” as the intuitive, incorrect answer and “second” as the reasoning-based, correct answer. The 7-item version used by Pennycook and Rand (2017) had a Cronbach’s alpha of .77 and was positively correlated with discernment of fake versus real news. The Cronbach’s alpha for the current study was a .74.

Familiarity

Exposure to a news story or headline can significantly increase an individual’s accuracy judgments of a fake news story. To assure that the counterfactual prime is decreasing confirmation bias, and not the exposure effect, participants were asked if they had seen the images before, on a 5-point scale, ranging from 1 (completely unfamiliar) to 5 (completely familiar). This was used as a covariate, along with the CRT scores.

Images

All participants viewed 12 images that contain false information regarding topics that described news that aligned with either left-leaning or right-leaning views. Each image was assessed prior to the study on how accurate they appeared by a group of 10 individuals. The three highest rated left-leaning and right-leaning images were used in the first block, with the final six making up the second block. The images were all randomized in viewing order in each of the individual blocks. The images were shown in a fashion similar to how they would be seen on social media if unclicked. Images were used instead of actual articles due to the increased focus on major social media sites to identify and remove fake news

articles and websites. The images will also span the political spectrum, in that half of the images shown will contain information supporting left-leaning politics, and the other half will show information supporting right-leaning politics. The images used were all verified false by Snopes, a prominent fact-checking website. Each image also has been shared primarily on social media platforms, whether it was Facebook or Twitter.

Accuracy

Participants were prompted following the viewing of each image to indicate whether they believed that the information presented in each image was accurate (Appendix B). This rating operated on a 7-point Likert type scale, ranging from extremely inaccurate to extremely accurate. Further, according to Pennycook (2017), the Cognitive Reflection Test (CRT) is positively correlated with the ability to accurately assess the veracity of information being presented. Due to this positive correlation, it is important to include the CRT as a potential covariate, as it could be a factor in better performance on accuracy judgments.

Confidence

After rating the accuracy of each image, participants were asked to indicate their confidence level in that accuracy judgment (Appendix B). The confidence measure was assessed on a 7-point Likert-type scale, ranging from strongly not confident to strongly confident. Kray and Galinsky (2003) used an 11-point confidence scale; however, Preston and Colman (2000) found that scales using more than 10 answer points showed lower reliability than scales using between 7 and 10 points. For the purposes of achieving the best measure of participant confidence, a 7-point scale was used.

Demographics

A brief demographics questionnaire was administered to participants (Appendix D). This section involved basic questions, such as age, semester, ethnicity, gender, and political leaning. Political leaning was assessed using a 5-point scale, ranging from very left-leaning to very right-leaning. When presented on the demographics sheet, the location of the directional leaning was presented on that location of the

document (left-leaning on the left side, right-leaning on the right side). The political leaning question was used as a non-randomized second independent variable in the analysis as a measure of confirmation bias effects, and was shown following participation to remove potential stereotype threat in decision-making. Recent research has shown the automaticity of confirming both grammaticality and logicality of arguments supporting an individual's personal and political beliefs (Gilead, Sera, & Maril, 2018; Gampa, Wojcik, Motyl, Nosek, & Ditto, 2019).

Procedure

Participants were provided with an informed consent form, which they signed before participating in the study. They were then randomly assigned to either the counterfactual prime group or non-prime (control) group. In the demographics, participants were also asked to indicate their political leaning, which was used as a second independent variable even though it was not randomly assigned.

Participants in the counterfactual prime group were presented with a scenario that included an upward counterfactual (imagining how a situation could be better). The scenario involved a concert-goer switching seats, and ultimately losing a trip to Hawaii as a result of switching seats. Participants were then asked to provide written examples of thoughts that the protagonist in the presented scenario would be thinking.

Participants in the non-prime group were presented with a scenario similar to the counterfactual prime group in which the protagonist did not win the trip to Hawaii; however, the protagonist had not switched seats. Participants were asked to provide written examples of thoughts the protagonist would experience in this scenario.

Immediately following the preceding scenarios, all participants were presented with a series of 12 images that have been shared on a major social media platform (Facebook or Twitter). The images were presented with information that had been verified false by the fact-checking website, Snopes. Further, the 12 images consisted of six that were left-leaning and six that were right-leaning. In order to

account for potential fatigue effects, the images were broken into two blocks, with each block containing three right-leaning and three left-leaning images. The images and related questions were shown within the survey creator, ePrime. Participants were given seven seconds to view each image to best simulate how one would view and interact with it in a social media environment. Most interactions through social media sites with these images are brief, and this shortened interaction was simulated in this study. Further, the shortened viewing time of each image induced a quicker processing time of the information, which increased the need to use a cognitive shortcut (e.g., confirmation bias).

After viewing each image, participants were prompted to indicate the degree to which they believed that the content is accurate, the degree to which they were confident in the accuracy of the content in the image, and how familiar they were with each image presented. Once participants viewed each image and responded to the related questions, they were asked to complete a demographics questionnaire. The demographics asked participants to indicate their political leaning, which was used as the second independent variable. Finally, all participants were debriefed.

Results

The effectiveness of counterfactual primes on minimizing the effects of confirmation bias was analyzed using 2(Priming: counterfactual prime, no prime) X 3(Political Leaning: left, centrist, right) X 2(Political Leaning of the Image: left, right) X 2(Block: Block 1, Block 2) repeated measures Bayesian ANCOVAs, where priming was a randomly assigned, between-groups variable, participant political leaning was a non-randomly assigned between-groups variable, image political leaning and image block were within-groups variables. The first ANCOVA assessed the accuracy ratings of each image, while the second evaluated the confidence ratings. The covariates for the ANCOVA were participants' CRT scores (critical thinking), and their ratings of their familiarity with the images. The covariates did not have a statistically significant effect on the dependent variables and were thus excluded from additional analyses. Thus, I report results without the covariates here.

Because Bayesian statistics were used to analyze the data, I used JASP statistical software (https://jasp-stats.org) to conduct the analyses. In order to assess hypothesized effects and interactions, I used the Bayes Factor (BF) inclusion measure in JASP. For each of the effects in the analysis, this measure gives a ratio of the average likelihood of all of the models that include that effect versus the average likelihood of the models that do not include that effect which gives a ratio of the average likelihood of all of the models (Jarosz & Wiley, 2014; BayesianSpectacles.org). Additionally, Kass and Raftery (1995) established cutoff values that indicate the strength of the Bayes Factor: 1 – 3.2 (bare mention), 3.2 – 10 (substantial), 10 – 100 (strong), and > 100 (decisive).

The first Bayesian ANOVA examined participants' accuracy ratings of the images. The results showed that, for left-leaning images, the counterfactual prime led to lower accuracy judgments by right-leaning individuals, on average, than by centrists and left-leaning individuals. Further, there was very strong evidence for a main effect of political leaning of the image for accuracy judgments, such that left-leaning images elicited higher overall accuracy ratings (M = 4.43), on average, than right-leaning images (M = 3.57; $BF_{inclusion}$ > 100), as well as a main effect of image blocks, where block one images were rated more accurately (M = 4.32) than block two images (M = 3.78; $BF_{inclusion}$ > 100). There was also some evidence for a main effect of individual political leaning, where Democrats rated ideologically aligned information more favorably ($BF_{inclusion}$ = 10.64) There was not strong evidence for main effect of the priming condition. There was, however, very strong evidence of a two-way interaction between participants' political leaning and the political leaning of the images ($BF_{inclusion}$ = 427.18). Lastly, there was small, but relevant evidence for a three-way interaction between the political leaning of the image, political leaning of the individual, and the priming condition ($BF_{inclusion}$ = 3.53). Figure 1 below shows the mean accuracy ratings for the left- and right-leaning images, where, the counterfactual prime induced higher mean accuracy ratings for individuals viewing ideologically aligned information for both left- and right-leaning individuals.

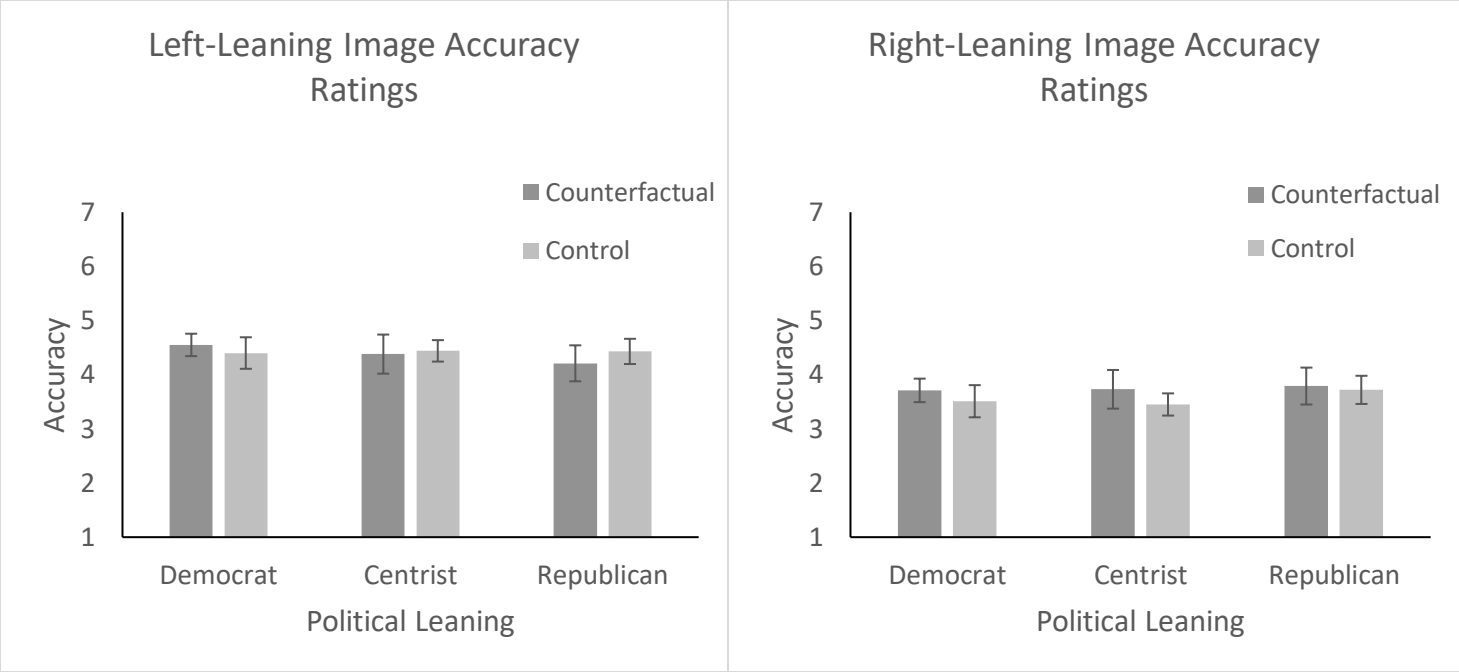

Figure 1: The means of the accuracy ratings amongst the different political leanings by the priming condition. Error bars represent the standard error.

The second ANOVA evaluated the confidence ratings of accuracy judgments for both blocks of images. Very strong evidence for a main effect of the political leaning of the image was present, where individuals were much more confident, on average, in accuracy judgments of left-leaning images (M = 4.4) than for the right-leaning images (M = 3.65; $BF_{inclusion}$ > 100). Similarly to the first analysis, there was very strong evidence for a main effect of image blocks, where the individuals were much more confident in the accuracy ratings of block one images (M = 4.24) than block two images (M = 3.81; $BF_{inclusion}$ > 100). Lastly, there was moderately strong evidence for a two-way interaction between the political leaning of the image and the blocks of images ($BF_{inclusion}$ = 12.55).

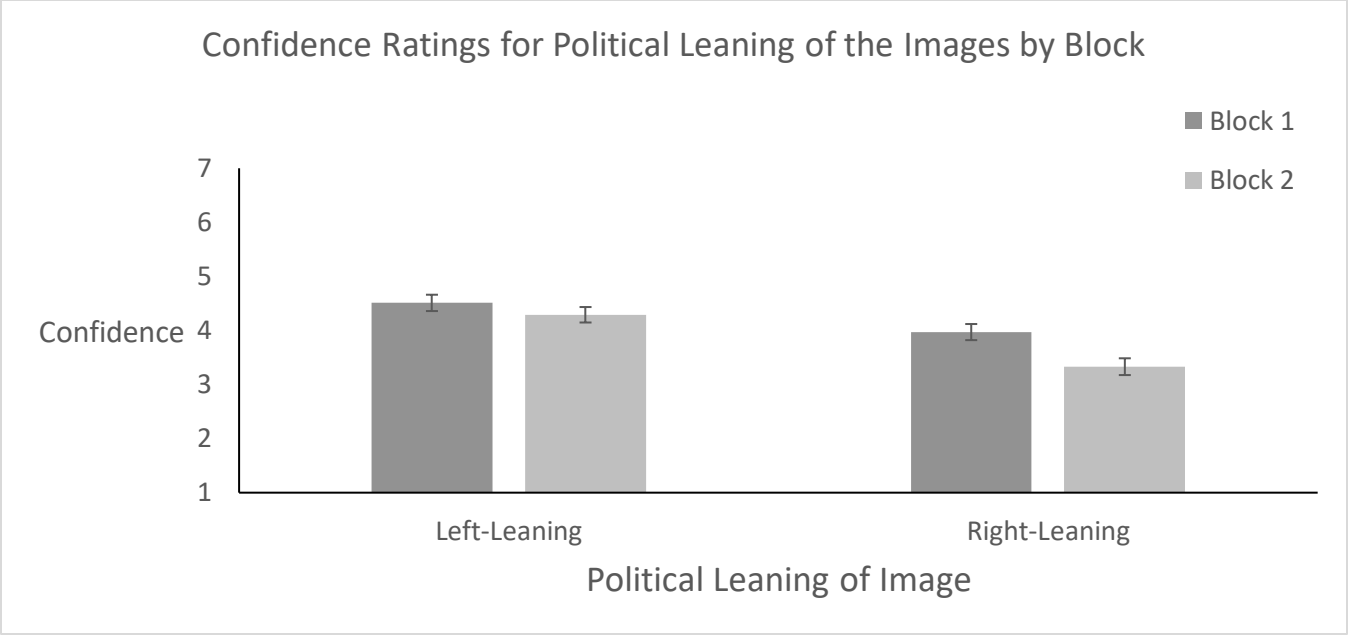

Figure 2:Means and confidence ratings of Political leaning of the image by the blocks presented. Error bars represent standard error.

Discussion

Overall, the results suggest that political ideology remains a strong predictor in political decision-making processes, even following a prime designed to lower the effects of confirmation bias. For left-leaning individuals, there was strong evidence that image accuracy ratings were, on average, higher when viewing images that aligned with political beliefs than when the images were not aligned. This trend was not seen with right-leaning individuals assessing right-leaning images, however, as no evidence was seen that right-leaning individuals viewed aligned images as more accurate, on average, than both left-leaning individuals and Centrists. Moreover, for right-leaning individuals specifically, the average accuracy ratings were lower in the prime scenario than in the non-prime condition when viewing politically incongruent images (that is, right-leaning individuals viewing left-leaning images). In contrast, left-leaning individuals' accuracy ratings of incongruent images were higher, on average, when reading the prime scenario than when reading the non-counterfactual scenario. Although accuracy ratings and confidence in those accuracy ratings did strongly differ, on average, between left-leaning and right-leaning images, the prime had little impact on either, except for when right-leaning individuals

viewed incongruent images. Further, Pennycook, Cannon, and Rand (2017) did show that critical thinking ability had a predictive relationship with the ability to discern between fake and real news. For this reason, CRT scores were initially included as a covariate; however, the results were inconsistent with those found by Pennycook and colleagues (2017).

Additionally, across both analyses (accuracy and confidence ratings), there was clear evidence that not only was the political of the image important, where left-leaning images were viewed as being more accurate, and garnering more confidence, but the particular block in which the image was seen had an effect as well. Images viewed in the first block were viewed as being more accurate and garnered higher confidence ratings than images in the second block. This difference could simply be due to the images in the first block being more representative of realistic fake news, or just through fatigue effects; specifically, participants may not have been attending to the images to the same degree in the second block as in the first. This effect was expected, however, and provides justification for the choice to split the images into separate blocks.

The reasons for the lack of evidence for the counterfactual prime are likely multi-faceted. When faced with political information, or any opinion-confirming information, individuals validate the accuracy of the information nearly automatically (Gilead, Sela, & Maril, 2018). This automaticity in decision-making situations, especially about opinion-congruent information, combined with the imposed time limit for each image (7 seconds), could be an explanation for why those in the counterfactual prime condition did not report lower accuracy ratings, on average, than did those in the non-prime condition. Moreover, according to work by Eidelman, Crandall, Goodman, and Blanchar (2012), right-leaning ideology is a result of more low-effort, or automatic thought processes, whereas left-leaning ideology uses more deliberate thought. This work, however, would not explain why left-leaning images were rated as being more accurate, on average, than right-leaning images, given the quick decisions due to the short time the images were visible.

Work by Eidelman and colleagues (2012), however, may suggest another explanation. Right-leaning ideologies tend to lend themselves to more low-effort, automatic thought processes, whereas left-leaning ideologies tend to lead to more of a deliberate process. By using a prime designed to increase critical thinking (deliberate processes), it is possible that the counterfactual prime led to higher left-leaning ideology than right-leaning ideology. This difference in thought and decision-making processes could explain why the prime was particularly ineffective on the judgments of left-leaning individuals. If self-identified left-leaning individuals are already using more deliberate thought processes, using a prime to encourage this would be ineffective. It is important to note that although the prime did not necessarily lead to higher levels of confidence in accuracy judgments in any condition, it did ultimately lead to higher critical thinking, on average, than did the control scenario, as evidenced by the CRT scores.

The study had several limitations, however. For instance, only one of the two between-groups variables was randomly assigned, with political leaning being a self-reported categorical variable. This lack of randomization in the variables can be problematic because through not randomly assigning one of the main variables, the distribution of the data could be affected adversely, where the observed data may not be normally distributed across all levels. Another limitation is that the study was conducted using college students. Links have been made between education level and political leaning and the sample population may not be representative of the larger population. Further, college campuses tend to be a bit more progressive and Liberal than Conservative and may lead some right-leaning individuals to be reluctant to share their views. This could have influenced the actual views of the individuals completing the study.

In future research, researchers might evaluate the use of counterfactual prime to elicit critical and deliberate thought in comparison to another group being put under high cognitive load to elicit a more automatic, lower effort thought process. This would address Eidelman and colleagues' (2012)

work on different thought processes used between the different ideologies. Another option would be to adjust the language within the prime to make it stronger, or even by making it apply to a political setting (Jane attends a political campaign rally, instead of a concert). Making the prime scenario use first-person language (use 'I', not 'Jane', as the protagonist) to produce a stronger attachment to the scenario may provoke more robust priming effects, especially when met with ideologically congruent stimuli. Lastly, the effects evaluated in the current study were short-term and immediate; future research should address if these effects would be seen long-term.

Overall, this research provides some information that might drive the fight to diminish belief in fake news, as it is presented today. Although the prime on its own did not provide any strong effects in diminishing the ideological allegiance to identified political leaning, there was evidence of increases in critical thinking, where those who received the prime scenario scored higher in the CRT than did those receiving the control scenario, on average. Moreover, in specific instances, the priming showed effects in diminishing accuracy judgments, especially when the political leaning of the image was incongruent with individual political leaning. This evidence of effectiveness for the prime is important moving forward with future research, as counterfactual thinking may hold the potential to mitigate belief in fake news.

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Appendix A

Counterfactual Scenario

Jane is attending a concert for her favorite band. Jane later switches seats to get closer to the stage. During the concert, the band announces one person will be selected to win a trip to Hawaii, based on who is currently occupying the seat chosen. Jane's old seat is chosen; however, because Jane moved seats, she did not win the trip to Hawaii.

Control Scenario

Jane is attending a concert for her favorite band. During the concert, the band announces one person will be selected to win a trip to Hawaii, based on who is currently occupying the seat chosen. Jane's seat is not chosen; therefore, she did not win the trip to Hawaii.

Appendix B

How accurate was the information in the previous image?

1	2	3	4	5	6	7
Completely Inaccurate			Neutral			Completely accurate

How confident are you in the accuracy judgment?

1	2	3	4	5	6	7
Completely Inaccurate			Neutral			Completely accurate

How familiar with the image are you?

1	2	3	4	5
Not Familiar At all		Moderately Familiar		Extremely Familiar

Appendix C

Demographics

Gender: ___ Male

___ Female

___ Other

Race/Ethnicity: __ African American/Black

__ Asian/Pacific Islander

__ Hispanic/Latino

__ Multiracial

__ Native American/American Indian

__ White

__ Not Listed (please specify) _____

Class Status: __ First year

__ Sophomore

__ Junior

__ Senior

Please indicate your political leaning using the scale below:

1	2	3	4	5
Far Left Leaning				Far Right Leaning