Fake news, who's opinion do we trust? The mass or an authority?

Studying the effects of notions of authority in fake news warnings and social endorsement on the perception of credibility and sharing intention

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Abstract

The spread of fake news has been a great concern since fake news on Facebook allegedly influenced the voting choices of many U.S. citizens during the 2016 presidential elections. Subsequently, Facebook introduced warnings against fake news in order to prevent people from believing fake news stories. However, because of the recency of the problem, scientific knowledge about these warnings is limited. Therefore, the present study investigated whether fake news warnings could be improved to further reduce the perceived credibility of fake news articles and to reduce a person's intention to share a fake news article. To improve the warnings, the present study added notions of authority to fake news warnings. Additionally, underneath every post or news article Facebook's interface shows notions of social endorsement that can increase the perceived credibility of fake news. Therefore the present study also sought to find out whether the proposed improvement could be undermined by these social endorsement cues. Participants engaged in a mixed designed experiment where they had to assess the credibility of fake news articles with a fake news warning on Facebook and indicate their intention to share the articles. We manipulated the level of authority of the source of the fake news warning and the number of social endorsements. The results demonstrated that authority and social endorsement cues did not affect participants' levels of perceived credibility or sharing intention. Furthermore, the authority and social endorsement cues did not interact which indicates that both variables do not affect each other's effect on perceived credibility or sharing intention. Finally, the results revealed that a person's intention to share a fake news article could be predicted by their perception of credibility.

Keywords: Facebook, social endorsement, authority, heuristics, cues, warnings against fake news, perceived credibility, sharing intention.

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Introduction

Since the U.S. Elections in 2016, the term ‘fake news’ went viral. Mainstream media outlets started publishing news articles which stated that Russia had allegedly interfered in the elections to favour Donald Trump by spreading false information about other presidential candidates. In response, U.S. President Donald Trump called the mainstream media articles that tried to discredit him out and labelled them as “fake news” (Persily, 2017). Both the mainstream media outlets and president Trump thus blamed fake news as the cause for the controversy surrounding the elections. A year later fake news became a true concern when Facebook CEO Mark Zuckerberg confirmed that 126 million Americans were indeed exposed to political fake news on Facebook that was distributed by Russian based sources. This meant that fake news might have influenced the public’s voting choice during the U.S. elections (CITS, 2018).

After these events, fake news got more attention in the scientific community among researchers in various scientific fields. Many scholars have studied and defined fake news in varying ways (Tandoc Jr., Lim, & Ling, 2018). For a definition of fake news, this study adheres to the definition of one of the most influential and recent papers about fake news by Lazer et al. (2018). In their literature review, Lazer et al. (2018), defined fake news as fabricated information that intentionally mimics the news and its content but does not mimic its organizational process or intent.

During the recent boom of new fake news studies, most scientists seemed to agree that social media are the primary platforms where fake news has gained a greater presence in recent years (Lazer et al., 2018). To elaborate, social media have significantly lowered the entry point for non-journalists to spread news. As a result, non-journalists could reach bigger audiences which allowed their news to compete with larger news outlets on social media (Lazer et al., 2018: Tandoc Jr. et al., 2018: Gelfert, 2018). In addition to the lower entry point, non-journalists also do not have to conform to the norms and standards set by large media

outlets (Lazer et al., 2018). This allows non-journalist essentially to spread whatever news they want, including fake news.

This is quite concerning because social media are becoming the main news source for a growing amount of people according to recent statistical reports (Pew Research Center, 2018). One of these reports published by Pew Research Center (2018) found that 20% of American adults frequently receive their news via social media. The same study also found that Facebook is the main social media platform for people to receive and read the news in the U.S.. Similar patterns of social media news consumption can be found in other western countries like The Netherlands. In The Netherlands, 29% of the people use social media as a news source (CvdM, 2018, p.40) and, like in the U.S., Facebook is the most popular social media platform for people to consume news (CvdM, 2018, p.49).

Furthermore, determining the credibility of a news article and identifying fake news might be harder for people on social media than on more traditional news platforms. Traditionally people generally consider the source of information or a news article to determine whether the information is credible or not and whether it is worth reading (Sundar, 2008). However, with new media platforms like Facebook, the assessment of news articles is not as straight forward as in a traditional newspaper. Other than information about the source and contents of the article, Facebook also provides information about others' opinions about the news. Facebook gives this information in the form of social endorsement cues (e.g. likes). People do often consider these social endorsement cues as indicators for the level of credibility of a news article (Sundar, 2008). For example, some scholars found that people are more likely to read articles that are endorsed by other people (Messing & Westwood, 2014; Anspach, 2017). In addition, social endorsement can also lead to increased perceptions of credibility for news articles and a greater intention to share these articles (Xu, 2013; Ma, Lee & Goh, 2014). In a fake news context, these findings are worrying because they do

imply that social endorsement contributes to higher perceived credibility and subsequently, can also lead to greater sharing and dissemination of fake news.

To prevent people from falling for fake news, researchers have searched for measures that could be implemented to reduce the perceived credibility of fake news. One of these measures that have recently been studied is fake news warnings on Facebook. Scholars found that warnings against fake news are moderately successful in reducing the perceived credibility of a fake news article (Clayton et al., 2019; Pennycook, Bear, Collins & Rand, 2017).

Although the moderate effectiveness of the warnings is promising, research to fake news warnings can be expanded on. For example, both Pennycook et al. (2017) and Clayton et al. (2019) did not consider the perceived authority of the source of the warnings as a possible factor that could contribute to the warnings' effectiveness. According to literature, whether the source of information is perceived as an authority or not is an important factor in determining the credibility of said information (Hilligross & Rieh, 2008; Sundar, Xu & Oeldrof-Hirsch, 2009). By adding clear notions of authority to these warnings it might be possible to further improve the warnings capabilities to lower perceptions of credibility. In addition, Clayton et al. (2019) and Pennycook et al. (2017) also did not examine social endorsement as a variable in their study, while the ability to endorse posts and news articles is a key feature of the Facebook interface. Therefore, there is a real chance that people see these social endorsements when they are looking at fake news articles.

Because these prior studies disregarded social endorsement and perceived authority, there is no current knowledge of the effect of social endorsement and a possible effect of the perceived authority of a fake news warning on perceived credibility and a person's sharing intention. Because of this lack of knowledge, this study will investigate (RQ1) what the

effects of the perceived authority of the source of a fake news warning and social endorsement are on people's perceptions of credibility and sharing intentions of fake news articles labelled with a warning on Facebook.

In addition, the generally opposite direction of the effects of both variables on perceived credibility gives reason to study whether they interact. It is currently unknown whether people attribute more importance to authority cues or social endorsement cues to determine the credibility of a fake news article. If people were to favour social endorsement cues over authority cues it could mean that the proposed improvement would be ineffective for socially endorsed articles. Or even more worrying, it could mean that people rather trust social endorsement cues over fake news warnings as indicators of the credibility of fake news articles.

To gain more insight in this possible interaction, this study aims to answer the question: (RQ2) to what extent does social endorsement affect the possible relationship between the perceived authority of the source of fake news warnings and perceived credibility and sharing intentions of fake news articles labelled with fake news warnings on Facebook?

Theoretical Framework

Information processing ELM

One of the main issues of fake news is that, like with real news, people are persuaded to read it but frequently cannot distinguish fake news from real news when they are processing its contents. An acknowledged model that explains how people process persuasive information is *the elaboration likelihood model of persuasion* (ELM) by Petty and Cacioppo (1986). ELM explains how information can be processed and how it can change a person's attitude towards the information. The theory describes that the level of importance of the information in the message to the reader determines the likelihood that people will elaborate on (think about) information that helps them to assess the persuasive message (O'Keefe, 2008). The ELM is a form of dual-process theory. According to general dual-process theory, information can be processed via two routes which differ in how much cognitive effort they require to process the information (Wason & Evans, 1974; Petty & Cacioppo, 1986; Chaiken, 1987).

The two distinguished routes by the ELM are the central and peripheral routes. If information is processed via the central route people will elaborate on information and consider all its elements with care. Subsequently, this allows them to come to a more critically evaluated conclusion. In order for information to be processed through the central route, two conditions have to be met (Petty & Cacioppo, 1986). Firstly, people have to be able to review the information thoroughly which requires them to reserve more time and make a greater cognitive effort to process all information. Secondly, people also need to have the motivation to want to process the information. For example, some people can be motivated because they are interested in a certain topic or can be demotivated to elaborate on the information because they think it is uninteresting or too difficult to understand.

In contrast, when people process information via the peripheral route, people are not able to fully process the information or, like previous examples explained, have no desire to do

so because the information is not interesting or too complex. If people process information peripherally instead of elaborately, people tend to rely on *heuristics* to help them process information (Petty, Cacioppo, & Schumann, 1983; Petty & Cacioppo, 1986). Heuristics are rules of thumb or strategies which help people to process information faster and make decisions more quickly (Metzger, Flanagin & Medders, 2010; Hutchinson & Gigerenzer, 2005). To illustrate, if a person quickly had to judge which city is bigger, a heuristic could be to look if one of the cities has a university. Based on the heuristic rule of thumb: "the presence of a university means that a city is big", a person can quickly determine that the city with a university must be bigger.

Scholars found that the use of heuristics can lead people to unconsciously process and accept a message (Bargh & Chartrand, 1999; Sundar, 2008). Unconscious processing happens when people make a judgement about the message without even considering the contents of the message itself. For example, a person might think that an argument is strong without even looking thoroughly at the argument's contents because it is lengthy (e.g. sentence length as heuristic cue). Examples like this led Tversky and Kahneman (1974) to conclude that the use of heuristics could lead to biases and errors in judgement as a long argument certainly does not mean that is it a strong argument.

These findings are important to the present study because if the ELM framework is applied to social media this could mean that people also process the information in news articles via the central or peripheral route. There is reason to believe that people do in fact process a lot of information on social media peripherally. Previous studies have found evidence that people do feel like they are exposed to too much information at once on social media which causes them to feel overloaded (Ozdalga, 2018; Agarwal & Yiliyasi, 2010).

Information overload and processing on social media

Information overload describes the phenomenon which occurs when people receive too much information and therefore exceeds their cognitive capabilities to process the information (Milford & Perry, 1977; Pentina & Tarafdar, 2014). Two parameters determine whether a person will feel overloaded namely, an individual's processing capabilities and the cognitive effort that is required to process the information (Eppler & Mengis, 2004). These two parameters are very similar to the conditions that lead people to process information peripherally according to the ELM. In an experimental study, Sicilia and Ruiz (2010) found that when people are provided with too much information on a webstore, they base their judgement about products on peripheral cues. Participants who were provided with a lot of information were not able to elaborate on the information as thoroughly as participants in the low and medium information conditions. Because information overload seems to lead to peripheral processing in an online website context, it seems reasonable to believe that this relationship is also existent in a social media context.

Like some websites on the internet, social media provide access to enormous amounts of information. This increases the change that people might feel overloaded (Ozdalga, 2018). Several studies tried to find explanations for why this phenomenon occurs on Facebook. Agarwal and Yiliyasi (2010) found that content that is displayed on the Facebook feed is generated so rapidly and in great numbers that it gets difficult for people to follow what is happing. Furthermore, people themselves are also to blame as most of them add too many friends to their networks and like too many pages which results in them receiving an unmanageable amount of status updates from all those users (Koroleva, Krasnova & Günther, 2010). Furthermore, a study by Shrivastav, Collins, Hiltz, and Dwyer (2012) concluded that the newsfeed structure by Facebook caused people to feel overloaded with information. Because

the newsfeed also displays status updates from friends of friends, the number of irrelevant posts was significantly increased, making it even harder to manage all information.

Lastly, indications that this assumption is true can also be found in the writing structure of real and fake news on social media. With a quantitative study, Osatuyi and Hughes (2018) found that fake news articles are more aligned to the peripheral route of the ELM model while real articles are more aligned to the central route. The authors compared proven fake news articles with their real counterparts from highly credited news outlets. Osatuyi and Hughes (2018) compared the articles based on the amount of information, the variance of information and the valence of information that was communicated by the real and fake news articles. The results showed that opposed to real news, fake news articles were easier to read, were more attention-grabbing and contained more affective cues like negativity and negative vocabulary. These characteristics are typical cues that are used when people elaborate on information via the peripheral route (Osatuyi & Hughes, 2018; Petty & Cacioppo, 1986). This finding that fake news articles on social media seem generally more accommodative to a person's peripheral cognitive process gives more reason to believe that people peripherally process information on social media.

Authority heuristics

The current study focusses on *the perceived authority of the source of fake news warnings* and *social endorsement* as factors that could determine whether people perceive information in fake news articles to be credible or not and their intention to share these articles. Literature indicates that both variables can be used as heuristics, but first the authority heuristics and a framework for authority cues will be discussed.

The authority heuristic describes how people perceive a source to be more credible if that source is an official authority (Sundar, 2008). Throughout the years, multiple scholars have

found evidence that authority is an important factor for people when assessing the credibility of a source or information. First, Eysenbach (2002) conducted a qualitative study that focussed on people's behaviour while they were searching for and appraising online health information. The author concluded the people found it important that the source of the information contained some form of authoritative characteristics. However, Eysenbach (2002) did not specify what kind of characteristics participants mentioned. Hilligoss and Rieh (2008) later conducted an interview study among students who recorded their online information-seeking behaviour for ten days. Participants based their judgement about websites' credibility on authority cues like acknowledgements or indicators that the website is official or recognized. Finally, more results that support the existence of an authority heuristic for credibility assessment were found by Metzger et al. (2010). The results of their interview study showed that reputation, a recognizable name or officiality were used as authority cues to determine whether a website was credible or not. Statements by participants indicated that websites that conveyed little to no cues of authority were not perceived as authorities and were perceived to be less credible. Both the studies by Hilligoss and Rieh (2008) and Metzger et al. (2010) identified some authority cues that were used as heuristics by participants. Because the found cues were not completely consistent, it is hard to determine which elements precisely make a source a perceived authority. Therefore, these studies do not provide a clear framework for how authority cues can be operationalized.

A framework that helps to determine when a person is perceived to be an authority is the concept of cognitive authority described by Wilson (1983). Cognitive authorities are people who can influence other people's thoughts because they are recognized in some official manner (Wilson, 1983). According to Wilson (1983), cognitive authorities are credible sources, therefore people tend to believe them. People do not only attribute cognitive authority to other people, but also to works of literature, institutions and organizations. The fundamentals for an

individual or organization to become a cognitive authority are a good reputation and being an expert (Wilson, 1983). The requirements to become a cognitive authority are very similar to the signs of authority that were mentioned by participants in the studies that provided evidence for the authority heuristic (Hilligoss & Rieh, 2008; Metzger et al., 2010). Therefore, it seems justifiable to assume that the mentioned requirements to become a cognitive authority can simultaneously also be seen as cues of authority and used as heuristics.

The role of authority heuristics in credibility assessment and possible cues that convey authority has now been established. In the subsequent paragraph, some more background information about fake news warnings and discussion about how authority cues could be present in these warnings will be provided.

Fake news warnings

Fake news warnings on Facebook are messages which aim to make readers aware that the contents of a news article might not be true to reality (Facebook, 2016). Scholars have recently put these warnings to the test and studied the effects of these warnings on a person's perceptions of the credibility of both real and fake news articles. The format for the warnings that was tested in a study by Pennycook, Bear, Collins and Rand (2018) closely resembled the real warnings that were used by Facebook. These warnings resembled a pop-up which contained a message that said that the article had been disputed by third-party fact-checker (see Figure 1).

Figure 1. Warning against fake news (Pennycook et al. 2018)

The study by Pennycook et al. (2018) had two goals with regard to reducing a persons' belief in fake news. One goal was to provide the existence of a 'warning effect' which simply means that fake news warnings reduce belief in fake news. The other was to study whether warnings could also have an 'implied truth effect'. The implied truth effect describes how fake news warnings can have a reverse effect if not all fake news articles are consistently marked as false. If not all articles are marked as false, Pennycook et al. (2018) hypothesized that people would think that the unmarked fake news items were true because attaching warnings to articles would imply that only articles with a warning were fake. In order to test this hypothesis, the authors conducted an experiment via a survey where participants had to read both fake and real news headlines (see Figure 1). The experiment contained two conditions. (1) a control condition where people were shown true and false headlines without warnings and (2) a warning condition where people would see true and false headlines with some false headlines containing a fake news warning. The experiment found a significant warning effect because the articles that contained a warning in the warning condition were perceived to be less credible than the same

articles in the control condition. Additionally, the study also found significant results for the implied truth effect. Regardless of whether the articles were fake or real, news articles that did not contain a warning in the warning condition were perceived to be more credible than articles in the control condition. These results have two important implications. Firstly, it thus seems that people do perceive fake news articles to be less credible if the articles are labelled with a fake news warning. Secondly, if not all fake news articles are labelled with a warning, people will perceive other news articles to be more credible without regard for if the articles are real or fake. Thus, to successfully reduce belief in fake news, all fake news articles have to labelled with a warning.

Clayton et al. (2019) continued studying the topic of fake news warnings and wanted to improve the original warnings that were tested by Pennycook et al. (2018). Clayton et al.'s (2019) reasoning for this was that a previous study by Ecker, Lewandosky and Tang (2010) found that belief in misinformation can be most effectively reduced by claiming that information is 'false'. Therefore, Clayton et al. (2019) compared the effects of two warnings. The first warning claimed that a news article was 'disputed', as seen in Pennycook et al.'s work (2018), and the second warning claimed that a news article was 'rated false'. A difference between the warnings that were tested by Clayton et al. (2019) and Pennycook et al. (2018) were the names of the fact-checkers that distributed the warnings. Clayton et al. (2019) choose to mention the names of the fact-checkers by wording the warning's messages as "Disputed by 3rd party fact-checkers Snopes and PolitiFact" and "Rated false by 3rd party fact-checkers Snopes and PolitiFact"(see Figure 2). Clayton et al. (2019) reasoned that this wording more closely resembled the official Facebook format for fake news warnings.

Figure 2. Rated false warning against fake news (Clayton et al., 2019)

Clayton et al. (2019) also tested a second type of warning called a general warning (see Figure 3). General warnings are messages that are displayed at the top of someone's Facebook feed which shows a warning about misleading articles and provide advice for identifying false information. The researchers introduced this warning in order to try to reduce the implied truth effect. Clayton et al. (2019) reasoned that people would be more sceptical after receiving a general warning. This sceptical attitude would then prevent them from believing fake news that was not labelled with a warning. Because Clayton et al. (2019) introduced general warnings, they renamed the regular warning format tested by Pennycook et al. (2018) as 'specific warnings'.

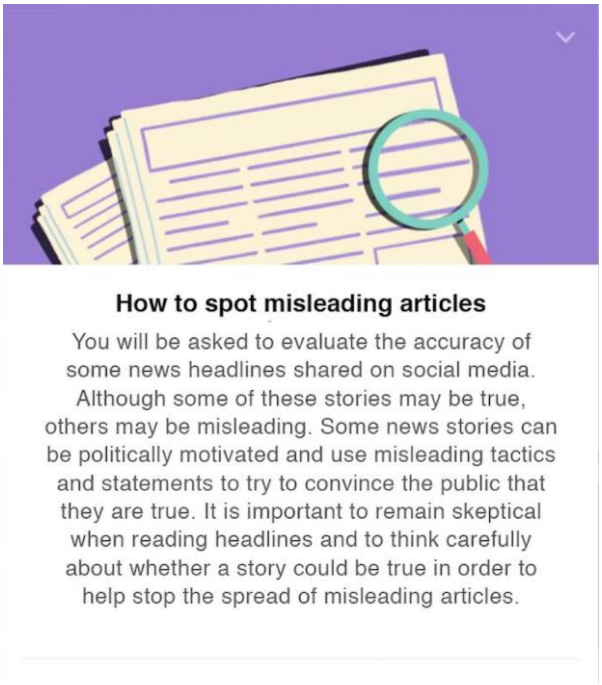

Figure 3. General warning in Clayton et al. (2019)

To compare the effectiveness of the disputed and rated false specific warnings and also measure the effectiveness of general warnings, Clayton et al. (2019) designed a 2 x 3 between-subjects experiment which was conducted via a survey. Participants were randomly assigned to one of three warning conditions (no warning, disputed or rated false) and were also randomly put in a general warning condition (yes or no warning). In all conditions, participants read six false headlines and also three true headlines in order to test for the implied truth effect.

Clayton et al. (2019) found the following results. Firstly, they found that the rated false warning significantly reduced belief in fake news more than the disputed warning. Secondly, the results also showed that people who saw a general warning before they read the headlines did perceive articles to be slightly less credible than people who did not see a general warning. Furthermore, Clayton et al. (2019) could not find evidence for the implied truth effect as there was no significant difference between perceived credibility scores for articles that were shown in congruence with specific fake news warnings and articles that were not. However, the results

did show signs of an unintended spillover effect of general warnings. General warnings did decrease the believability of both real and fake news items rather than only decreasing the believability of fake news items. People that saw no general warnings generally perceived all articles to be more credible than people who did see general warnings. This finding led the authors to conclude that general warnings are less effective than specific warnings because they online marginally decrease perceptions of credibility and also have an unintended spillover effect.

Now that the current literature about fake news warnings and their effect on perceived credibility is discussed, the angle of approach on how authority heuristics could be applicable to fake news warnings in the current study will be discussed. The previous paragraphs discussed how fake news warnings make a claim about an article (e.g. the article is rated false) and that the claim originates from a fact-checker. These fact-checkers might become a cognitive authority in the minds of the reader (Wilson, 1983) if enough cues of authority are given. Simultaneously, these cues might be used as authority heuristics to make judgements about the credibility of the claim of the warning and subsequently, about the fake news articles. The warnings tested by Pennycook et al. (2018) and Clayton et al. (2019) did not contain any authority cues for cognitive authority. Therefore, we expect that adding cues that convey that the fact-checker is an authority, will lower the perceived credibility of the fake news articles because people tend to believe authorities (Wilson, 1983). In contrast, we also believe that adding cues that convey that the fact-checker is not an authority will increase perceptions of the credibility of a fake news article compared to warnings that do not convey any notions of authority. Based on this line of reasoning the following hypothesis is proposed:

H1: Compared to warnings without authority cues, fake news warnings distributed by perceived authorities will decrease the perceived credibility of fake news articles while fake

news warnings distributed by perceived low authorities will increase the perceived credibility of fake news articles.

The social endorsement heuristic

Similarly to authority, previous work by scholars indicates that social endorsement is also used as a heuristic by people to determine the credibility of information. Based on an observational interview study, Hilligoss and Rieh (2008) reported that participants used social endorsement as a heuristic to determine whether online information was credible or not. Hilligoss and Rieh (2008) concluded that the general rule behind the identified social endorsement heuristic was that people tend to believe that a source of information is credible if other people do think so as well. Hilligoss and Rieh (2008) found that social endorsement could be given by many different types of sources. Their results indicate that social endorsement could come from known or unknown individuals, citations, organizations and even popularity.

A later qualitative interview study by Metzger et al. (2010) provided findings that supported Hilligoss and Rieh's (2008) results and conclusions. Metzger et al. (2010) also found that people use social endorsement heuristics to evaluate a source's credibility on the internet. The participants of their study indicated that several types of cues can convey social endorsement like word of mouth by others, recommendations, reviews, ratings, testimonials or simply believing a person because people trust them. Subsequently, this means that there are many types of social endorsement cues that can be used as a heuristic. Finally, in line with the findings by Hilligoss and Rieh (2008), Metzger et al. (2010) also found that people seemed to think that information was more credible if many other people did so as well. Metzger et al. (2010) referred to the *bandwagon effect* as a theoretical explanation for this finding. The bandwagon effect refers to the tendency that people have to copy other peoples' opinions or thoughts if a lot of other people share that opinion our thought too (Sundar, 2008). According

to Sundar, (2008) the bandwagon effect can be a powerful heuristic because it gives notions of collective endorsement and popularity of the endorsed subject.

A more recent study by Xu (2013) implemented the bandwagon heuristic in an experimental study that aimed to investigate how social endorsement of news articles on social media affected people's perceptions of the credibility of news articles. The experiment was conducted with news articles that were posted on a social news site call Digg.com. Xu (2013) described Digg.com as a news site that also provides a platform to share and discuss news articles with other users. The platform holds similarities with social media like Facebook, Twitter and Instagram as users can upvote, comment, and share articles with other users or people without an account. Xu (2013) operationalized endorsement by manipulating the amount of 'diggs' (the equivalent of likes on Facebook) or 'buries' (dislikes) a news article got.

The results showed that participants generally perceived articles that received many diggs to be more credible than articles without diggs. Because the displayed news articles were the same apart from the number of diggs, Xu (2013) argued that the difference in perceived credibility between both conditions could be explained by the bandwagon effect. These findings seem to suggest two important implications. Firstly, because only the diggs (likes) were manipulated it seems that likes are perceived as social endorsement cues and are used as a heuristic because the likes seemed to be causing the difference between both conditions. Secondly, this study implies that people will generally perceive news articles with many likes to be more credible than news articles that receive a smaller amount of likes.

Finally, because the social endorsement features of Digg.com share quite a bit in common with Facebook we have reason to believe that the results of Xu's (2013) study could be replicated for news articles on Facebook. In addition, because there are many types of social endorsement cues (Hilligoss & Rieh, 2008), which can come from different sources (Metzger

et al., 2010), there is more reason to assume that Facebook likes can act as a social endorsement cue. For these reasons the following hypothesis is proposed:

H2: High social endorsement of fake news articles with a fake news warning will lead to greater perceived credibility than low social endorsement of fake news articles with a fake news warning.

Authority and Social endorsement interaction

Other than the discussed effects of authority and social endorsement on perceived credibility, the proposed interaction between both heuristics is a main point of interest of this study. To the best of our knowledge, there is almost no documentation on this interaction in previous works. Therefore, we will discuss a study by Messing and Westwood (2014) that conducted an experiment that most closely resembles the current experiment. One of the main goals of their study was to test whether social endorsement would be a more dominant heuristic cue than source-based cues if people select a Facebook article to read based on heuristics. According to Messing and Westwood (2014), source-based cues are the credited author(s) of the information or news article. This entails that if no author is credited for a news article, there are no source cues for that article. Source cues are reputation based cues because people do judge these sources based on their reputation (Messing & Westwood, 2014). Messing and Westwood (2014) hypothesized that while people are selecting a news article they would put more emphasis on endorsement cues rather than on source cues if both cues were present next to the news article. The authors reasoned that endorsement heuristics contained more decision-relevant information than source-based heuristics (Messing & Westwood, 2014). According to literature, information is only relevant in a decision-making process if the information is valuable, interesting and socially significant (Sears & Freedman, 1967). According to Messing and Westwood (2014), social endorsement cues explicitly convey that a news article is

interesting according to other people. Therefore endorsement also conveys that an article is socially significant because others endorsed it. Subsequently, it was argued that sources cannot convey notions of decision-relevant information because a source gives an unclear indication of whether the information is interesting or socially relevant. (Messing & Westwood, 2014)

Messing and Westwood (2014) tested whether their reasoning was correct with the following experimental design. Participants would be assigned to one of three conditions (see Figure 4): a source-based condition (A). This source-based condition was operationalized by displaying sources that generally favored republicans or democrats. Messing and Westwood (2014) hypothesized that sources that aligned with a person's political beliefs were seen as more reputable and favourable and thus would be selected more often. The second condition was an endorsement-based condition (B). Social endorsement was operationalized with a Facebook recommendation format which was specifically designed for the study. From the four displayed articles, three articles would be little endorsed with a random number of recommendations between 0 and 1000 and one article would be highly endorsed with more than 10.000 recommendations. The last condition contained both source and endorsement based cues (C).

Highly relevant for the present study is that the experiment confirmed an interaction between social endorsement and source-based heuristics. Messing and Westwood (2014) found that the selection rates were higher for articles that aligned with participants' political beliefs when social endorsement cues were absent. However, in the condition with both source cues and social endorsement cues, the selection rate of highly endorsed articles became higher among people who favored the source but also among people who did not favor the source. The authors concluded that because participants were more likely to select highly endorsed articles regardless of the favourability of the source, the effect of source cues on article selection behaviour was weakened for highly endorsed articles. Important to note is that the endorsement heuristic was only stronger than the source-based heuristics when an article is highly endorsed.

The results showed that when an article had little endorsement participants would still be more likely to select articles from favorable sources.

The findings of Messing and Westwood (2014) thus show evidence that the bandwagon effect (Sundar, 2008) could also be the explanation for why endorsement cues might be a stronger heuristic cue to people than source-based cues.

Figure 4. Experimental conditions in Messing and Westwood (2014)

Because source-based heuristics are mainly based on reputation, the present study proposes that the authority heuristic could be classified as a source-based heuristic. The first reason for this proposal is that one of the two conditions for cognitive authority is reputation (Rieh, 2010) and source heuristic are reputation-based (Messing & Westwood, 2014). Hence, we argue that people might also evaluate a source's level of authority when they asses the

source's reputation. Secondly, in support of our argument, Metzger et al. (2010) describe that source information like author identity and reputation, are indicators of authority. Based on these similarities between the source and authority heuristics, a similar interaction between social endorsement and fake news warnings seems possible. This would imply that people find social endorsement cues more important than authority cues when they are selecting news articles. However, because the present study is not so much interested in people's news selecting behaviour, we will try to argue that the proposed interaction might also occur when people make judgements about news credibility.

Messing and Westwood (2014) stated that during the process of selecting an article, people also make assessments about the credibility of the articles. Other work by Winter and Krämer (2012) about news selection behaviour for online scientific articles found evidence for Messing and Westwood's (2014) argumentation. With a questionnaire and a behavioural study, Winter and Krämer (2012) found that people do not select articles randomly, but select articles based on their credibility and overall message quality. This implies that people select articles that are perceived to be more credible and of better quality over articles of lower quality and with lower credibility. Based on this conclusion, we believe that credibility assessment could be a subfactor of the news article selection process. Subsequently, we reason that heuristics that are used while people are selecting a news article are also used to make a judgment about a news article's credibility.

The similarities between source-based cues and authority cues and the relation between news article selection and credibility assessment have been discussed. Following, our expectation for an interaction effect between social endorsement cues and authority cues will be discussed. Similarly to the finding by Messing and Westwood (2014) that high social endorsement is a stronger heuristic cue than source-based cues, the present study expects that high social endorsement cues will be a stronger heuristic cue than authority cues. Subsequently,

this entails that the effect of authority would be different for fake news articles with cues of high endorsement than for fake news articles with low endorsement cues. To elaborate, the present study already proposed that high social endorsement has a positive effect on credibility and leads to higher perceived credibility than low social endorsement. Moreover, we also hypothesized that compared to warnings without authority cues, fake news warnings with high authority cues will decrease perceived credibility, while fake news warnings with cues of low authority will increase the perceived credibility of fake news articles. Since we believe that the high endorsement heuristic will be more dominant than the authority heuristic, we reason that the effect of high endorsement will affect perceived credibility across all authority conditions. This entails that perceived credibility scores for articles with high endorsement will be higher across all authority conditions compared to articles with low endorsement. The present study thus predicts that high social endorsement's positive effect on credibility weakens the hypothesized effect of high authority to reduce perceived credibility while it amplifies low authority's hypothesized effect to increase perceived credibility. This hypothesized interaction effect is formulated with the following hypothesis:

H3: Compared to fake news articles with low endorsement, the effect of high authority on perceived credibility will be weaker while the effect of low authority on perceived credibility will be amplified for articles with high social endorsement.

Perceived credibility and sharing intention

Noticeably, the previous paragraphs have discussed the proposed effects of social endorsement and authority on people's perceptions of credibility and not on their sharing intentions. The reason for this is that social endorsement and authority cues seem to have a direct effect on credibility but literature gives reason to believe that they do not have a direct

effect on sharing intention. Rather, previous works indicate that sharing intention can be predicted by perceived credibility. The same study by Xu (2013) which examined the effect of social endorsement on perceived credibility also studied sharing intention as a dependent variable. The results implicated that respondents' intention to share an article could be predicted by their perceptions of credibility for that article. In other words, Xu (2013) found that people in the high endorsement condition were more likely to think an article was credible and were thus also more likely to share that article. Similarly, people were less likely to share articles that were perceived to have little credibility.

The effect of perceived credibility on sharing intention was found by other researchers as well. Ma, Lee and Goh (2014) found that the perceived credibility of a news article on social media was positively related to sharing intentions. The authors concluded that a person's intention to share news articles increased when they thought that an article was credible. One of the main reasons for this is that people do not want to spread misinformation (Ma et al., 2014). Boehmer and Tandoc, Jr., (2015) found the same relationship but on Twitter. They found that people's intention to retweet (the Twitter variant of sharing) news was dependent on the perceived credibility of those news articles. The existence of this relationship contributes greatly to the present study as it can explain why authority cues might be able to reduce a person's intention to share fake news by reducing the perceived credibility of the fake news articles. For this reason, we formulated the following hypothesis with regard to peoples' sharing intentions:

H4: People's intention to share a fake news article can be predicted based on their perceptions of credibility for that fake news article.

Method

Design

The experiment had a 3 x 2 mixed design with two independent variables, two dependent variables and one mediating variable. The first independent variable *perceived authority of the source of fake news warnings* contained three levels: (1) perceived authority and (2) perceived non-authority and (3) no-authority. The no-authority condition was included to test whether the inclusion of authority cues significantly increases or decreases the effect of warnings on perceived credibility compared to the effect of regular warnings without notions of authority. The second independent variable *social endorsement* contained two levels: (1) high endorsement and (2) low endorsement. The dependent variables were *perceived credibility* and *sharing intention*. Important to note is that perceived credibility also acts as a predictor variable in the relationship between perceived credibility and sharing intention. In total, the experiment contained six conditions. Respondents were randomly assigned to one of three authority conditions and to both social endorsement conditions. The effect of social endorsement was tested in a between condition format because in a real Facebook setting participants would scroll past both highly endorsed and low endorsed articles if they were reading news articles.

Participants

Participants were recruited via convenience and snowball sampling on Facebook and LinkedIn. Furthermore, to diversify the sample and to recruit more participants, respondents were also recruited via SurveySwap.io. In order to participate in the study, participants needed to be 18 years or older and to have or have had a Facebook account in order to ensure that they were familiar with the Facebook news format. For reference to an acceptable sample size, the present study looked at a previous Master thesis that studied the effect of fake news warnings. In this thesis, at least 50 respondents were needed in each of the 6 conditions (Snelting, 2019).

In addition, an a priori power analysis was conducted using G*Power3 (Faul, Erdfelder, Lang, & Buchner, 2007) to calculate the minimum sample size to test the difference between the three authority conditions for both endorsement conditions with a medium effect size ($\eta 2$= .25), and an alpha of .05. Results showed that a total sample of 120 participants with three equal-sized groups of 40 participants was required to achieve a generally accepted power of .80. Combining the outcome of the power analysis and Snelting's (2019) sample size, we aimed to recruit 50 participants per condition knowing that 40 participants would be the lowest acceptable amount.

A total of 188 respondents participated in the experiment. A number of respondents were excluded from further analysis because they were only partially completed (N = 12) of did not consent to the terms of participation (N = 4). The final sample consisted of 172 respondents who were equally distributed across the authority conditions (see Table 1).

As for indicators of the demographic characteristics and diversity of the sample, 83 (48.3%) respondents were females while 89 (51.7%) were males. The average age of the respondents was 27 (SD = 9.01) within an age range of 18 to 69 years old. The majority of the respondents (N = 123, 70.4%) had a higher educational background (Bachelor's, Master's or Ph.D. degrees). Additionally, the nationalities of the respondents were quite diverse as the sample consisted of participants from 27 different nationalities from whom the majority were Dutch (N = 115, 66.9 %).

Table 1

Distribution of participants across all between-participant conditions

Condition	Number of participants
High authority	56
Low authority	58
No-authority	59

Stimuli

Format for fake news articles

Firstly, the present study uses the fake news format by Clayton et al. (2019) for reference (see Figure 6) as their research is the most recent paper that studied the effectiveness of warnings against fake news on Facebook. Clayton et al. (2019) displayed news articles via the standard Facebook format with a picture, a headline, a lead sentence and a source without showing the Facebook user who posted it or the endorsement for each article. Since a warning that specifies that an article is "rated false" most effectively reduces credibility (Clayton et al. 2019), the present study applies the 'rated false' warning. This operationalization has two main reasons: (1) to test if perceived authority can improve significantly on fake news warnings' effectiveness it needs to be tested with the most effective warning. (2) The power of social endorsement can only be truly studied if it has to compete against the most effective warning. Like in the work by Clayton et al. (2019), the present study adopts the same format but the low authority warning that was displayed substituted Snopes.com with a fictional low authority source called BadNews.net. Warnings in the non-authority conditions did not mention a fact-checker's name and stated: "Rated false by 3rd Party Fact-Checkers". Finally, all stimuli

contained a fake news warning because this study is particularly interested in studying the effects of authority and endorsement on fake news articles with warnings and not on real news articles.

Figure 6: Example of a fake news article in Clayton et al. (2019)

News article selection

Secondly, the fake news articles that were displayed were picked from fact-checking website Snopes.com. The articles that were selected contained ambiguous topics in order to avoid that participants could to easily determine that the articles were fake (Pennycook, Cannon & Rand, 2018). If the articles are too preposterous or absurd, participants might determine that the articles are fake regardless of the manipulations which would render the manipulations virtually useless. Therefore, we hope that by displaying ambiguous articles, a setting is created that more closely resembles the real problematic situations where people have difficulties with quickly assessing news articles which leads them to rely on heuristic cues like authority and social endorsement. In order to select ambiguous articles, all selected articles were rated as

'mixed' by Snopes.com. A mixed rating means that an article is partly true and partly false (Snopes.com, n.d.). Additionally, articles that are highly susceptible to partisanship like heavy politically oriented articles were avoided in this study since partisan articles can lead partisan people to perceive the information which is opposite to their own beliefs as less credible (Kim, 2015).

In order to select the most ambiguous articles for the final study, a pre-test with 20 respondents was performed (see Appendix C). During the pre-test, respondents were presented with 16 articles picked from Snopes.com in random order. The articles were presented in a Facebook format without displaying any forms of social endorsement, a source or a fake news warning (see Figure 7). The perceived credibility of the news articles was measured with a perceived credibility scale. This perceived credibility scale was pre-tested simultaneously during the article selection pre-test and was later used during the final study (see ¶ Measures for a detailed discussion of the scales and pre-test). Perceived credibility was measured with four items on a 7-point Likert scale. The articles which were used in the final study were selected based on their mean credibility score. Articles that were closest to the mid-point of the scale were selected. The acceptable range for articles to be eligible as stimuli were mean scores between 3 and 5. The scores of the selected articles ranged from 3.77 to 3.97 on the credibility scale.

Figure 7. Example of a pre-test news item

Manipulating authority

Thirdly, to the best of our knowledge, there are no studies that have tried to visualize authority in a context that is similar to the Facebook news context of this study. For this reason, this study tried a newly constructed format to manipulate authority. The constructed authority manipulation drew inspiration from online star-rating systems since that was ought to be an understandable format for the respondents and is practical to implement for future studies. The ratings were designed to say something about the elements of authority (reputation and expertise) (Wilson, 1983) rather than directly about authority to prevent the manipulation from being too obvious. Star-ratings by themselves generally already serve as an indication of reputation (Zervas & Byers, 2015) as they do on familiar platforms like Airbnb and Tripadvisor. In order to also give indications about the level of expertise, the rating was called a "Fact-checking quality rating" to indicate the fact-checking skills of the organisation. The fact-checker in the high authority condition Snopes.com was given a high 4.5-star quality rating while BadNews.net was given a low 1.5-star quality rating.

A second pre-test with 20 participants compared the mean difference between the low and high authority manipulations (See Appendix D). Participants were randomly assigned to one of two authority conditions (high or low authority) and were presented with one of the selected articles from the first pre-test that contained a fake news warning (see Figure 8). Perceived authority was measured with the authority scale that was also implemented in the final study (see ¶ Measures).

Figure 8. Example of the pre-tested authority stimuli

To measure the mean difference between the perceived authority in both authority conditions, an independent samples t-test was performed. For this pre-test, the assumptions of normality and homogeneity were met. On average, perceived authority for the high authority condition (M = 4.51, SD = 1.30) was higher than perceived authority in the low authority condition (M = 2.63, SD = 1.23). This was a significant difference ($Mdif$ = 1.80, $t(18) = 3.72$, p = .002). The results indicate that the mean authority scores did significantly differ between both

authority conditions. This entailed that the manipulations were successful and could be implemented in the main survey.

Social endorsement

The stimuli had to convey that the fake news articles were socially endorsed. Social endorsement was operationalized with the standard Facebook format with likes. The studies on which the current stimuli are based (Messing and Westwood, 2012; Xu, 2013), operationalized social endorsement by only showing likes, therefore other Facebook endorsement cues like comments and shares were left out of the stimuli. The number of likes that characterized the high and low endorsement conditions was also derived from Messing and Westwood (2012) – 10.000 for the high endorsement condition and 0-1000 for the low endorsement condition. However, a 1000 endorsements still seemed very high for the low endorsement condition, therefore the present study capped low endorsement at a maximum of 100 likes.

Measures

Dependent variables

Perceived credibility. Clayton et al. (2019) only used a one-item 4 point-Likert scale to measure perceived credibility. A one-item measurement scale is often less strong and therefore a stronger credibility scale, implemented by Kim (2015) and other scholars, was adopted. The content credibility scale measured perceived credibility based on three items namely, by asking to what extent people agree whether an article is trustworthy, believable and accurate (e.g., To what extent do you agree with the following statements about the article you were just shown?.... The news item is believable). The present study also added a fourth category which directly asked whether people thought the article was credible. The scale was a 7-point Likert scale ranging from (1 = very strongly disagree) to (7 = very strongly agree). The scale was pre-tested simultaneously with the ambiguity check. In this pre-test, 20 participants had to answer

with the credibility scale for 16 articles (See Appendix C). The perceived credibility scale had good reliability in both the pre-test and main survey (α = .93, pre-test; α = .92, main survey).

Sharing intentions. Secondly, respondents' intention to share fake news was measured with a sharing intention scale (Xu, 2013). This scale measured sharing intention with three items. Namely, likelihood to discuss the news with friends, share news with friends and recommend news to others (e.g., please indicate how likely you are to:…. Discuss this article with your friends). The scale measured the items on a 7 point Likert-scale ranging from (1 = Not at all likely) to (7 = highly likely). The sharing intention scale was not pre-tested since it was already a proven measure in Xu's (2013) study who reported a Cronbach's Alpha of α = .92. In accordance with Xu's (2013) reliability analysis, the scale had good reliability in the main survey (α = .90).

Independent variable check

Perceived authority. To measure whether the stimuli were successful in implying that a fact-checker was an authority or non-authority, an authority scale was developed based on the determinants of authority by Wilson (1983). This newly developed authority scale consisted of 3 items (expertise, reputation and authority) and asked participants to what extent they agreed with these attributes on a 7 point Likert-scale (e.g. "To what extent do you agree that fact-checker Snopes.com is an expert organisation") (1 = very strongly disagree, 7 = very strongly agree). The scale was pre-tested simultaneously with the authority manipulation in the second pre-test among 20 participants (See Appendix D). Based on a reliability analysis in the pre-test and final study, the reliability of the scale was good (α = .93, pre-test; α = .92, main survey).

Control variables

Trust in news on Facebook. To start with, participants' trust in news on Facebook needed to be measured as this could lead to biases that might have primed participants to be

highly doubtful of the credibility of the fake news articles regardless of the manipulations. This variable was measured on a five-point Likert-scale with one item as used by Snelting (2019) and the Dutch supervisory board for media (CvdM, 2018). Respondents had to indicate their stance on the statement: "I trust news on Facebook" (1 = completely disagree, 5 = completely agree).

Daily news reading habits. A second control variable checked for participants' habits of reading the news in their everyday lives. People who read the news more frequently have more experience with reading the news and might therefore be better or more confident in determining the credibility of a Facebook news article regardless of warnings by authorities and social endorsement. To measure this variable, a five-point Likert-scale with one item that was earlier implement by Pew Research Center (2018) and Snelting (2019) was used. Respondents had to indicate their stance on the statement: "I read the news daily" (1 = completely disagree, 5 = completely agree).

News reading on Facebook. The third control variable asked how many times respondents did read the news of Facebook per week. This question was included because participants' levels of familiarity with news on Facebook might help them to better identify fake news articles regardless of the manipulations. This control variable was implemented by asking participants how often they read the news on Facebook on a 7-point Likert scale with one item (1 = more than 5 times a day, 7 = Neve) (e.g., how often do you read the news?).

Demographics. Additionally, respondents were also asked if they could fill in some demographic information about themselves like gender, age, nationality and highest achieved educational degree. These variables are generally included in most studies, but might also influence some of the effects of the manipulations.

Level of English proficiency. Finally, since the nationalities in the sample are quite diverse but the survey was in English, respondents were asked about mastery of the English language. It could be possible that respondents who have a lesser mastery of the English language have had more difficulty understanding the articles and to determine their credibility. Participants were asked how they would rate their mastery of the English language based on the well-known CEFR standard framework for language proficiency levels (e.g., A1(Beginner), A2 (Elementary), B1 (Intermediate), etc.) (Tracktest, n.d.).

Procedure

The experiment was designed with Qualtrics survey software and was distributed via Facebook, LinkedIn, SurveySwap.io during a period of 9 days. The experiment was approved by the Tilburg University Research Ethics and Data Management Committee. Participants could complete the survey on a location and time to their liking. The survey was both available on PCs and mobile devices and was accessible via an online link. Before the actual survey started, participants were informed that the survey was part of a Master thesis study and that the goal of the survey was to study participants' information processing behaviour on Facebook (for the whole survey see Appendix B). Respondents were not told that the study involved fake news to prevent for negative biased attitudes towards the articles. Furthermore, respondents were told that all data was collected, analysed and stored anonymously and that participation was voluntary. The indicated estimated time of completion would be 5 to 7 minutes. After participants had read the introduction and terms for participation, they were asked to give their informed consent for participation in this study.

After respondents had given their informed consent, they would be asked to answer some basic demographic information about themselves. Subsequently, respondents were introduced to a practice question. This question introduced the stimuli and the questions in order

to familiarize participants with the concept of the survey. After the practice question, the six fake news articles would be displayed in random order. Because the endorsement condition was distributed within-subjects, participants saw three highly endorsed and three low endorsed articles in random order. Right after each article, participants were presented with the questions that asked about their perceptions of credibility and their sharing intentions.

Furthermore, the discussed ELM theory stated that people process information peripherally partly because of information overload on social media. Without any intervention, participants would have had as much time as they like to process the information in the articles. This would have eliminated the effect of information overload and likely allowed participants to process information centrally. Therefore, respondents were given 15 seconds to analyse each article before they had to answer the questions. Adding a timer better recreated a real Facebook setting were participants pay quick and limited attention to posts or news articles in their feeds (Snelting, 2019). The time restriction thus aimed to limit participants' information processing capabilities and force them to rely more on heuristic cues.

After respondents had read all articles and answered the associated questions, participants in the high or low authority conditions were asked about their perceptions of the authority of the 3rd-party fact-checker. Finally, if respondents had seen al stimuli they were asked to answer some control questions about their trust in news on Facebook, their daily news reading behaviour, their news reading behaviour on Facebook. Thereafter, they were debriefed about the goals of the study and the manipulations.

Results

With a 3 (perceived authority: high, low and no-authority (between)) x 2 (social endorsement: high, low (within)) mixed designed experiment the present study aimed to investigate the effect of authority and social endorsement on perceived credibility and sharing intention. The experiment aimed to study the effects of authority and social endorsement on perceived credibility and the interaction effect between both variables with perceived credibility as the dependent variable. The final aim was to study the relationship between perceived credibility and sharing intention to learn whether sharing intention could be predicted by perceived credibility.

Interaction between authority and social endorsement on perceived credibility

The purpose of the first test was three-fold. First, it tried to test whether (H1), compared to warnings without authority cues, fake news warnings distributed by perceived authorities will decrease the perceived credibility of fake news articles while fake news warnings distributed by perceived low authorities will increase the perceived credibility of fake news articles. Secondly, we tested whether (H2) high social endorsement of fake news articles with a fake news warning will lead to greater perceived credibility than low social endorsement of fake news articles with a fake news warning. Finally, it was tested whether (H3) compared to fake news articles with low endorsement, the effect of high authority on perceived credibility will be weaker while the effect of low authority on perceived credibility will be amplified for articles with high social endorsement.

In order to test these hypotheses, a two-way mixed ANOVA was performed. Firstly, the data was checked for any outliers for perceived credibility. Two outlying scores from one respondent were identified in the no-authority condition with high endorsement (M = 5.25, deviation = 0.17) and low endorsement (M = 5.58, deviation = 0.41) The outlier was removed

from the final testing procedure because repeated tests with and without the outlier revealed that outlier did not significantly affect the results or any assumptions. Secondly, the assumption of normality was not met for the high endorsement - high authority condition (z-score $_{skewness}$= 2.52). However, because the assumption was only not met in a single condition, the test was proceeded as normal since ANOVAs are fairly robust against outliers. The assumption of homogeneity of variances was met as Levene's test was not significant for both within conditions (High endorsement: $F(2, 169) = .08$, $p = .922$) (Low endorsement: $F(2, 169) = .204$, $p = .815$). Finally, the assumption of equality of covariances was also met since Box's test was insignificant ($p = 0.69$).

With regards to the first hypothesis, focusing on authority cues, the mean perceived credibility score in the high authority condition was 2.54 ($SD = 0.88$). The mean credibility scores for the low and no-authority conditions were 2.54 ($SD = 0.96$) and 2.69 ($SD = 1.00$) respectively. The mixed ANOVA showed no significant main effect of authority, $F(2, 169) = .28$, $p = .759$. The results indicate that different levels of perceived authority of a warning do not lead to significantly different perceptions of perceived credibility of fake news articles. Hence, these results did not support the hypothesis (H1) that, compared to warnings without authority cues, fake news warnings distributed by perceived authorities would decrease the perceived credibility of fake news articles while fake news warnings distributed by perceived low authorities would increase the perceived credibility of fake news articles.

For the second hypothesis that focused on social endorsement cues, the mean perceived credibility score for participants in the high endorsement condition was 2.51 ($SD = 1.11$) and 2.64 ($SD = 1.00$) in the low endorsement condition. The ANOVA showed no significant main effect of social endorsement, $F(1, 169) = 2.74$, $p = .100$. These findings indicate that fake news articles that are highly endorsed are not perceived to be significantly more credible than fake news articles with low endorsement. Hence, this insignificant difference entails that the analysis

did not support the hypothesis that (H2) high social endorsement of fake news articles with a fake news warning would lead to greater perceived credibility than low social endorsement of fake news articles with a fake news warning.

Finally, the last hypothesis focused on the interaction between authority and social endorsement. The ANOVA also showed no significant interaction effect between authority and social endorsement $F(2, 169)= .852$, $p = .428$. The interaction visualized in Figure 9 demonstrates the effects of authority within both endorsement conditions on perceived credibility. The results and graph indicate that the effect of perceived authority on perceived credibility was not significantly different for articles with high or low social endorsement. More specifically, the graph displays how the level of perceived credibility attributed by respondents in any of the authority conditions did not significantly differ between articles with high social endorsement or low social endorsement. This indicates that any possible effects of one of the levels of perceived authority on credibility were not different for either high and lowly endorsed fake news articles. Hence, these findings did not support the hypothesis that (H3) compared to fake news articles with low endorsement, the effect of high authority on perceived credibility would be weaker while the effect of low authority on perceived credibility would be amplified for articles with high social endorsement.

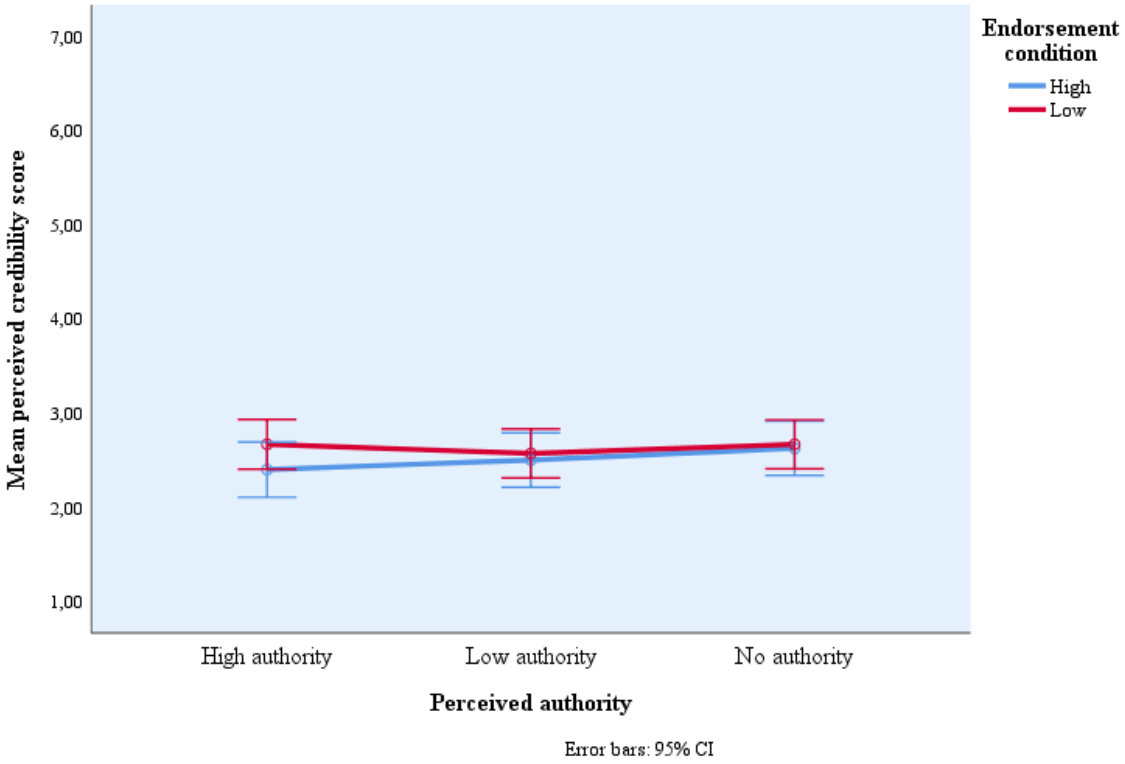

Figure 9. Interaction between perceived authority and social endorsement

Furthermore, some additional control variables were included in the survey that might have affected the participant's perceptions of credibility. The above reported ANOVA tests did not account for any possible covariate variables. As an extra precaution, in order to rule out the minor possibility that any confounding variables might have affected the ANOVA model that tested H1, H2 and H3, we opted to run the ANOVA tests a second time and included any potential covariates. To check whether any of the control variables cohered with perceived credibility and could be considered as confounding variables, bivariate correlation analyses were conducted between perceived credibility and the individual control variables. The reported outcomes (see Table 2) indicate that there was a negative relationship between daily news reading behaviour and perceived credibility. Furthermore, there was also a positive relationship between trust in news on Facebook and perceived credibility. These results thus gave reason to believe that daily news reading behaviour and a respondent's trust in news on Facebook could be confounding variables.

Table 2

Correlation analysis for control variables and perceived credibility

	R	*p-value*
Gender	-.143	.061
Age	-.067	.383
English Proficiency	-.085	.268
Level of education	-.037	.628
Daily news reading	-.300	<.001***
News reading on Facebook	-.013	.870
Trust in news on Facebook	.254	.001**

N = 172, ** *p* <.05, *** *p* <.001 (two-sided)

Subsequently, the second time that the ANOVA was performed to test H1, H2 and H3 the model also accounted for respondents' daily news reading behaviour and their trust in news on Facebook as covariates. The ANOVA revealed that daily news reading behaviour influenced perceived credibility $F(1,167) = 14.64$, $p = <.001$ and also that respondents' trust in news on Facebook influenced perceived credibility $F(1,167) = 8.95$, $p = .003$. More importantly, after accounting for the covariates there still was no main effect of authority $F(2, 167) = .722$, $p = .487$ and no main effect of social endorsement $F(1, 167) = .557$, $p = .456$. Furthermore, again there was no interaction effect between authority and social endorsement $F(2, 167)= 1.29$, $p = .277$. This entails that daily news reading behaviour and trust in news on Facebook did not significantly impact the results of our initial ANOVA. This entails, that the prior results and drawn conclusions about the hypothesis still hold true.

Perceived credibility as a predictor for sharing intention

The final hypothesis that was tested (H4) hypothesized that people's intention to share a news article could be predicted based on the perceptions of credibility for that news article. To analyse this hypothesis a linear regression analysis with perceived credibility as the predictor (M = 2.59, SD = 0.95) and sharing intention (M = 2.20, SD = 0.96) as the outcome variable was performed.

The regression analysis showed that a person's intention to share a news article can be predicted by that person's perceptions of credibility of a news article b = .663, β = 66, $t(171)$ = 11.32, p = <.001. The model explains 42.8% of the variance in sharing intention R2 = .425, $F(1, 171) = 128.17$, p = <.001 However, the assumption of normality was not met (z-score $_{\text{kurtosis}}$ = 3.47). To assess whether the model is sensitive to these violations of assumptions, bootstrapping was performed. The bootstrapped coefficients were: b = .663, p = .001, 95% CI [.53, .79]. Importantly, the bootstrapped 95% confidence interval did not cross zero, indicating that the model generalizes to the population. Because the results were significant, H4 was accepted meaning that a person's intention to share a fake news article can be predicted by that person's perceptions of credibility for that news article.

Discussion

The present study examined what the effects of the perceived authority of the source of a fake news warning and social endorsement were on people's perceptions of credibility and sharing intentions of fake news articles labeled with fake news warnings on Facebook (RQ1). Firstly, to answer this question it was hypothesized that, compared to warnings without authority cues, fake news warnings distributed by perceived authorities would decrease the perceived credibility of fake news articles while fake news warnings distributed by perceived low authorities would increase the perceived credibility of fake news articles (H1). A Second hypothesis predicted that high social endorsement of fake news articles with a fake news warning would lead to greater perceived credibility than low social endorsement of fake news articles with a fake news warning (H2). Finally, prior theoretical work led us to believe that social endorsement and authority do not affect sharing intention, but rather than sharing intention could be predicted by perceived credibility. Therefore we hypothesized that people's intention to share a fake news article could be predicted based on their perceptions of credibility for that fake news article (H4).

We could not find statistical support for H1 and H2, however, our results did support H4. These results mean that there is no effect of the perceived authority of the source of fake news warnings and social endorsement on perceived credibility and sharing intention. However, we did find that a person's intention to share a fake news article, can be predicted by their perceptions of credibility of a news article.

The present study also examined to what extent social endorsement could affect the possible relationship between the perceived authority of the source of fake news warnings and perceived credibility and sharing intentions of fake news articles labeled with fake news warnings on Facebook (RQ2). It was hypothesized that, compared to fake news articles with low endorsement, the effect of high authority on perceived credibility would be weaker while

the effect of low authority on perceived credibility would be amplified for articles with high social endorsement. (H3). The results did not support this hypothesis, meaning that social endorsement did not affect the relationship between perceived authority and perceived credibility and sharing intentions for fake news articles.

Theoretical implications

The findings that the perceived authority of fake news warnings and social endorsement did not affect the perceived credibility of fake news articles are not in line with previous findings about the authority and social endorsement heuristics. Multiple studies found that authority cues (Eysenbach, 2002; Hilligoss & Rieh, 2008; Metzger Flanagin and Medders, 2010) and social endorsement cues (Hilligoss & Rieh, 2008; Metzger et al., 2010; Xu, 2013) are used as heuristics that affect peoples' perceptions of credibility for a source or of information. Contrary to these studies, the present findings do imply that people do not use authority cues and social endorsement cues as heuristics to determine the credibility of fake news articles.

A theoretical explanation for why the present findings contradict these previous studies might be that heuristic cues do not always lead to heuristic processing (Chen & Chaiken, 1999; Bellur & Sundar, 2014). To elaborate, when heuristic cues are recognized and understood by a person, that person does not have to take them into account when he or she is processing the information. Whether cues will be used a heuristics can be dependent on several factors, one of which is heuristic dominance (Bellur & Sundar, 2014).

First, heuristic dominance means that several heuristics might be at play but that one heuristic is dominant and most strongly influences a person's information processing. For the present study, this could mean that there are other heuristics at play that were not considered in the present model. For example, the warnings against fake news themselves might have acted

as a dominant heuristic cue. Prior research implies that warnings could act as heuristics since online security warnings were used as a heuristic that affected people's perceptions of online threats (Zhang et al., 2014). Zhang et al. (2014) found that warnings might have triggered a heuristic rule of thumb that said that if there is a warning, the website must be unsafe. Participants in the present study might have reasoned that the articles were not credible because they predominantly thought that the warning means that it is fake, regardless of their perceptions of the authority and social endorsement cues. Whether the theoretical approach that fake news warnings themselves might be a more dominating heuristic might be true could be investigated in a future study to fake news warnings.

Secondly, we would like to discuss a second possible theoretical explanation and implication as to why this study did not replicate the findings by Xu (2013) that social endorsement cues lead to greater perceptions of credibility. A second factor for why a cue might not be used as a heuristic is the perceived reliability of a cue (Bellur & Sundar, 2014). Perceived reliability refers to the likelihood that a cue can reliably help to make the correct judgment. For example, a person might not think that endorsement for a movie by movie critics is a reliable cue because movie critics have a bad reputation or because that person enjoyed movies in the past which critics found to be unenjoyable. Similarly, the diggs on Digg.com that were manipulated by Xu (2013) might be perceived to be reliable cues to use as heuristics for credibility assessment while people on Facebook perceive the number of likes not to be a good indicator of credibility.

Furthermore, in the present study, social endorsement was operationalized by solely displaying the likes under Facebook posts to best replicate the design by Xu (2013) and Messing and Westwood (2014). However, this choice did mean that comments and shares were not integrated with the stimuli. Normally, shares and comments are also part of the Facebook posting format. It seems reasonable to argue that comments and shares are also forms of social

endorsement since a greater amount of likes, comments and shares are likely to lead to more engagement with content (Malhotra, Kubowicz & See, 2013). Future studies could thus examine whether likes on Facebook are perceived to be less reliable heuristic cues and whether people perceive comments and shares as more reliable social endorsement cues for credibility assessment of (fake) news.

Thirdly, while Messing and Westwood (2014) found an interaction effect between source-based heuristics and social endorsement heuristics on people's intention to read an article, a similar interaction effect was not found between the effects of authority and social endorsement heuristics on perceived credibility. Because the newly found results did not provide evidence for a direct effect of social endorsement and authority, the present study provides less theoretical implications for an interaction between both variables. The main take away based on the current data is that the number of likes for a fake news article or the level of the perceived authority of a fake news warning does not seem to interact or influence the level of credibility that a person attributes to the fake news article.

The final theoretical implication is that the present findings do lend support to the belief that there is a positive relationship between perceived credibility of a news article and people's intentions to share that article (Xu, 2013; Ma et al., 2014; Boehmer & Tandoc Jr, 2015). In other words, if a person attributes high credibility to a fake news article that person's intention to share the article will also be higher and if a person attributes low credibility this relationship is reversed. For future researchers who seek to study both variables as a dependent factor, it now seems more reasonable to treat perceived credibility as a predictor for sharing intention.

Practical implications and societal contribution

Although the present study could not confirm most hypothesis there are still relevant conclusions which can be drawn from the data. The results of the present study offer room for

discussion about the role of warnings against fake news, authority and social endorsement in the Facebook environment. Firstly, the hopes for this study were to improve the effectiveness of warnings against fake news by adding cues that gave clear notions of authority. Because no effect of perceived authority was found, communication professionals in the online fact-checking environment should note that adding authority cues to fake news warnings does not seem like an effective measure to improve future fake news warnings.

From a societal standpoint, it is positive that the results contradict previous beliefs that social endorsement leads to higher perceived credibility. Specifically, on Facebook high endorsement in the form of likes on a fake news article does not seem to be a cue for people that causes them to believe that fake news articles labeled with a warning are credible. In turn, because social endorsement cues do not affect credibility, people will also not gain stronger intentions to share fake news. This means that likes do not incentives people to spread fake news, but rather only drive the algorithm to disseminate fake news as it prefers to display content that is highly endorsed with likes (Tien, 2018). In practice, this would mean that the spread of fake news by social endorsement should be combated by improving the algorithms rather than with greater efforts to incentivize people not to like fake news.

Lastly, the main focus of online communication researchers and professionals alike should be to keep continuing to develop measures that are mainly focussed on reducing the publics' perception of the credibility of fake news rather than focussing on the reduction of sharing intentions. Because lowering perceived credibility also lowers peoples' intention to share fake news, it seems possible to reduce two contributors to the spread of fake news with one measure.

Limitations and suggestions for further research

The present study ultimately carries some limitations which need to be discussed. The first limitation that will be addressed is whether participants' experienced true information overload that makes them peripherally process the fake news articles. The present study attempted to replicate information overload for participants by adding a timer. However, the present study did not check whether participants were truly experiencing information overload. We believe that adding a timer is an effective measure that has been used in prior studies (Snelting, 2019). However, future studies might want to include a measure that tests whether participants truly feel overloaded. Another alternative would be to check whether participants processed information peripherally and relied on the heuristics. An example of a possible measure to test whether a person relied on heuristics is described by Bellur and Sundar (2014). They recommend asking whether the participant agrees with the rule of thumb of the heuristic. If a participant agrees, they are more likely to use a cue as a heuristic. In case of disagreement, it is less likely that a person would use a particular cue as a heuristic or that he or she might use a different rule of thumb.

A second, limitation it that participants were not asked whether they were familiar with Snopes.com, and if so, their biases towards Snopes.com were not checked. People that are overly negatively or positively biased towards a fact-checker might disregard the authority rating completely and asses a warning's message solely on the bases of their opinions of that fact-checker (Clayton et al. 2019). The fact-checker in the low authority condition was fictional to prevent positive bias. An argument could be made that the high authority fact-checker should also be fictional. However, a fictional name could still lead to negative biases as people might be skeptical of the fact-checker because they do not recognize it. For this reason, in subsequent studies researchers might want to include a measure that checks people's biases towards the fact-checkers regardless of the authenticity of their fact-checkers.

Finally, the present study checked whether high social endorsement could increase the perceived credibility of a fake news article with a warning. No main effect was found but there might still be an effect of social endorsement on fake news articles without a warning. With the data gathered in the current experiment, it is not possible to study this effect because the experiment included a no warning condition. Future studies could study this proposed relationship. It seems like a relevant experiment because, in reality, a lot of fake news articles are not labeled with a warning because fact-checkers are unable to review all news (Pennycook et al. 2017). Knowing whether social endorsement has a positive effect on perceived credibility and sharing of fake news seems like important knowledge. It would provide a better understanding of the factors that contribute to the dissemination and belief in fake news. This would then add a new challenge for scientists and communication professionals alike, to find new ways of how this potential problem might be solved.

Conclusion

To wrap up this paper, the study aimed to improve fake news warnings' ability to reduce perceived credibility and to reduce sharing intention of fake news by adding authority cues. Furthermore, the study sought to find out whether social endorsement could weaken the effect of authority on perceived credibility and sharing intention. The findings could not provide any evidence for an interaction effect between authority and social endorsement that affected perceived credibility. Furthermore, the results gave reason to believe that authority cues added to fake news warnings and social endorsement do not have an effect on perceived credibility. However, the study did find that a person's intention to share a fake news article can be predicted by their perceptions of credibility, leaving hope that future researchers might be able to reduce credibility and sharing intention simultaneously.

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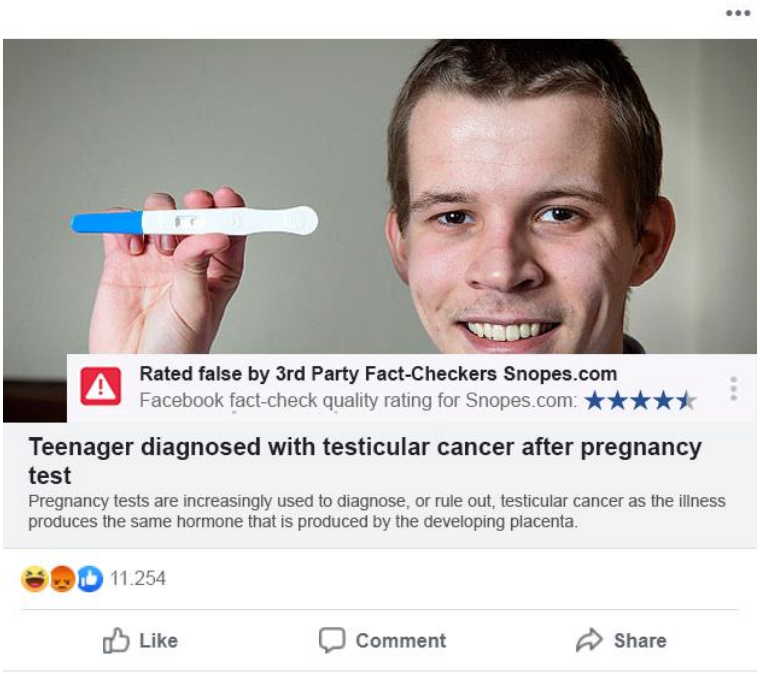
Appendices

Appendix A

Stimuli 1: A highly endorsed article with a warning by a high authority



Stimuli 2: A highly endorsed article with a warning by a high authority

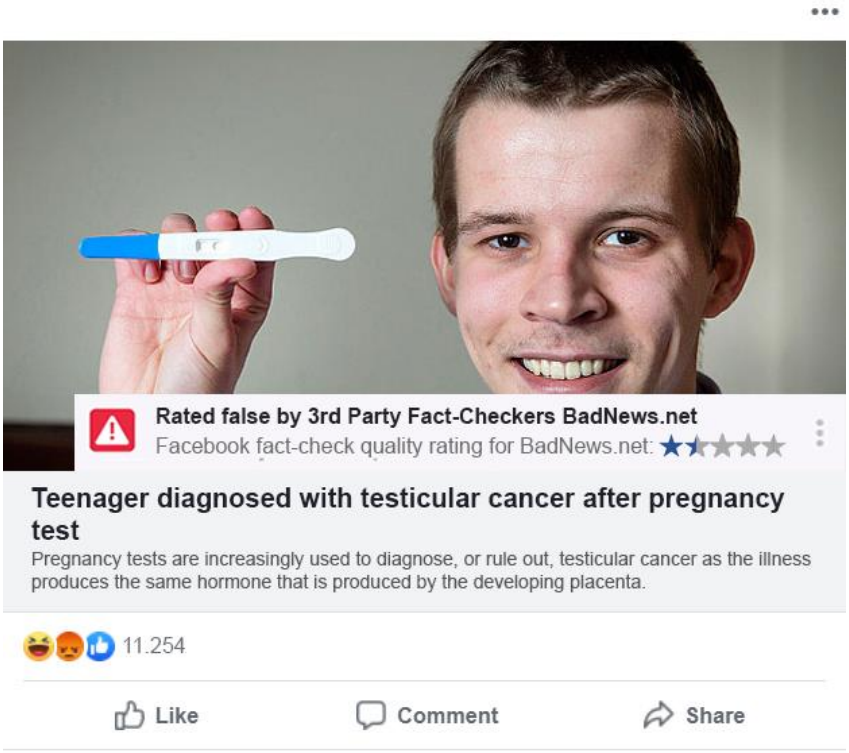
Stimuli 3: A highly endorsed article with a warning by a high authority

Stimuli 4: A low endorsed article with a warning by a high authority

Stimuli 5: A low endorsed article with a warning by a high authority

Stimuli 6: A low endorsed article with a warning by a high authority

Stimuli 7: A highly endorsed article with a warning by a low authority



Stimuli 8: A highly endorsed article with a warning by a low authority

Stimuli 9: A highly endorsed article with a warning by a low authority

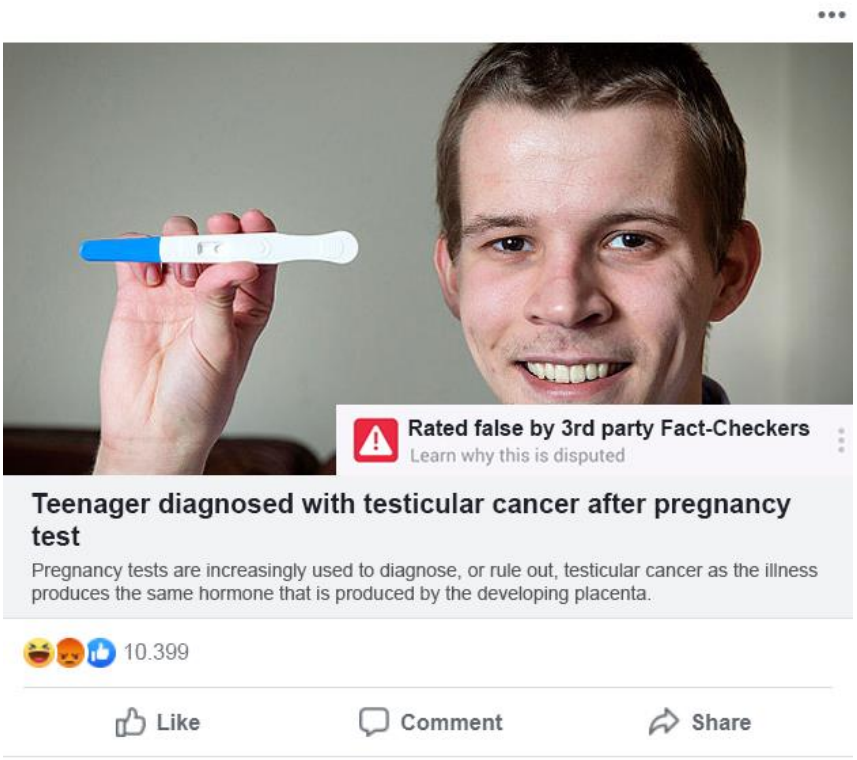
Stimuli 10: A low endorsed article with a warning by a low authority

Stimuli 11: A low endorsed article with a warning by a low authority

Stimuli 12: A low endorsed article with a warning by a low authority

Stimuli 13: A highly endorsed article with a warning without authority cues

Stimuli 14: A highly endorsed article with a warning without authority cues



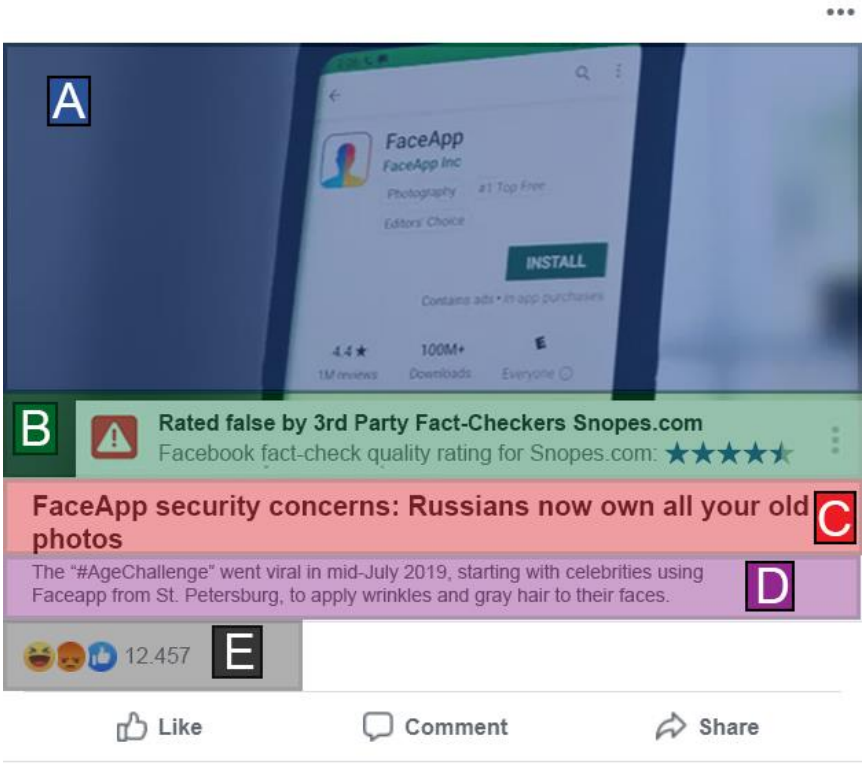
Stimuli 15: A highly endorsed article with a warning without authority cues

Stimuli 16: A low endorsed article with a warning without authority cues

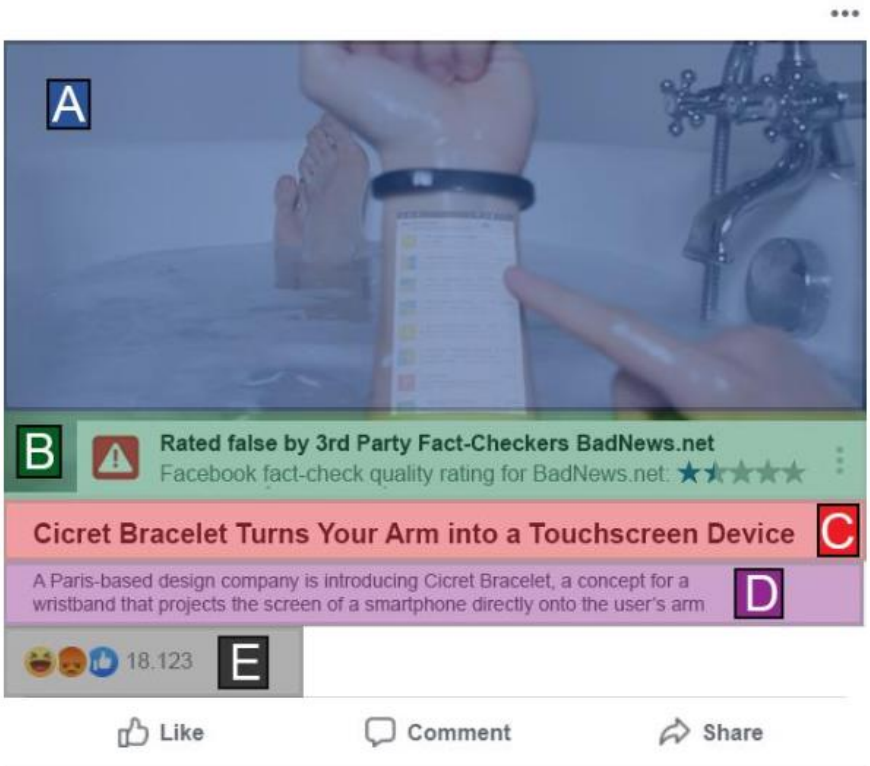
Stimuli 17: A low endorsed article with a warning without authority cues

Stimuli 18: A low endorsed article with a warning without authority cues

Stimuli 19: Manipulation check for high authority condition



Stimuli 20: Manipulation check for low authority condition



Stimuli 21: Manipulation check for no-authority condition


A
B
Rated false by 3rd party Fact-Checkers
Learn why this is disputed
Does Daylight Saving Time Exacerbate Global Warming?
C
A letter to the editor suggested the early start to Daylight Saving Time worsened the effects of global warming.
D
17
E
Like
Comment
Share

Appendix B

Note: this appendix contains the survey for the high authority condition. All questions in the low and no-authority conditions are the exact same except for the question for perceived authority, which is left out of the no-authority condition.

Dear participant,

Thank you for taking part in this study! In this study, we investigate how people process information on Facebook. This study is a part of a master thesis project of the Tilburg University.

Information about the study This study takes approximately 5 minutes to complete, and will not cause you any harm or discomfort. More importantly, your responses will remain completely anonymous and all the data that we collect in this study will be processed anonymously.

Your participation in this study is voluntary and you are allowed to withdraw from the study at any time without any consequences or without providing any explanation. If you have any questions regarding this study, please contact the researchers via j.herfst@uvt.nl

Ethical approval

This study has been reviewed and approved by the Research Ethics and Data Management Committee of Tilburg School of Humanities and Digital Sciences.

On the next page, we ask you to give your informed consent to participate in this study.

(Informed Consent)

In order to participate in this study, you have to agree to the terms of participation. Please read the following terms carefully, and let us know the terms you agree with:

▢ You agree that you are above the age of 18 and have/ have had a Facebook account

▢ You have read the description of the study and understand the goal and purpose of the study

▢ You give permission for the researchers of this study to collect and process your data in an anonymous and confidential manner

▢ You agree that your data will be stored and encrypted for a time period of 10 years

▢ You agree that the collected data will be used for current research and educational purposes

▢ You agree that the collected data can be used for future research and educational purposes

By ticking the following box, you agree to give your informed consent to continue with the study:

o I agree to give my informed consent

o I do not agree to give my informed consent

Thank you for your interest in the study. However because you did not consent with the terms of this study you won't be able to participate in the rest of the survey. If you did not give your consent by mistake or have changed your mind about participation you can click the 'next' button and open the survey again with the same link.

(Demographics)

What is your age? (e.g., provide a numerical response like "18")

_____

What gender do you identify with the most?

o Male

o Female

o Other

What is your highest completed level of education?

o High school

o Intermediate vocational education (in Dutch: MBO)

o Bachelor' s degree

o Master' s degree

o PhD

o Other _____

What is your nationality? (e.g., "Dutch")

_____

How would you rate your English language skills:

o A1 (Beginner)

o A2 (Elementary English - moderate)

o B1 (Intermediate English - Decent)

o B2 (Upper-Intermediate English - Good)

o C1 (Advanced English - Excellent)

o C2 (Proficiency English - Perfect)

PLEASE READ THE FOLLOWING INFORMATION CAREFULLY

You are about to start with the second part of the study. This part is aimed at looking how people do generally read and interpret news articles on Facebook. You will be looking at 6 news articles that have been posted on Facebook this last year. You will be asked to answer a few questions about these articles. For each article, you have 15 seconds to study it. You cannot go back to previous questions.

(Practise article)

To what extent do you agree with the following statements about the article you were just shown?

1. The news article is trustworthy.
2. The news article is believable.
3. The news article is accurate.
4. The news article is credible.

Very strongly disagree (1), Disagree (2), Somewhat disagree (3), Neither agree nor disagree (4), Somewhat agree (5), Agree (6), Very strongly agree (7).

Please indicate how likely you are to:

1. Discuss this article with your friends.
2. Share this article with your friends.
3. Recommend this article to others.

Not likely at all (1), Not likely (2), Somewhat unlikely (3), Neutral (4), Somewhat likely (5), Likely (6), Highly likely (7).

(Article 1)

To what extent do you agree with the following statements about the article you were just shown?

1. The news article is trustworthy.

2. The news article is believable.

3. The news article is accurate.

4. The news article is credible.

Very strongly disagree (1), Disagree (2), Somewhat disagree (3), Neither agree nor disagree (4), Somewhat agree (5), Agree (6), Very strongly agree (7).

Please indicate how likely you are to:

1. Discuss this article with your friends.

2. Share this article with your friends.

3. Recommend this article to others.

Not likely at all (1), Not likely (2), Somewhat unlikely (3), Neutral (4), Somewhat likely (5), Likely (6), Highly likely (7).

(Article 2)

To what extent do you agree with the following statements about the article you were just shown?

1. The news article is trustworthy.
2. The news article is believable.
3. The news article is accurate.
4. The news article is credible.

Very strongly disagree (1), Disagree (2), Somewhat disagree (3), Neither agree nor disagree (4), Somewhat agree (5), Agree (6), Very strongly agree (7).

Please indicate how likely you are to:

1. Discuss this article with your friends.
2. Share this article with your friends.
3. Recommend this article to others.

Not likely at all (1), Not likely (2), Somewhat unlikely (3), Neutral (4), Somewhat likely (5), Likely (6), Highly likely (7).

(Article 3)

To what extent do you agree with the following statements about the article you were just shown?

1. The news article is trustworthy.
2. The news article is believable.
3. The news article is accurate.
4. The news article is credible.

Very strongly disagree (1), Disagree (2), Somewhat disagree (3), Neither agree nor disagree (4), Somewhat agree (5), Agree (6), Very strongly agree (7).

Please indicate how likely you are to:

1. Discuss this article with your friends.
2. Share this article with your friends.
3. Recommend this article to others.

Not likely at all (1), Not likely (2), Somewhat unlikely (3), Neutral (4), Somewhat likely (5), Likely (6), Highly likely (7).

(Article 4)

To what extent do you agree with the following statements about the article you were just shown?

1. The news article is trustworthy.
2. The news article is believable.
3. The news article is accurate.
4. The news article is credible.

Very strongly disagree (1), Disagree (2), Somewhat disagree (3), Neither agree nor disagree (4), Somewhat agree (5), Agree (6), Very strongly agree (7).

Please indicate how likely you are to:

1. Discuss this article with your friends.
2. Share this article with your friends.
3. Recommend this article to others.

Not likely at all (1), Not likely (2), Somewhat unlikely (3), Neutral (4), Somewhat likely (5), Likely (6), Highly likely (7).

(Article 5)

To what extent do you agree with the following statements about the article you were just shown?

1. The news article is trustworthy.
2. The news article is believable.
3. The news article is accurate.
4. The news article is credible.

Very strongly disagree (1), Disagree (2), Somewhat disagree (3), Neither agree nor disagree (4), Somewhat agree (5), Agree (6), Very strongly agree (7).

Please indicate how likely you are to:

1. Discuss this article with your friends.
2. Share this article with your friends.
3. Recommend this article to others.

Not likely at all (1), Not likely (2), Somewhat unlikely (3), Neutral (4), Somewhat likely (5), Likely (6), Highly likely (7).

(Article 6)

To what extent do you agree with the following statements about the article you were just shown?

1. The news article is trustworthy.
2. The news article is believable.
3. The news article is accurate.
4. The news article is credible.

Very strongly disagree (1), Disagree (2), Somewhat disagree (3), Neither agree nor disagree (4), Somewhat agree (5), Agree (6), Very strongly agree (7).

Please indicate how likely you are to:

1. Discuss this article with your friends.
2. Share this article with your friends.
3. Recommend this article to others.

Not likely at all (1), Not likely (2), Somewhat unlikely (3), Neutral (4), Somewhat likely (5), Likely (6), Highly likely (7).

(Authority check)

All news articles that you have just seen were reviewed and rated false by fact-checker Snopes.com

Please indicate to what extent you agree with the following arguments about Snopes.com

1. Fact-checker Snopes.com is an expert organisation.

2. Fact-checker Snopes.com is a reputable organisation.

3. Fact-checker Snopes.com is an authority organisation for fact-checking Facebook news.

Very strongly disagree (1), Disagree (2), Somewhat disagree (3), Neither agree nor disagree (4), Somewhat agree (5), Agree (6), Very strongly agree (7).

(Manipulation check)

You just read 6 articles. We want to know on what parts of the article you focused when you answered the questions about the article. Below, you see an image of an article in which each section of the article has been labeled with a letter.

For the final question use the image on above to indicate what elements you looked at in order to answer the questions for the previous articles.

To do this please order the elements of the articles from most to least important.

_____ Front-image (A)

_____ Fake news warning (B)

_____ Title (C)

_____ Article intro (D)

_____ Likes (E)

(Control variables)

How often do you read the news?

1. I read the news on a daily basis.

Completely disagree (1), Disagree (2), Neutral (3), Agree (4), Completely agree (5)

Do you trust news on Facebook?

1. I generally trust the news on Facebook.

Completely disagree (1), Disagree (2), Neutral (3), Agree (4), Completely agree (5)

How often do you read news on Facebook?

1. I read news on Facebook.

More than 5 times a day (1), 4-5 times a day (2), 2-3 times a day (3), A few times a day (4), 1 time a day (5), A few times a month (6), Never (7)

(Debriefing)

Thank you for you participation!

Goal of the study

This study examined how warnings against fake news by either authority or non-authority organisations influence the believability of the news article, and what role the endorsement by friends (number of likes) influence this relationship.

In order to make sure that you would critically evaluate the fact-checking authorities, you were not told that these were fictional. Also, all information about the fact-checking authorities that you have read beforehand was fictional. The news articles that you have seen in the first part of the study were articles that have been published on Facebook but were deemed partly false.

Since you took part in manipulation of different experimental conditions in this study, you have the possibility to withdraw your answer from the analysis. If you would like to do this, please contact the researchers. Additionally, if you have any further questions regarding this study, you may contact us via e-mail: j.herfst@uvt.nl

Confidentiality

We ask you to not talk about the process or goal of this study with other potential participants. By clikcing the box below, you agree that you have read the de-briefing information and that you will not share any information regarding this study with other potential participants.

- I agree

Appendix C

Note: This appendix contains the first pre-test survey that was used to measure the ambiguity of the news articles and also tested the perceived credibility scale. We have not included all 16 articles that were tested but rather only one as an example. The perceived credibility questions for each article were the exact same, therefore the example question is representative for all 16 questions used in the pre-tests.

Dear Participant,

We (Joris Herfst & Michaela Mojtová) would like to thank you for your interest in our survey.
We are both Master students in Business Communication and Digital Media at Tilburg University and are currently writing our Master thesis. With our thesis we try to study peoples' behaviour when they interact with information and news articles on Facebook.

The questionnaire will take around 10 minutes to complete. Participation in this study is voluntary and you are allowed to withdraw from the survey at any time without any consequences or without providing any explanation. Every respondent has the right to contact the researchers if they want any additional information about the procedure or their participation. The researchers can be contacted via e-
mail.

This study will not cause you any harm or discomfort. The study does not involve any intensive physical activity and will not expose you to vulgar or disturbing information and imagery. When you enter this study, data will be collected anonymously and will be stored and encrypted in a confidential manner for 10 years. Only the researchers and reviewers of the Master theses will have access to the data of your answers. This survey does not collect any data that can be traced back to yourself or any other participant. Before you can start the survey you get to see an overview of the terms of participation. After this you will be asked for your informed consent and then the survey will start.

In order to participate in this study, respondents have to agree to the terms of participation. Please read the following terms for participation in this study:

- You are agreeing that the data you enter in this survey can be analysed and reported in two master's theses.
- You agree that you are above the age of 18 and have a Facebook account.
- You have read the description of the study and understand the goal and purpose of the study.
- You have been informed about possible discomforts that could be caused by participating in this study.
- You give permission for the researchers of this study to collect and process your data in a confidential manner.
- You agree that your data will be stored and encrypted for a time period of 10 years.

- You agree that the researchers of this study and the reviewers of the Master theses can have access to your data.
- You know that these data, together with your answers on the questionnaire, will be used for research and educational purposes.
- You understand that no identifying information will be tied to the data. Instead of identifying information, the researchers will use a participant number.
- You took the time to read this form and to understand what is written on it.

Please note, that participation is voluntary, all responses are anonymous, will be dealt with confidentiality and that you are able to contact the researchers at any point for any inquiries or information regarding this study. If you agree to these terms and are willing to continue participation in this study please tick the ‘yes’ box to give your informed consent.

I hereby agree with the terms for participation in this study and give my informed consent:

○ Yes

○ No

You will now be viewing some news articles that are published on Facebook that have to be reviewed by a fact-checking organisation.

Dr. Leon Eisenberg: ADHD Is a 'Fictitious Disease'

Dr. Leon Eisenberg, the 'father' of ADHD, said just before his death that ADHD 'is a prime example of a fictitious disease.'

Like Comment Share

To what extent do you agree with the following statements?

	Very strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Very strongly agree
This news article is trustworthy	○	○	○	○	○	○	○
This news article is believable	○	○	○	○	○	○	○
This news article is accurate	○	○	○	○	○	○	○
This news article is credible	○	○	○	○	○	○	○

Appendix D

Note: this appendix contains the second pre-test which measured whether the manipulations of the authority cues were successful and whether the perceived authority scale was a reliable measure.

Dear participant,

Thank you for showing interest in this study. This survey is part of two Master theses by students of Tilburg University of the Humanities & Digital Sciences department.

Before you start the study please make sure that you read every question carefully and give only honest answers. The Survey takes approximately two minutes to complete.

Before you can answer the questions you will be given a short introduction about 'fake news' on Facebook and about the actions that are taken to combat fake news.

In recent years the amount of fake news that has been posted and spread on Facebook has increased. In order to stop fake news from spreading Facebook started to fact-check articles. However, ten thousands of news articles are posted on Facebook each day which Facebook cannot fact-check all by themselves.

Therefore, Facebook works together with 3rd party fact-checking organisations who do the fact-checking for Facebook.

You are about to see some information about these fact-checkers and are about to answer a few questions about them.

Please take a look at the following rating:

To what extend do you agree with the following statement?

	Very strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Very strongly agree
Fact checker Snopes.com is an expert organisation	○	○	○	○	○	○	○
Fact checker Snopes.com is a reputable organisation	○	○	○	○	○	○	○
Fact checker Snopes.com is an authority organisation in the field of fact-checking Facebook news	○	○	○	○	○	○	○

Please take a look at the following rating:

To what extend do you agree with the following statement?

	Very strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Very strongly agree
Fact checker Snopes.com is an expert organisation	○	○	○	○	○	○	○
Fact checker Snopes.com is a reputable organisation	○	○	○	○	○	○	○
Fact checker Snopes.com is an authority organisation in the field of fact-checking Facebook news	○	○	○	○	○	○	○

Please take a look at the following rating:

To what extend do you agree with the following statement?

	Very strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Very strongly agree
Fact checker BadNews.net is an expert organisation	○	○	○	○	○	○	○
Fact checker BadNews.net is a reputable organisation	○	○	○	○	○	○	○
Fact checker BadNews.net is an authority organisation in the field of fact-checking Facebook news	○	○	○	○	○	○	○

Please take a look at the following rating:

To what extend do you agree with the following statement?

	Very strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Very strongly agree
Fact checker BadNews.net is an expert organisation	○	○	○	○	○	○	○
Fact checker BadNews.net is a reputable organisation	○	○	○	○	○	○	○
Fact checker BadNews.net is an authority organisation in the field of fact-checking Facebook news	○	○	○	○	○	○	○