

COMENIUS UNIVERSITY IN BRATISLAVA
FACULTY OF MATHEMATICS, PHYSICS AND INFORMATICS

EFFECT OF EMOTION MANIPULATION ON
ACCEPTING AND SHARING OF FAKE NEWS
MASTER THESIS

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COMENIUS UNIVERSITY IN BRATISLAVA
FACULTY OF MATHEMATICS, PHYSICS AND INFORMATICS

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MASTER THESIS

Study Programme: Cognitive Science
Field of Study: Computer Science
Department: Slovak Academy of Sciences
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Title: Effect of emotion manipulation on accepting and sharing of fake news

Annotation: Fake news often rely on arousing emotions, especially fear and anger, which leads to increased sharing of this content. However, previous research has shown that for reducing the spread of disinformation, a promising debiasing method lies in a simple intervention for increasing analytic thought that might counteract the intuitive response based on emotions. For example, Pennycook et al. (2020) have shown that simply evaluating the accuracy of (real and fake) news articles is enough to reduce the willingness to share fake news.

Aim: Examine the effect of two distinct negative emotions (anger vs. anxiety) on the susceptibility to believe and share fake news with health content.

Literature: Lutzke, L., Drummond, C., Slovic, P., & Árvai, J. (2019). Priming critical thinking: Simple interventions limit the influence of fake news about climate change on Facebook. *Global environmental change*, 58, 101964.
Pennycook, G., & Rand, D. G. (2020). Who falls for fake news? The roles of bullshit receptivity, overclaiming, familiarity, and analytic thinking. *Journal of personality*, 88(2), 185-200.

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Názov: Effect of emotion manipulation on accepting and sharing of fake news
Vplyv manipulácie emóciami na prijímanie a zdieľanie falošných správ

Anotácia: Falošné správy sa často spoliehajú na vzbudzovanie emócií, najmä strachu a hnevu, čo vedie k zvýšenému zdieľaniu tohto obsahu. Predchádzajúce výskumy však ukázali, že na zníženie šírenia dezinformácií je sľubná metóda skreslenia v jednoduchom zásahu na zvýšenie analytického myslenia, ktoré by mohlo pôsobiť proti intuitívnej reakcii založenej na emóciách. Napríklad Pennycook a kol. (2020) ukázali, že jednoduché vyhodnotenie presnosti (skutočných a falošných) spravodajských článkov stačí na zníženie ochoty zdieľať falošné správy.

Cieľ: Preskúmajte vplyv dvoch odlišných negatívnych emócií (hnev vs. úzkosť) na náchylnosť veriť a zdieľať falošné správy týkajúce sa zdravia.

Literatúra: Lutzke, L., Drummond, C., Slovic, P., & Árvai, J. (2019). Priming critical thinking: Simple interventions limit the influence of fake news about climate change on Facebook. *Global environmental change*, 58, 101964.
Pennycook, G., & Rand, D. G. (2020). Who falls for fake news? The roles of bullshit receptivity, overclaiming, familiarity, and analytic thinking. *Journal of personality*, 88(2), 185-200.

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Abstrakt

V tejto práci sme sa sústredili na vplyv emócií na akceptáciu a zdieľanie falošných správ. Vytvorili sme súbor Facebookových príspevkov, ktorí sa venujú správam o zdraví a nechali sme respondentov rozhodovať o tom, aké sa im jednotlivé správy zdajú dôveryhodné či by boli ochotní ich zdieľať na vlastných sociálnych sieťach. Respondenti boli rozdelení do troch skupín, z toho dve skupiny sme podrobili emočnej manipulácii vo forme krátkych príbehov. Z výsledkov vyplýva, že obe emočné manipulácie fungovali, avšak nemali signifikantný efekt na prijímanie, ani zdieľanie falošných správ. Ako aj v širšej literatúre, aj v tejto práci sa ukázalo, že respondenti sa rozhodujú skôr podľa dlhodobějších názorov než podľa emócií, ktorej podliehajú v danej chvíli.

Kľúčové slová: emócie, falošné správy, sociálne siete

Abstract

In this work, we focused on the influence of emotion on the acceptance and sharing of fake news. We created a set of Facebook posts dedicated to health news and let respondents decide how credible each message seemed to them and whether they would be willing to share it on their own social networks. The respondents were divided into three groups, two of which were subjected to emotional manipulation in the form of short stories. The results show that both emotional manipulations worked, but did not have a significant effect on receiving or sharing fake news. As in the wider literature, it was also shown in this work that the respondents make decisions based on longer-term views rather than on the emotions they are subject to at the moment.

Keywords: emotions, fake news, social media

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Chapter 1

Introduction

Fake news is not a new phenomenon. It has been with us in forms of rumours or tabloids for a long time now, although it was not spreading so rapidly. Nowadays, there are new tools which help fake news spread faster - social media. Oftentimes, the aim of the fake news is to evoke negative emotions. In recent years, there has not been much positive news lately if we consider the pandemic, war in Ukraine or fight for women's rights in Iran. These events have been traumatic by themselves, the aftermath of the war has touched everyone in Europe and the whole world was affected by the pandemic. Not only these events fed negative emotions and mood, they gave enormous opportunity to the spread of fake news - we have seen it with the pandemic, with the war in Ukraine and with every major and minor event that happened globally in the past few years. Trend of fake news is getting stronger and stronger as many people stayed home during the pandemic and lost connection with the real world. Whereas before, we were forced to discuss our ideas or opinions with people different from us - classmates or coworkers - the pandemic took that away from us as we stayed home and did not have the critical third party to discuss our latest thoughts with. We are encapsulated even more into our bubbles where we nourish only our opinions and it is harder for us to escape them with more time spent in them. As it might seem, negative emotions are playing the lead role lately. Therefore we thought it might be beneficial to look at how emotions affect our perception of the news. In this study, we wanted to consider emotions as mediators of the fake news effect. We wanted to test whether previously induced emotional states have an effect on respondents' perception of the fake news. The other reason to focus on negative emotion is previous research. The main motivations to focus on this study was increasing use of social media, growth of fake news sources, lack of research regarding emotions and their effect on perception of fake news. We cannot disassociate from our emotions and therefore it is important for us to understand their impact on our daily life. However, it is very broad to examine negative emotions in general. Different emotions may be activated differently among

people. Therefore we have chosen to examine anger and anxiety. We have chosen short stories to activate emotions, as we were working on an online questionnaire and it was difficult for us to choose the right video to activate only one emotion, as we wanted to focus directly on anger and fear. Previous research has shown news and fake news are mostly evoking negative emotions anyway. We can see emotions being used and oftentimes abused in context with fake news.

The aim of this work is to discover the behavior towards fake news in the online environment, most specifically on social media. We are not only examining the susceptibility or respondent's perception of the fake news. As social media, preferably Facebook, have many ways of interacting with content, our second goal is to determine what is the behavior towards sharing fake news as well. We cannot encapsulate entire behavior online so we chose our focus. Many studies suggest there is no correlation between believing and sharing fake news, so the structure of the questionnaire allows us to study this phenomenon as well. Even though this study has been done in the English language, we would like to investigate whether the results are inline. It is interesting because linguistics may play a role here. This paper may be an interesting foundation for future research in the area of fake news on social media and I consider this to be also an important part of this research.

Our most important research questions are as follows:

- How does anger influence the acceptance of fake news?
- How does anger influence the willingness to share fake news?
- How does fear influence the acceptance of fake news?
- How does fear influence the willingness to share fake news?
- Are people more likely to believe in fake news also more willing to share the fake news?

In this master thesis, we firstly set base and research the current work in the area of fake news, it can be found in the chapter 3 Current research in fake news, where we also focus on the emotion part of the research. We focus on the phenomena of social media in the chapter 4 Social media and fake news. We briefly touch what are used suspected to on Facebook. We present our design of the study, participants and variables in the chapter 5 Methodology. You can find analytical part of the study in the chapter 6 Results where we analysed our data using R and found out whether our hypothesis were correct and if our data has statistical significance. We further discuss our finding in the chapter 7 Discussion and conclude our study in the chapter 8 Conclusion.

Chapter 2

Aim of this work

In this study, we focus on what role does emotion play in the perception of fake news. Whether they have any implications on accepting and sharing false content.

We have decided to conduct this study because of the development of fake news on social media since 2016. Year, in which Donald Trump was elected 45th President of the United States and the British have decided to exit the European Union by a very close referendum vote. As research has shown later, both instances have been influenced by false content on social media, Facebook in particular. Since we have seen the power of paid false advertisements in 2016, it only got worse. In 2020, we saw an enormous anti-campaign against COVID-19 disease caused by SARS-CoV-2 virus. People have lost lives because of the false information and that was the impulse for us to focus on the news related to health. Primary was our goal always to test whether emotion plays a role in accepting and sharing fake news. Therefore, we formed couple of hypotheses:

- People exposed to a story to evoke anger would be more angry compared to a control group.
- People exposed to a story to evoke fear would be more fearful compared to a control group.
- People reading a story to evoke anger would be more willing to accept fake news compared to control group.
- People reading a story to evoke anger would be more willing to share fake news compared to a control group.
- People reading a story to evoke fear would be more willing to accept fake news compared to a control group
- People reading a story to evoke fear would be more willing to share fake news compared to a control group.

- People who scored higher on accepting the fake news will also score higher on sharing the fake news.

To summarize our hypotheses, we expected our emotional manipulation to work. We also expected that our emotional manipulation will form perception of fake news and make people believe in them more. As we researched in literature, negative emotions may influence respondents' behaviour to accept and also share fake news more often than without such manipulation [40] [24].

Chapter 3

Current research in fake news

Fake news has a long history. As we have lived through a pandemic, we now know misinformation is dangerous and may take lives. Since the first Trump campaign in 2016 or Brexit, we know that spreading and users' believing in fake news creates a threat to democracies. As more and more people are getting their news from social media platforms, relevant and critical journalism is also at stake as it is difficult for users to distinguish among them and identify which news is correct and which is misinformation or disinformation [45]. Recent research has begun once there were multiple scandals regarding political figures in the United States and United Kingdom in 2016. False stories related to the Trump campaign have been shared at least 38 million times on Facebook prior to the 2016 election, 30 million of them in favor of the candidate Donald Trump [2]. Things skyrocketed during COVID-19 pandemic in 2020 and got even worse during the war in Ukraine in 2022 when the Slovak government even banned websites spreading fake content. Social media platforms, such as Twitter and Facebook have become more strict and also started to ban users spreading misinformation, disinformation or false content. It has become really hard to navigate in the sea of the news, to determine which news is trustworthy and which was created with intention to be deceiving. The intent is the main thing which separates news from fake news. Fake news is being created with the intent to mislead the reader [36].

3.1 Why do people believe fake news?

There are many factors that influence users' behaviour online and on social media. Users' cognition is not endless, it is limited. Therefore there is only a limited amount of information users' can process. This brings along challenges and opportunities for malicious accounts, because if they create and promote enough content, it is statistically probable that it will reach enough users' and they will not be able to distinguish among misleading content.

3.1.1 Identity-protective cognition

One of the reasons users tend to believe the fake news is identity-protective cognition [20]. The main idea is that users' perception of facts are shaped by their values [20]. Users value culture above facts in the apprehension of societal risks [20]. Users' decision making is conditional on their perception of facts [20], it is cognitively prior and therefore people tend to believe the news that align with their political values and identity. We should not expect users to form accurate decisions based on the information processed because it is not its goal, this reflects poorly on public's reasoning [20]. Normally, users should update their beliefs every time they encounter evidence which is not inline with their beliefs, but this is not what is happening. Users are evaluating this evidence (or news) as inaccurate because of their prior beliefs, therefore the evidence stays consistent [20]. This means users are more likely to stay in their beliefs even though they have been presented new evidence that might suggest their prior beliefs have been wrong [19].

Similarly, we can take a look at how easy it is to change the opinions of the users who are subjected to identity-protective cognition. It turns out corrective messages (content supporting truthful information) is not well adjusted by users whose identity is threatened by the news [20]. Users are more likely to abandon their misinterpretation when they feel like their identity is being affirmed by false information [20].

Additionally, factual presentation does not seem to have an effect on believing the misinformation [20]. The identity-protective cognition is therefore stronger than the relationship with factual belief and when it comes to misinformation, it is not enough. There is something far stronger than our understanding of science or data and it is our identity or what person we consider ourselves to be.

Political motivations

Believing the misinformation regarding political news may be explained by identity-protective cognition. Users who claim strong affiliation towards a political party tend to be more subjective to false claims when the claims are inline with their political beliefs or identity [18].

There has been a respectful amount of work done related to fake news when it comes to the US presidential election in 2016. In accordance with identity-protective cognition, researchers have found that respondents have been more likely to believe the news which supported their preferred candidate or unsupported the opponent of the preferred candidate [2]. More interestingly, they have found that respondents were making up stories which aligned with their opinions or beliefs as previously seen stories to support their identity-protective cognition [2]. Respondents are easy to persuade to believe the news in favour of their preferred candidate. Also meaning, they are

choosing information already based on their preference or belief.

To sum up, users are choosing which news to read or consider reliable not based on factual interpretations or validity. They are choosing how reliable the news is based on their belief system because their identity is far more important to them than the relevance of the news presented.

3.1.2 Dual-process theory

Dual-process theories are essential in cognitive science research regarding reasoning [35]. These theories consist of two different cognitive systems, or processes, guiding the cognition. System 1 processing is mostly automated and happens without our intention or knowledge [35]. System 1 evokes Type 1 outputs, also considered as intuitions, where the response comes to the mind directly as a response to a stimulus [35]. System 2 evokes Type 2 outputs, also considered as deliberate type of response which may or may not arise as a response to a particular output, or even sets of outputs [35].

It may be illustrated using the Cognitive Reflection Test: bat and ball cost \$ 1.10 in total. The bat costs \$ 1.00 more than the ball. How much does the ball cost?' The answer - 10 cents - usually comes to the mind right away, or intuitively although the answer 10 cents is not correct. This demonstrates Type 1 output. Correct answer - 5 cents - comes to most minds after some additional process (Type 2 output) [36]. Using Cognitive Reflection Test often serves as during research associated with reasoning, beliefs, behaviours or online presence.

Classical reasoning vs. Motivated reasoning

As mentioned prior, dual-process theory is also used in determining why people believe fake news. It is based on the idea that analytical thinking or processes may override intuitive processes and therefore, one is more prompt to distinguish among fake news [36].

Classical reasoning accounts which are in line with dual-process theory rely on analytical thinking to be correcting the assumptions [36]. This account argues that people who use will while deciding without deep consideration are less likely to believe fake news. They are better able to distinguish between true and fake news without considering their political motivations while reading news [36]. From this point of view, people more engaged in analytical thinking are less likely to be victims of false content [36]. This still does not answer the question why people who engage in analytical thinking are still susceptible to fake news related to ideology such as religion or paranormal beliefs [36].

When we consider motivated reasoning in regard to fake news, we see that studies are often considering political partisanship to be the motivator when it comes to believ-

ing the fake news. If we consider motivated reasoning, we might be able to explain why people believe completely fabricated stories supporting their ideology [20]. Motivated reasoning as System 2 explains why people believe politically motivated fake news - they align with their political ideology - this system supports the tendency to engage in motivated reasoning [18]. There is no correction though and people who are certain about their beliefs do not correct their views while engaging in analytical thinking, they are becoming more polarized [36].

3.1.3 Heuristics

It has been discovered people are using mental shortcuts or heuristics when they are judging news headlines [33]. It has been proved that people judge news as more likely to be true with increased familiarity [34]. Interestingly, it does not matter how ridiculous the news presented be, it only takes being shown twice and people are prompted to believe in it more [32]. Another example of heuristic shortcuts is the fact that people are judging news based on the source, not based on the news itself [34].

Prior exposure to the news

Illusory truth effect has been proven a long time ago. Firstly in the study of wartime rumors, where researchers have found that if respondents have heard the rumor before they were more likely to believe it [3]. When connected with fake news, it has been proven that if respondents are exposed to a certain headline even once prior to assessing its reliability, they will assess it to be more believable [33]. In an experiment, even deeply unrealistic news doubled in accuracy by respondents in measures taken one week apart (from 5 % to 10 %) [32]. Many studies have agreed that this illusory effect happens because of prior exposure to the news and that respondents believe repeated stimuli more [13]. This happens to be true also with politically motivated fabricated news [33], even if the respondents political beliefs did not align with news presented [33] and even if it contained an explicit warning the news is untrue by fact-checkers [34].

3.2 The role of emotion

Emotions are defined as internal mental states. They are representing reactions to events, objects or agents and they vary in intensity [24]. Emotions are usually short-term states resulting from external stimuli [24].

We are emotional beings. Often we act emotionally. Studies have found emotion has an impact on the way we perceive the news regardless of their nature - they might be as well true as well as misinformation or disinformation [6]. Emotions are playing a

role in deciding and forming judgement. There are few cognitive theoretical approaches which examine the role of emotion while deciding or judging.

3.2.1 Cognitive-appraisal theory

Cognitive-appraisal theory is based on the idea that people are making predictions while influencing a specific emotions on judgement [39]. Researchers have identified six dimensions defining patterns of appraisal. These patterns are underlying different emotions, such as responsibility, anticipated effort, intentional activity, control, pleasantness and certainty [39]. For example, anger arises from underlying emotions such as responsibility (for negative events), control and sense of certainty about the event [39]. These are the main dimensions distinguishing anger from other emotions. Different emotions come from different dimensions. Anger and sadness are both negative emotions, but they both arise from different appraisal [26]. As we mention prior, anger arises from individual control over a negative events and sadness arises from situational control of a negative event [26]. This is why considering only negative emotions in this study might be insufficient and we zoomed in on anger and sadness.

3.2.2 Functional theory of emotion

Functional theory of emotion states that emotions trigger a set of responses. These responses may be physiological, behavioral, experimental or concern communication. Responses are enabling people to react quickly and be quick on their feet during unexpected event or when they face a problem or a new opportunity [27]. Emotion and cognition are deeply linked. There are processes, such as attention, memory or judgement that can be influenced or regulated by emotion, meaning emotions can directly influence one's cognition [21]. Not only is emotion and cognition deeply linked, one can influence another. Emotion has the ability to focus the cognition [21]. Emotion is directing the thoughts connected to a certain stimuli, which might be relevant to the ongoing situation, but also it can not be [21]. Consider anger, anger can be elevated by different stimuli.

3.3 Framing effect theory

Framing effect theory is a theory within communication and media science [24]. This theory has both social and psychological bases [24]. It describes the ability of the media or news stories to shape readers behavior by the way media reports on the certain issue [24].

For a long time, researchers have thought that processes which are enabling framing

are cognitive [25]. Researchers slowly began to realize it is not only cognitive, but they need to take emotions into consideration as well. Framing may be also mediated by emotional response [25].

There are many approaches to framing, we will highlight the ones where these methods have been used while studying fake news. In our study, we are using anger and fear as mediators for framing.

Nowadays, with multiple problems of hate speech on social media, we can observe users using framing. Users accused of using hate speech are defending themselves saying they are exercising their free speech. As of November 2022, we can observe social media (Twitter, Facebook) allowing people distribute hate speech under misapprehension that free speech is there for everyone and they should not be censured. As social media are private companies it is difficult to exercise law there and all the users are in the hands of CEOs and owners of the social media companies.

3.3.1 Morality frame

Morality frame uses a context of values, morality, culture or religiousness [38]. While interesting for studying the fake news, this is the least common frame to be used in actual news stories. It is often not in line with values valued by journalists. But while considering the fake news and reliability of its content, it is actually morality or dogmatism that prompt higher tendency to believe in them [36]. As we can observe news from all over the globe now, we see the rise of the morality frame being used among conservative media in the United States of America. To choose one outlet, Fox News has been serving controversial fake news about the 2020 election using a morality frame. Prior to the election, they already warned their viewers about not favoring the outcome towards Donald Trump, elevating emotions. After the unsuccessful election for the 45th President of the United States, Donald Trump, they kept on elevating the tension, spreading fear and controversy. All this coverage resulted in the attack on the Capitol building on January 6th 2021. It is fair to say anchors were using the morality frame because they repetitively speculated about votes from undocumented immigrants while fully aware this is not a possibility. Their continuous attacks elevated anger among their viewers and therefore they were using those negative emotions as future framing for upcoming news. So even though this framing is not very popular among serious journalists, it has found its base for usage - so called conservative news in the United States.

Framing can evoke emotional responses [24]. Emotional responses may involve discrete emotions, such as anger, joy, hope or fear [24] .

3.3.2 Conflict frame

Conflict frame is often being used in political news and political communication. Conflict framing in this context proved to have mobilizing force [37]. Studies have found that news using conflict framing was shared 11 % more times than the ones which did not use conflict framing [37].

3.3.3 Human interest frame

Human interest frame is being used to simplify a complex situation or to make a specific example so that the whole situation is more accessible to the audience [44]. This frame aims to humanize the news so it feels more personal for the reader. It tries to put a human face on an event, issue or a problem [44]. This frame aims to humanize the news so it feels more personal for the reader. It tries to put a human face on an event, issue or a problem [38]. It also often tries to emotionalize the content, or dramatize to it captures higher attention and spikes audience interest [38]. It has been found that humanizing content or news is associated with learning from it. [17]. It speaks to people who are inclined to soften version of usually hard news, this frame is enabling them to consume it [17]. It may be argued it evokes psychological engagement in the news.

Human interest framing has shown higher involvement of people with the stories while dealing with medical news [40].

3.4 Sharing of the fake news

Many researchers devote their energy to finding out why do people share fake news. Behavioral characteristics of believing and sharing differ. Content which is triggering high arousal emotions such as happiness or anger is being shared more often [40]. Therefore we might claim users are being exposed to emotion leading sharing - users are sharing news they feel more attached to. While using conflict framing, there is a probability it will increase people's attention to a story [40].

Human interest frame has shown higher tendencies for readers to share such stories [40]. Users of social media platforms may identify themselves with the events in the story and as a consequence, they might be more prompt to sharing [40]. While using the human interest frame, the rating of sharing the news on Facebook has increased by 33 % when compared to the news without human interest frame [40]. In another study, while comparing different types of framing, human interest frame has become the most vital frame for sharing content among others [43]. The reason for this might be because human interest frame is triggering a strong emotional arousal [17]. This

frame also increases psychological involvement with the news story which may result in increased sharing preferences [40].

Conflict framing is not working great while sharing the news content. Positive stories have higher tendency to be shared than negative ones [40]. Therefore conflict framing is not effective if we want to increase sharing of the story. This conclusion may seem logical, users oftentimes do not want to portrayed as negative and therefore the sharing of the negative or conflicted news is lower than positive ones [40].

Morality frame is the least popular frame to be used for sharing as well as it the least used in creation of the news itself [43]. Is is believed morality framing has a strong emotional activation and therefore stories using morality framing should be more prompt to sharing [40]. These stories are becoming viral because of their emotional tone and arousal [40]. Another reason for a morality framing to have a high sharing score is the fact that these stories resonate with readers on level of their values [40]. When readers evaluate a news story as important they are prompt to share it [40]. News stories which match readers' values are shared more often because they have higher tendency to be remembered and they resonate with readers [40]. Accordingly, when readers perceive the news as important or influential, they have a higher tendency to share those as well [40]. Users are sharing news according to their attitudes and preference, news reflecting their viewpoints [4]. Users are using sharing as a way of telling their friends and followers what do they think, believe or agree with [40].

Another reason to share the news might be simply informative. Many people may choose to share to inform their social circle about something they find important. Even in this case, we should not connect reliability of the news and readers' willingness to share this news. Some of the users who share the news may share it in good belief that they are informing their social circle about misinformation spreading online. When users decide to share particular news, motivations may vary. It is courageous to claim there is an absolute link between sharing and believing in news.

3.4.1 Emotional broadcaster theory

Emotional broadcaster theory is an approach in social psychology. It explains why people have internally driven desire to share their experience with others, such as their friends but oftentimes strangers. It also questions why are people sharing news stories. Emotional broadcaster theory explains why do people share especially emotional content [14]. Emotional content while shared among others fulfills the need for sharing [14].

Emotional broadcaster theory stands on four basic pillars: emotional need to share their experience, making the experience public has a healing effect, others can benefit from from this information and possibility the revelation will be so impressive it will

travel far on the social media platform [14]. It is said the troublesome will divide in half when we share our troubling news. Keeping a traumatizing event for oneself may have devastating consequence on one's health. If we have experienced a traumatizing event, it is oftentimes healing to share. The urgency is causing people to share deeply private aspects of their experience [14]. The urgency to share such experience has no gender nor specific culture [14]. Researchers have discovered more than 30 000 years old drawings in Lascaux cave which suggest sharing our emotions or distress is deeply rooted in our heritage [14]. Sharing has been proven to be a therapeutic tool as well. Researchers have found that after patients verbalize their traumatic event during psychotherapy, the prognosis for their recovery becomes better [14]. If patients are writing down their feelings or verbalizing them, it has a positive impact on their health and brings some health benefits [14]. It helps to have a well-structured text with good chronology and use imagery and metaphors [14]. Sharing present a valuable informative function for other people or users. People tend to be more empathetic and have a higher understanding for traumatized event when they hear about it from a victim [14]. It also creates a cautionary effect where people are taking bigger precautions after talking to the actual victims [14]. During a research on the children of Holocaust survivors, it has been shown that they develop a worldview where they prefer moderation and complexity compared to extremism [10].

When something big happens, what creates a mark on a huge amount of people, such as terrorist attack, there are not only primary, but also secondary victims who became victims via sharing the experience of primary victims [14]. This creates a phenomena called secondary social sharing [14]. The extend of secondary social sharing is drawing from the original, primary source and shares the distress with primary victims [11]. This phenomena is also important for social media platforms as secondary victims are becoming a sharing force during traumatic events [11].

Secondary sharing is not the only one, there is also a tertiary sharing. The harder the emotional toll on the primary victim, the further the news spreads [14]. The difference between secondary and tertiary shares is that tertiary person sharing the news has no ties to the primary victim whereas secondary person does know the primary victim. As mentioned earlier, these secondary sharers are also becoming victims for deep sharing of the emotion with primary victim. The more people are talking about the event, the higher tendency it has to reach poll of people outside primary victim's friends circle. Here, the interest value of the story plays a role, where "guess what happened" kind of situations starts to occur [14]. In this stage, we are starting to miss primary victim and it is more of an episodic story at this point. From the point of view of emotional broadcaster theory it is an important chain of events as the theory also argues that social sharing is also about transferring of emotional content as well as about social support [14].

Chapter 4

Social media and fake news

Fake news never had a better, nor faster ways of spreading compared to spreading via social media. Whereas before social media, there were always bubbles within society, social media deepens the bubbles. Many studies have proved that social media are the main source of news nowadays. As before, people with different opinions used to be confronted with other people, social media took that away. People may stay deep in their bubble without even realizing they might be suspected to the misinformation or disinformation. Social media such as Facebook are creating mentioned bubbles because they are grouping individuals within.

The existence of fake news on social media presents itself with unique challenges. Posts on social media are made misleading intentionally which makes them harder to detect for common users. Additionally, social media are overwhelmingly overflowing with posts which makes it harder for people to distinguish between solid news and made up posts. We cannot safely interpret or group users of social media under one umbrella. This fact also creates an ambiguity for creators of fake news and many opportunities to find audience for their content. Users come to social media for different reasons - to connect with families and friends, to share their recent news, to find a group of like-minded people, to discuss their opinions and as we have learnt from many studies, to gather information. This is crucial for fake news content creators because they already know users are interested in such content. Moreover, creating a news stories for social media is much less expensive than publishing stories in regular newspaper. User profiles do not undergo many investigations before their creation and therefore it is not only cheap to produce fake content, it is also very easy and each and every user can become either creator of fake content or its distributor.

4.1 Echo chambers

While researchers investigating the phenomena of echo chambers on social media [12]. They confirmed an echo chamber phenomena on social media [12]. They proposed a definition of echo chamber with two essential properties. Firstly, the opinion of polarisation with respect to controversial topic and secondly, the desire to interact among users with similar opinions [12]. These chambers tend to have isolating effect on users and moreover, they facilitate a process where users within groups believe fake news based on few factors [31]. First of them is social credibility where users tend to view a post more credible if other user from within the chamber consider the information credible. This factor is only strengthen when users are unable to determine the truthfulness of the given information. Second is called frequency heuristic, which suggest users tend to believe an information which is often presented to them. Frequency heuristic applies to true news as well as to misinformation and disinformation [31].

To sum up, echo chambers may be described as an environment in which we encapsulate opinions, political leaning or particular beliefs [12]. Users and also people in offline world have a tendency to seek information in which they primarily believe in - also called as confirmation bias [29].

4.2 Filter bubbles

Filter bubble happens when social media platforms are using algorithms to determine what they are showing to the users [30]. It makes a decision instead of user. User is not in the charge of the content anymore. It creates a similar encapsulation of users as echo chambers. The algorithm intentionally separates and intellectually isolates users [30]. It has been shown individual users are not aware Facebook is using such algorithms, not even maintaining their traits, interests and their behavior online [16]. The platform is more likely to use this data against the user to profit of targeted ads. It may take into consideration their prior activity on the platform and show results inline with this activity [16]. As a result of these algorithms, users may find themselves isolated without opposite view being presented to them. Therefore filter bubbles also directly impact users' perception of fake news and it might be harder for users to distinguish among fake news. As in echo chambers, users are unwillingly exposed confirmation bias [29] where they tend to believe the news they have read before which is only being amplified by the algorithms.

4.3 Fake accounts

In order to create an illusion of multiplicity, some media outlets, individuals and even political parties are creating fake accounts to strengthen the illusion of multiple users supporting misinformation, disinformation or conspiracy theory. Not only that, social media platforms are full of bots and non-existing accounts doing the same. Another group of users is called trolls. They are real humans who are adding comments to heat up debates, create feuds and tension. They often try to create an emotional response.

4.4 Cost effective

The content on social media platforms is so robust that it remains difficult to eliminate malicious content event until this day. This is a very difficult job for an algorithm, therefore it is still done by people. The human cognition is limited and as an result, workers cannot eliminate all the malicious content. This creates an opportunity for malicious content to be created. Additionally, news shared on social media may be also created by sources which are considered not to be serious or truthful. Whereas the fact checking for printed media undergoes wide and robust activities, the content created for social media does not have to be flawless. Therefore media do not have to invest big amount of budgets to create or finish a story. This is cost effective and creates a platform for anyone to set up a fan page and start creating content (basically as we did with this study).

4.5 Health related content

Finding out how are users influenced to believe fake news related to health or medicine is important because as a result, they might be prompt not to trust their doctor or they may decide against getting vaccinated [32].

Social media platforms have their limitations when it comes to health related content. One of the most important ones is the quality of shared news [28]. Research has found that quality of shared news varies a lot [28]. They have identified four dimensions of quality of shared news, relevance, credibility, readability and completeness [28]. The lack of quality can lead to creation of similar but untrue stories which try to mimic health or medical information, but in fact they are misleading [22]. These stories are lacking the informational intent. When it comes to disinformation, they are created purposefully to deceive users [23]. Misinformation has the goal of misleading the user [23].

Those limitations mentioned above are problems because research has found that 80 % of social media users are actively searching for health related or medical infor-

mation on social media platforms [7]. Additionally, 45 % of those are seeking a second professional opinion based on the misleading content they have found online [7].

4.6 Malicious use of users' personal data

It can be argued social media are being used as weapons sometimes. General public had an opportunity to observe such behavior more than once before. Main scandals that come to mind are US Presidential election of 2016 and Brexit vote. These two examples are direct proof that social media has influenced the outcome of the vote and therefore, the democracy.

4.6.1 Personalizing of content

Users on Facebook are not created equal. As we have learnt from Cambridge Analytica scandal, there are some algorithms in place. These algorithms can determine the content seen on social media platform which varies from user to user. For example, if you were to be user inclined to believe in phenomena unsupported by data, you will be a candidate to receive the content which would support the ideas of leaving European Union, when it comes to Brexit. This paints a huge issue because the content is not traceable by users less inclined to believe fake news and therefore the algorithm is not allowing users on Facebook to fight these misinformation and disinformation because users are simply not aware of the fact that mentioned content even exists [9].

This phenomena is called micro-targeting. Micro-targeting may result in exploiting strong emotions among users and play make them act upon their vulnerabilities [9]. It is an act of manipulation with users. These algorithms are wittingly called also weapons of math destruction [42]. Problem is that propaganda is not being noticed on the social media platforms [42]. It is difficult to find sources of such unreliable data and it is more commonly based on lies or misleading information [8].

4.6.2 Social engagement metrics

Social engagement metrics have been proven to elevate the susceptibility to misinformation and disinformation [5]. All the social media platforms include such metrics - Instagram, Twitter, Linked In, Reddit and Facebook, too. You will not find a social media platform without it. After some disturbing results on youth mental health Instagram has decided to eliminate social engagement metrics such as likes. Social engagement metrics on Facebook include the amount of likes per post, the amount of shares per post or the amount of interactions on given post, i. e. expressions of love, disturbance, surprise or support.

4.7 Emotional content going viral

Literature says social media posts of fake news going viral comprises of three dimensions: reach, evaluation and deliberation [1]. Reach means the amount of sharing, forwarded posts and messages and re-posts, evaluation meaning number of likes and other reactions and deliberation means number of comments [1]. Applied to news content, this approach combines popularity with “contagious behavior” [15]. We define news virality on social media following definition: a property of content that enhances its likelihood to be shared by a multitude of users in different social media [15]. In this sense, virality is equated with re-transmission or diffusion—“the probability that the message be sent along” rather than sheer attention or positive evaluation garnered by the content [15]. This means emotional state of the individual might not be the most important thing when it comes to deciding whether to share a certain content or do not share.

4.7.1 Advertising

Advertising online has changed a lot. Some time ago, advertisers were focused on product quality while advertising. Since the data of online users are available to many companies, the quality has become a second priority. Nowadays, it is easier and cheaper to market and sell products according to users’ preferences [9]. This is another malicious practice with users’ data which are mostly given unwillingly. This might mean that users are under influence of advertisers, they do not choose the content they see. It is been a long time since Facebook stopped showing the content chronologically and prioritize paid content. Once we combine this with echo chambers, we face a difficult situation for getting out of fake news content for users who enter this spiral.

Chapter 5

Methodology

5.1 Participants

We have gathered 142 participants, but we had to eliminate 41 due to unfinished questionnaire. This has left us with 101 respondents. One respondent has was not interested in being part of the study, so we eliminated this response as well. Finally, we had to eliminate test runs in previews while testing the questionnaire so we ended up with 97 responses in total. There were 37 male and 60 female respondents. Age median equals to 27, $\text{median}(\text{age}) = 27$ and $\text{mean}(\text{age}) = 29.21$.

5.2 Design and procedure

We have separated respondents among three groups. Two of the groups received an emotion manipulation in form of short stories. One short story was supposed to evoke anger and the other one was supposed to evoke fear. Following short stories comes positive and negative affect schedule (PANAS) questionnaire. If you would find yourself in the control group, your questionnaire was starting with PANAS. We wanted to access all the respondents' current emotional state. All respondents have received the same PANAS questionnaire.

After accessing their feelings or emotions, participants were inform about evaluating upcoming stories resembling Facebook posts. Questions were randomized per questionnaire. Respondents were asked how likely are they to believe the presented news and also how likely are they to share presented news. We have gathered responses using 5-point Likert scale for both questions. Question "How reliable do you think the post is?" ranged from 1 - very unreliable to 5 - very reliable. Question "How likely are you to share this post?" varied from 1 - very unlikely to 5 - extremely likely.

We wanted to observe the effect of emotions on the answers. Both emotions we were trying to evoke were negative. We assumed that the story about the waiting

room would elevate the feeling of anger and the story about the forest might elevate fear. We have used a 5-point Likert scale for respondents to answer two questions below every post we have created. First question was: How likely do you believe the news presented to you?. The second question was How likely are you to share this news on your social media? Respondents were not aware of how many posts are true. They are not aware of the goal of this study, they are simply being directed with general information about their behaviour online.

5.3 Independent variables

We are using short stories to try and manipulate respondents' emotions or feeling within the moment of filling out the questionnaire. As we are focusing on anger and fear, the first short story is visiting your doctor in order to prescribe the same drugs as usual but you see other patients being favored. We find this story relatable and it has been proven to manipulate emotion in the study conducted by Slovak Academy of Sciences regarding confirmation bias [41]. The full text may be found in 5.2 both in Slovak and English language. The second story is about a lovely trip into the woods. Two friends are chatting without realizing time passing by. On their way out, the night is starting to fall. We aim this story to indicate fear. The full text may be found in 5.1 both in Slovak and English language.

5.4 Experimental manipulation check

To make sure our short stories have worked, we have included PANAS questionnaire - positive and negative affect schedule questionnaire. Respondents had to evaluate their current state of emotion. PANAS questionnaire is common practice to use while determining emotions or current mood of the respondents while participating in studies. PANAS questionnaire consists of following emotions or feelings: interested, distressed, excited, upset, strong, guilty, scared, hostile, enthusiastic, proud, irritable, alert, ashamed, inspired, nervous, determined, attentive, jittery, active, afraid. We have used a Slovak translation to these emotions as we worked with Slovak respondents, translations were provided by Slovak Academy of Sciences and they were already previously used in psychological research. Translations were as follows: interested - zvedavý, distressed - sklúčený, excited - vzrušený (pozitívne nabudený), strong - silný (psychicky), guilty - vinný, scared - vystrašený, hostile - nepriateľský, enthusiastic - nadšený, proud - hrdý, irritable - podráždený/popudivý, alert - čulý (psychicky), ashamed - zahanbený, inspired - plný nápadov, nervous - nervózny, determined - rozhodný/odhodlaný, attentive - pozorný, jittery - roztrasený (emočne), ative

<p>Predstavte si, že sa s kamarátom vyberiete na poludnie do lesa. Výjdete na kopec, sadnete si a začnete sa rozprávať. Pomaly sa ale začína stmievať a vy ste na tomto mieste po prvýkrát. Rozhodnete sa, že je čas vrátiť sa naspäť, aby ste to ešte stihli za svetla. Pri druhej zákrute si už nie ste istí, ktorou trasou sa vybrať a nakoniec zvolíte nesprávnu. Po hodine chôdze ste už mali byť von z lesa ale vy stále kráčate po neznámej ceste a pomaly sa začína stmievať. Obom sa vám vybili telefóny. Keď padne tma, začínate zrýchľovať tempo. Začujete v blízkosti rýchle kroky, dychčanie a šúchanie lístia.</p>	<p>Imagine that you go to the forest at noon with a friend. You go up the hill, sit down and start talking. But it is slowly getting dark and you are in this place for the first time. You decide it's time to turn back so you can still make it in the daylight. At the second turn, you are no longer sure which route to take and end up taking the wrong one. After an hour of walking, you should have been out of the forest, but you are still walking along an unknown path and it is slowly getting dark. Both of your phones died. As darkness falls, you begin to pick up the pace. You hear quick footsteps nearby, panting and rustling of leaves.</p>
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Table 5.1: The story to evoke fear in Slovak and English language.

- aktívny/činnorodý, afraid - obávajúci sa. Respondents had to determine how are they currently feeling with every emotion or feeling. To determine the degree of current emotion we have used a 5-point Likert scale from 1 - Very little (veľmi málo) to 5 - Very significant (veľmi výrazne).

5.5 Dependent variables

We have created 11 posts from *Zdravotár* Facebook fan page. The content of this posts were either real or false. Six posts were true and from the solid source and five were false from misleading source. We have used acclaimed newspapers in Slovakia to create posts with true content. Among newspapers are *Hospodárske Noviny*, *Denník SME* and *Denník N*. An example may be seen on Figure 4.2.

On the other hand, we have chosen sources such as *Bádateľ*, *Info Vojna* and *Proti prírodu* to create a Facebook posts with misinformation and disinformation. To identify the sources of misinformation or disinformation, we have used a website *kospiratori.sk*. This website is a public database gathering websites with non-serious, deceptive, fraudulent, conspiracy or propaganda content. An example may be seen on Figure 4.3.



Figure 5.1: Example of real information as an Facebook post



Figure 5.2: Example of false information as an Facebook post

<p>Predstavte si, že ste v čakárni u lekára. Potrebujete recept od lekárky, ktorý užívate pravidelne kvôli vysokému krvnému tlaku. Čakáreň je plná chorých ľudí. Zaklopete sestračke, aby vedela, že ste tam a čakáte na Váš recept a dáte jej kartičku poistenca. Do čakárne prichádzajú stále ďalší pacienti, ktorí čakajú na vyšetrenie. Vždy, keď sa otvoria dvere, s nádejou čakáte, že Vám sestračka podá recept a kartičku poistenca, čo sa však nedeje. Sestračka namiesto toho postupne volá dnu iných pacientov. Po hodine čakania už chodia dnu pacienti, ktorí prišli po Vás.</p>	<p>Imagine you are in a doctor's waiting room. You need a prescription from a doctor that you take regularly for high blood pressure. The waiting room is full of sick people. You knock on the nurse's door so she knows you are there waiting for your prescription and give her your insurance card. More and more patients are coming to the waiting room waiting for examination. Every time the door opens, you wait with hope that the nurse will hand you a prescription and insurance card, but that doesn't happen. Instead, the nurse gradually calls in other patients. After an hour of waiting, the patients who came for you are already coming in.</p>
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Table 5.2: The story to evoke anger in Slovak and English language.

We have used screenshots to simulate real Facebook experience in this study. All Facebook posts are in Slovak because we have decided to conduct this study in Slovak language. We have decided to omit any signs of other users' interaction in the posts because it tends to alternate users' decisions while rating reliability of the presented news. The amount of shares, likes or comments has been previously proven to shape the perception of news shared on social media platforms [32].

We were trying to focus on the news related to health. Therefore we decided to name the fan page *Zdravotár*. Our aim was that the name would evoke the feeling of health related content. Prior to naming the fan page, we have researched many Facebook fan pages focused on promoting health articles and also Slovak magazines promoting health and recipes for healthy lifestyle. We have used online logo creating tool to create a logo, seen in 5.3

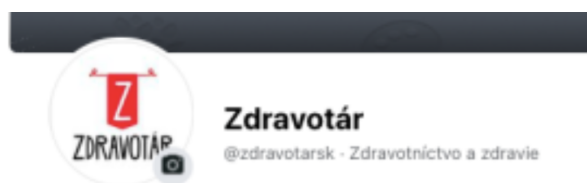


Figure 5.3: Logo Zdravotár as presented on Facebook

Chapter 6

Results

6.1 Emotional manipulation

We have divided respondents among three groups. Two groups have received stories which should have prompt their emotions. One group was a control group. Before working with data set we have tested whether are our data normally distributed. The normality test helped us determine which test we should use to interpret our data set.

We are working with null hypothesis that our short stories (getting lost in the woods for fear and being neglected over other patients in doctor's waiting room for anger) have no effect on respondents' emotions. Stories may be found in Table 5.2 and Table 5.1. We wanted to evaluate whether our emotional manipulation have worked, so we are starting with ANOVA test. Results may be found in the Table 6.1 Most important part of this ANOVA test is evaluating chosen emotions of anger and fear. However, we also examined negative emotions in general, just to see how the results vary. We also include positive emotions on the PANAS scale to see whether these types of emotion have any impact.

Secondly, if we focus on the forth column named "m(fear)", we can observe similar phenomenon. We can observe a difference in mean values among groups. Group receiving a story evoking anger has a mean value of $\text{mean(anger)} = 1.77$, $\text{SD} = 0.99$, whereas second group receiving a fearful story has a mean value of $\text{mean(fear)} = 3.46$, $\text{SD} = 0.98$ comparing to control group receiving a mean value of $\text{mean(neutral)} = 1.90$, $\text{SD} = 1.19$. This ANOVA test had also p-value < 0.001 which again, negates the null hypothesis and supports our hypothesis that we would achieve emotional manipulation using chosen stories. We can conclude with certainty we were successful in our emotion manipulation and both of our stories - being neglected in the doctor's waiting room and getting lost in the forest while dark - managed to simulate emotions we wanted them to.

For a bigger picture, we also wanted to see how was the mean value score among

Table 6.1: Results of ANOVA testing among groups to determine emotional manipulation

Group	m(pos),SD	p-val	m(neg),SD	p-val	m(anger),SD	p-val	m(fear),SD	p-val
anger	2.42,0.4	0.0272	2.78,0.53	<0.001	2.94,1.15	<0.001	1.77,0.99	<0.001
fear	2.54,0.4	0.0272	2.89,0.76	<0.001	3.37,1.06	<0.001	3.46,0.98	<0.001
neutral	2.72,0.39	0.0272	1.90,1.9	<0.001	2.19,1.19,	<0.001	1.90,1.19	<0.001

groups in generally negative emotions. For a negative emotions we have selected following from PANAS scale: distressed, upset, guilty, scared, hostile, irritable, ashamed, nervous, jittery and afraid. As we can observe in the Table 6.1 in to column "m(neg)", there is also a difference among groups. Group receiving story about doctor's office got a mean value of mean(anger) = 2.78, SD = 0.53, group receiving a story about getting lost in the forest gained a mean value of mean(fear) = 2.89, SD = 0.76 and control group, group without any short story received a mean value of mean(neutral) = 1.90, SD = 1.9. With p-value < 0.001, we again proved our hypothesis was right and there is some effect of stories on the negative emotions in general as well. We have used the emotions we omitted from negative scale for the last test connected to the emotion manipulation. We have chosen following emotions from PANAS scale: interested, excited, strong, enthusiastic, proud, alert, inspired, determined, attentive and active. Doing the same test as previously, we identified small to no change among values of mean. Mean(anger) = 2.42, SD = 0.4, mean(fear) = 2.54, SD = 0.4 and control group mean(neutral) = 2.72, SD = 0.39. In this test, we calculated p-value = 0.0272 which means there in fact is a small emotional manipulation but very little, even negligible when we take a look at mean values across groups. This make sense as we did not intend to manipulate positive emotions with our stories and it shows, we did not.

6.2 Accepting and sharing news

Our most important test was to compare results among groups when it comes to believing in fake news. The null hypothesis we will be working with is as follows: Emotional manipulation has zero effect on accepting fake news. Results may be found in Table 6.2. ANOVA test for fake news among our three groups (stimulated by anger, stimulated by fear and control group) shows that there is a small difference in evaluating reliability of the fake news. First group, stimulated by anger has a mean value as following: mean(anger) = 2.22, SD = 0.70. Second group, stimulated by fear has a mean

value as following: $\text{mean}(\text{fear}) = 2.49$, $\text{SD} = 0.66$. Control group has a mean value as following: $\text{mean}(\text{neutral}) = 2.38$, $\text{SD} = 0.56$. With p-value of ANOVA test (p-value = 0.249), we can conclude our null hypothesis is correct and our manipulation had zero effect on accepting or believing of fake news presented. Therefore, our original hypothesis that respondents under emotional manipulation regarding anger and fear will be more likely to accept and believe fake news, does not have a statistical relevance. Secondly, we have tested respondents' willingness to share fake news at their own personal profile on Facebook. We are working with null hypothesis saying that emotional manipulation has zero effect on sharing fake news. ANOVA test between three groups has been conducted and results go as following: for a group stimulated by anger the mean value equals to $\text{mean}(\text{anger}) = 1.60$, $\text{SD} = 0.62$. For the second group stimulated by fear the mean value equals to $\text{mean}(\text{fear}) = 1.85$, $\text{SD} = 0.8$. Our control group scored mean value equal to $\text{mean}(\text{neutral}) = 1.86$, $\text{SD} = 0.7$. This test came out with high p-value (p-value = 0.307) meaning this test does not have a statistical significance. Therefore it shows our original hypothesis, where we hypothesised that emotional manipulation either with anger or fear, will result in higher shares of fake news, has been proven insignificant and incorrect based on our collected data.

We also wanted to see respondents' behavior towards presented real news. Therefore, we ran the same tests in nature with data regarding accepting and sharing real news. Results may be found in the Table 6.3. Here, we worked with null hypothesis that emotional manipulation has zero effect on accepting and sharing real news.

We conducted first ANOVA test on our three groups (stimulated by anger, stimulated by fear and control group) with regard to accepting fake news. From the results we may see following: for a group stimulated by story of waiting in the doctor's waiting room to evoke anger, the mean value of accepting the real news was $\text{mean}(\text{anger}) = 2.78$, $\text{SD} = 0.67$. The second group, stimulated by a story of getting lost in the woods mean value equals $\text{mean}(\text{fear}) = 2.87$, $\text{SD} = 0.64$ and control group scored a mean value of accepting the real news $\text{mean}(\text{neutral}) = 3.10$, $\text{SD} = 0.57$. We have calculated p-value = 0.249 which means this test have been statistically insignificant and our null hypothesis has been proven correct. Our original hypothesis that emotional manipulation will not have significant effect on accepting real news has been proven significantly insignificant as well.

Our second ANOVA test among three groups of participants focused on willingness to share real news. Null hypothesis states that emotional manipulation has zero effect on sharing of the real news. Results show this was also statistically insignificant with p-value = 0.307. There was only little to none difference among means. For the first group manipulated by short story to evoke anger, we have calculated mean value of sharing real news $\text{mean}(\text{anger}) = 1.86$, $\text{SD} = 0.68$. Second group manipulated to feel fear received mean value of $\text{mean}(\text{fear}) = 2.00$, $\text{SD} = 0.90$ and thirdly, we have

Table 6.2: Result to determine effect on accepting and sharing fake news

Group	mean(accept), SD(accept)	p-value	mean(share), SD(share)	p-value
anger	2.22, 0.70	0.249	1.60, 0.62	0.307
fear	2.49, 0.66	0.249	1.85, 0.83	0.307
neutral	2.38, 0.56	0.249	1.86, 0.79	0.307

Table 6.3: Result to determine effect on accepting and sharing real news

Group	mean(accept), SD(accept)	p-value	mean(share), SD(share)	p-value
anger	2.78, 0.67	0.126	1.86, 0.68	0.173
fear	2.87, 0.64	0.126	2.00, 0.90	0.173
neutral	3.10, 0.57	0.126	2.27, 0.98	0.173

calculated the mean value of sharing real news in the control group mean value of $\text{mean}(\text{neutral}) = 2.27$, $\text{SD} = 0.98$. Our primal hypothesis that fearful people will share real news also a bit more often compared to control group has not been proven. We have set this assumption on the premises fearful people would like to inform they close friends, relatives and acquaintances about upcoming danger. On the other hand, we have assumed angry people would use share button as venting mechanism while angry.

6.2.1 Correlation between accepting and sharing the news

We have conducted a correlation between accepting and sharing fake news and also real news to see whether there is a relationship between the two. The Pearson's correlation test shows that there are indeed strong correlations between variables and results are shown in the Table 6.4. When it comes to the fake news, the correlation test has shown a strong positive correlation between accepting and sharing the fake news, with values: $\text{cor}(\text{accept fake}, \text{share fake}) = 0.6509531$ and $\text{p-value} < 0.001$ which makes this test statistically significant as well. There is also a strong correlation between accepting and sharing the real news: $\text{cor}(\text{accept real}, \text{share real}) = 0.5688305$, $\text{p-value} < 0.001$ which also makes this test statistically significant. Correlation between accepting and sharing fake news is stronger than correlation between accepting and sharing real news which means there is a stronger relationship between the two variables when it comes to fake news.

Table 6.4: Correlation between accepting and sharing the news

Variables	Fake news	p-value	Real news	p-value
Accept and Share	0.651	<0.001	0.569	<0.001

6.3 Fake news discernment

We have tested how are respondents score in accepting fake news versus real news. We have calculated the difference in mean value for accepting the news for fake news and real news respectively. Afterwards, we have calculated the difference in mean value between accepting real news and fake news. We have ended up with $\text{mean}(\text{difference}) = 0.547$. This result shows us our respondents accept or believe more in presented real news than in presented fake news.

6.4 Additional correlations

We also conducted some additional correlations to see how whether there are any correlations among the age, gender and education. Results regarding fake news may be found in the Table 6.5. We have always given into correlation test both accepting and sharing of fake news. As we can see from the Table 6.5 correlations were not statistically significant and tests showed correlations were weak at best. Specifically, correlations tests concerning age showed negligible negative correlation in account of accepting and sharing the fake news: $\text{cor}(\text{age}, \text{share}) = -0.029$, $\text{p-value} = 0.775$ and $\text{cor}(\text{age}, \text{accept}) = -0.029$, $\text{p-value} = 0.783$. Correlations regarding gender were both statistically insignificant. Correlation between gender and sharing fake news was negligible with value of $\text{cor}(\text{gender}, \text{share}) = 0.005$, $\text{p-value} = 0.372$. The only significant correlation appeared between gender and accepting fake news: $\text{cor}(\text{gender}, \text{accept}) = 0.560$, but with $\text{p-value} = 0.091$ it was also statistically insignificant. Thirdly, we took a look at education. According to our data, there is also almost non-existent correlation between education and sharing and accepting fake news. Both correlations are negligible: $\text{cor}(\text{education}, \text{share}) = -0.046$, $\text{p-value} = 0.653$ and $\text{cor}(\text{education}, \text{accept}) = 0.012$, $\text{p-value} = 0.899$.

Results of additional correlations regarding real news may be found in the Table 6.6. From the results, we may observe none of the correlations have statistical significant value and they are also mostly negligible with the exception of few weak correlations. Similarly to fake news, we correlated all the additional data we have collected - age, gender and education. Correlation between age and accepting and sharing real news turned out to be negligible and negative: $\text{cor}(\text{age}, \text{share}) = -0.044$, $\text{p-value} = 0.666$

Table 6.5: Results of additional correlations regarding fake news

Variable	Sharing fake news	p-value	Accepting fake news	p-value
Age	-0.029	0.775	-0.028	0.783
Gender	0.005	0.372	0.560	0.091
Education	-0.046	0.653	0.012	0.899

which makes this test statistically insignificant, similarly $\text{cor}(\text{age}, \text{accept}) = -0.169$, $\text{p-value} = 0.096$ is weak correlation and also statistically insignificant. Regarding gender, the results are as following: $\text{cor}(\text{gender}, \text{share}) < 0.001$, $\text{p-value} = 0.995$ which makes this correlation the weakest from all and also not statistically significant. Weak correlation was found between gender and accepting real news: $\text{cor}(\text{gender}, \text{accept}) = 0.134$, $\text{p-value} = 0.189$, correlation also statistically insignificant. Lastly, correlations with education proven statistically insignificant with values $\text{cor}(\text{education}, \text{share}) = -0.044$, $\text{p-value} = 0.661$ which makes correlation between education and sharing real news negligible and correlation between education and accepting real news $\text{cor}(\text{education}, \text{accept}) = 0.135$, $\text{p-value} = 0.186$ is very weak.

Table 6.6: Results of additional correlations regarding real news

Variable	Sharing real news	p-value	Accepting real news	p-value
Age	-0.044	0.666	-0.169	0.096
Gender	<0.001	0.995	0.134	0.189
Education	-0.044	0.661	0.135	0.186

Chapter 7

Discussion

Our main goal was to determine whether negative emotions - anger and fear - have an impact on accepting and sharing fake news. We have thought these negative emotions will influence respondents to higher acceptance and also to higher sharing rate among respondents. Further in this chapter, we are interpreting results in more depth, but before we dive into discussion, we would like to emphasise that although our hypotheses turned out not to be correct, it is mostly because of our lack of literature knowledge at the time of creating. We were successful in emotionally manipulating our respondents, but the results show it was not enough to make them accept and share fake news more. Our results are in line with broader literature regarding emotional manipulation and one's behaviour towards fake news [6] [36].

7.1 Interpreting results

7.1.1 Emotional manipulation

All the results regarding emotional manipulation may be found in the Table 6.1. From the table, we can observe all of our emotional manipulations have worked. Meaning, our story of being neglected at the doctor's office has evoked feelings of anger, as expected. Therefore, we might conclude our first emotional manipulation has worked and our intervention then worked as well. However, we also see that respondents recorded elevated feeling of fear related to this story as well. We can only speculate why, but we can conclude from this emotional manipulation that is hard to focus solemnly on one emotion and same activators (the story) can have different effect on the perceived emotions. Our second emotional manipulation has been a bit more straightforward. Results show our intervention on evoking fearful feelings has worked, as observed in Table 6.1. Our second story, being lost in the woods has shown to prompt fear just as we expected. Therefore, we might conclude our second intervention has worked as well. Here, we only observed a significant difference between emotion of fear compared

to control group and as a result, we might conclude this intervention was a bit more one-sided regarding the emotions it evoked. As we also conducted ANOVA tests to compare negative and positive emotions among groups, we can rule out the possibility that our intervention had a positive impact on the emotions as we did not observe a significant difference in mean values among groups. On the other hand, we had another proof our stories has evoked negative emotions, as we observed differences in mean values among groups when it came to negative emotions on the PANAS scale.

7.1.2 Accepting and sharing of fake news

We can conclude from our results about emotional manipulation that the interventions have worked. Although the interventions were successful, they did not intervene with the perception of the fake news. Results show emotional manipulation had no effect on accepting, nor sharing fake news. This may have a number of explanations. For example, respondents may not be primarily deciding based on their emotions. Research shows there are other factors which people consider to be more important while deciding on reliability of the news. Secondly, there have been numerous studies focusing on fake news similar to ours in design regarding rating made-up posts that look exactly like from Facebook. However, majority of the studies focus on political content. Therefore, other factors, such as political affiliation or partisanship. These factors are contributing to accepting the fake news. People's previous opinions, expectations or beliefs are more important in regard of accepting fake news than current state of mind they are in. Thirdly, respondents may decide based on their prior beliefs and the results of their score is just confirming their bias. Confirmation bias theory is a theory suggesting that people would favor information confirming their prior beliefs. Next, the content itself might not have been strong enough to persuade participants the content is fake. As we have chosen content from already existing sources, it might be possible that our respondents have seen articles prior to participating in this study. We have also used original photographs attached to articles, which might have ringed a bell with our respondents.

When it comes to sharing of fake news, our emotional manipulation was not efficient enough to prompt sharing of fake news. We have anticipated that people under emotional manipulation would be more open to sharing fake news. According to the literature, anger motivates people to share news in order to warn their close friends about potential threat. Fear is also a good motivator for sharing news in the literature. This may mean a few things. Either our stories were not efficient enough to alert our respondents to share the news or the content might not have been strong enough to motivate the same emotion and intention to protect their friends. Similarly to accepting the fake news, sharing a political content may be more interesting for users of social

media because it can sometimes begin a heated debate, this does not seem to happen when users share health related content. Health-related content is not so controversial as political content and users are less interested in sharing it. We need to address a sample of respondents in this account as well. As our respondents were not prompt to accept fake news, they were not prompt to share them as well. It may be also caused by the the fact that the survey was voluntary and only people who want to contribute to the research about fake news participated, therefore it is logical to assume they would be less willing to share fake news because they might have come across with them previously. Such respondents may also be more trained to distinguish between fake and real news.

Fake news discernment

As it shows, our respondents had a bigger belief in real news compared to fake news. This is overall positive as we found the respondents able to distinguish among real and fake news. They believed in real news for 0.5 points. This might be result of our sample as we discuss later in the part Sample. We might have gathered participants too similar not too susceptible to fake news.

7.2 Correlations

The results from correlations are not very much surprising. Literature states that we cannot generalize accepting and sharing of fake news based on demographic factors such as age or gender. As our results show, education is also not a factor regarding accepting and sharing of fake news.

7.3 Fear vs. anxiety

Firstly, we wanted to conduct this study based on anger and anxiety. We have set these emotion prior to getting familiar with positive and negative affect (PANAS) scale. Later, while conducting the study and examining the PANAS scale, we have noticed there is not a specific field regarding anxiety. Therefore it would be more difficult for us to access direct impact of the short story upon anxiety. It is the first reason why we have decided to switch during study from anxiety to fear. Fear can be directly found in PANAS scale and therefore it is easier for us during analysis to connect short story to a manipulation and determine whether our intentions have worked.

Secondly, during literature research we have also noticed it is hard to evoke anxiety because there are multiple activators for this particular emotion. Literature is inline and fear is more commonly used emotion in study of framing and accepting of fake

news. This was other reason we decided to switch to the emotion of fear, so we can compare our results to the research already done regarding framing and perception of fake news.

We have done additional tests to find out whether there was any difference between male and female respondents. Studies are suggesting that female respondents are more likely to identify their true level of feelings while participating in study. On the other hand, male respondents tend to be more restrained when naming their emotions.

7.4 Health related content

Retrospectively, we observe failure in the design of our study - we have focused only on content related to health. Going forward, if we really want to test if people are more incline to believe fake news related to health, we must mix content with other than health related topics. We have used topics about COVID-19 vaccination, dietary supplements but we are lacking content about, e.g. political situation so we can access the scores of the responses. This would be a great next step for the future of this study, expand the number of posts and see the implications. Maybe we do not need to extend the study, we might eliminate some content (e.g. vaccination) and replace with content not relevant to health. This has become somehow secondary to our study as we decided to focus on whether anger and fear contribute to accepting and sharing of fake news.

7.5 Sample

As we collected data online and distributed questionnaires ourselves, it is possible we may have caught respondents with similar view of life. It is more likely we gathered people with similar opinions to ours. Additionally, there was no award for filling out the questionnaire. It is possible the questionnaire attracted people already interested in fake news and therefore they were less willing to accept and share fake news.

7.6 Contributions

In this section, we would like to highlight some contributions of this study that might with the fake news related research:

7.6.1 Health related content

Majority of studies focused on accepting and sharing fake news is working with political content. There are not many studies focusing on health related content. Although their

amount is increasing since the COVID-19 pandemic hit the world in 2020. Researchers have seen the urgency when people started to believe fake news, injecting detergent which is highly hazardous and can be lethal. There is also research about alternative medicine where researchers are using health related content and content about alternative medicine. Results from this study might be beneficial for mentioned research because we were selecting content from the world of alternative medicine and health supplements. If not results, then perhaps posts we have manufactured and adapted for this study - we have omitted social media interaction indicators and created an entire fake fun page on Facebook which we will be very happy to pass forward if ever interested.

7.6.2 Slovak language

Slovak Academy of Sciences is doing great research in quality and value regarding fake news, but it is the only institution focusing on Slovak language. As we have seen with Russian war on Ukraine, many people consume news from Russian sources which are mostly fraudulent and therefore it is important to identify motivators specific for Slovak population as the motivators may differ from the ones in the United States of America. We used web page *badatel.net* as a source for fake news during this study. As high as 35% of Slovak doctors are reporting that their patients are refusing proposed treatment based on information they read on mention online journal. It is important for us to understand motivations and find out how are readers working with such text and information in order for us to regulate their behavior online. Based on information gathered we can propose interventions for online readers.

7.6.3 Emotional manipulation

We have used one previously checked story to evoke anger. We have written the second one to evoke fear and now it can be used the same way as we used the story about waiting in the doctor's office. If needed, our story about getting lost in the woods is now proven to evoke fear in the readers and can be used in future psychological research, not only research connected to fake news, but also to broader field of psychological research regarding emotions.

7.7 Interdisciplinary approach

Many approaches we are discussing in this study are cognitive in nature. For example, confirmation bias is a cognitive bias. The whole area of deciding, which is primal and crucial to our research is truly a cognitive science research. We are using Facebook

post to make our respondents decide whether they accept certain news. Respondents acknowledge prior to filling out the questionnaire that they will be deciding accuracy of Facebook posts based on news so we are preparing them for the task of deciding. We are researching multiple cognitive theories connecting to reasoning and deciding, such as motivated, classical reasoning and also confirmation bias.

Social media can be seen as interdisciplinary by itself. Users are acting differently on social media. Research shows users are perceiving news differently while using social media and they are also using different cognition, called techno-cognition, which might prove this research is interdisciplinary. Looking to the future, it might be interesting to research how techno-cognition influence other aspects of online behaviour, not only perceiving of fake news.

7.8 Further research

First and in our opinion the most important next step would be to add information of different content, both for real and fake news. If we have chosen to add political content, we would be able to calculate whether would people believe more in political or health related content. We would also be able to compare score between two groups to identify the difference in accepting and sharing the news. Secondly, if possible, we would like to extend demographic questions about questions related to political affiliations. Since it is conducted in Slovak language, we might ask the preferred political party from Slovak political spectrum. That would indicate whether there is any connection between political beliefs and accepting or sharing of fake news. If we possessed both political affiliations and political content, we would be able to hypothesise about other motivators in believing of fake news and also verify such hypotheses. Thirdly, we can also deepen this research in the regard of social media. It would be beneficial to create different set of the same posts we have now. The new set would be enriched about social media interaction indicators such as likes, shares or comments to test hypotheses about fake news specifically on social media. Then we would be able to compare the results in Slovak language with the results done in English. Similarly as we done in this study. We would not focus on emotional manipulation as such but on the fact how are these indicators modifying the behavior online. If we would like to go even deeper regarding social media, we could enlarge our set of dependant variables. We could use original screenshots from the articles and display them to the one group, second group would still receive articles in form of Facebook posts and we could compare the results in accepting and sharing of fake news. We could see whether there is a difference in behavior when it comes to fake news consumed directly on the web page of a magazine or whether social media play a role in accepting and sharing the news. Now, we would

hypothesise at least sharing would be influenced by respondent's direct presence on social media platform, but we would need to conduct another experiment to test it.

7.9 Limitations

One of the limitations of this study can be considered the fact that we are asking participants to rate the Facebook post as accurate and decide whether they would be willing to share this post on their Facebook profile. There is a reason to believe that if we separated these two questions, first present them with the idea of rating the accuracy and second to reveal their willingness to share this news, we would have different results because of the repeated exposure, there is a chance that respondents might answer more willing to share the news they have seen prior.

Our study has focused primarily on Facebook content and on the headlines of the articles with a small description without any social cues used in online world such as the amount of likes, shares or comments. Future work should examine whether these cues contribute to this phenomena or contradict it. We could also examine different network from Facebook. For example, Instagram has become very popular among youngsters and therefore, we see as beneficial to examine it.

An obvious limitation of the current work is that it is conducted in an experimental context rather than in the naturally occurring setting of browsing through Facebook on one's own. However, Facebook has been forthcoming regarding the release of data they collect and (particularly in the wake of the Cambridge Analytica scandal) have made it extremely difficult for academics to conduct their own studies on Facebook. Thus, laboratory-style data provide a useful window into the potential effects of interventions aimed at fighting misinformation. This is particularly true given evidence that self-reported social media sharing intentions are predictive of actual sharing on social media.

From studies literature, we have found out the link between liking and sharing fake news online is not as obvious and we have thought when we proposed our hypothesis. Our results are aligned with broad research on liking and sharing fake news. It is also in line with broader research about emotions in regard to accepting and sharing fake news.

Chapter 8

Conclusion

In conclusion, since we started writing this study, the problem of fake news became only greater with time. If we have started to write this thesis couple of months later, we would not prioritize health related content. Although we still feel the importance of finding out why people believe made up medical content because it may cause their lives, we now feel it is more important to focus on Russian influence in the news in Slovakia and teach online users interventions how to see through the false content and propaganda.

Let us now take a look at our results with regard to our initial hypotheses. First of all, we expected our emotional manipulation to work. We expected that people exposed to a story to evoke anger would be more angry compared to a control group. Results were statistically significant, with $p\text{-value} < 0.001$ and so we confirmed our hypothesis that people reading a story to evoke anger would be more angry compared to a control group. What we did anticipate and found in results also were the fact that a story to evoke anger also evoked fear. This might have multiple reasons and we speculate about them in the chapter 7 Discussion. The fact that this emotional manipulation has worked was not a big surprise for us because we decided to use a story already used in research on Slovak Academy of Sciences regarding confirmation bias [41]. We also expected people exposed to a story to evoke fear would be more fearful compared to a control group. We can now conclude that our assumption was correct. We have come up with this story ourselves, we assumed to be relatable because it is based on real events and now it can be used in further research as it has a power to evoke fear. All and all, our emotional manipulation using short stories have been successful.

Now, after confirming our hypotheses about emotional manipulation, it is time to see whether these emotions had any effect on accepting and sharing fake news. We proposed two hypothesis regarding accepting the fake news. Firstly, we expected people reading a story to evoke anger be more willing to accept fake news compared to a control group and secondly, we expected people reading a story to evoke fear

would be more willing to share fake news compared to a control group. Basically, we hypothesised that being exposed to negative emotions will strengthen the tendency to believe in fake news. Let us focus on anger first. As results show, we did not have a statistical significance and from this result, we can conclude that anger did not play a role while deciding among news. It is not a big surprise when we dive into literature, because a little that has been written agrees that negative emotions, including anger, shelter people from accepting fake news. When it comes to fear, also a negative emotion, results do not differ that much. Similar to anger, our results do not have statistical significance. Therefore, we may conclude fear also did not play a role while deciding on accepting fake news. We learned from literature that there are different factors than emotions that influence people's reluctance or openness to accepting fake news [24]. From this study, we also may conclude emotions are not primary motivators but from the data we gathered we cannot conclude anything else with satisfying level of certainty. We only know the current state of mind or emotion might be less important than people's opinion about subject or their judgement towards content we have proposed. This conclusion is inline with current research [32] [36]. It can also mean content we created was not strong enough to persuade respondents to evaluate it based on current emotions.

We see our emotional manipulation has not been successful regarding accepting of fake news. But when it comes to sharing of fake news, literature agrees emotions play bigger role compared to accepting of fake news [24]. We hypothesised that people reading a story to evoke anger would be more willing to share fake news compared to a control group. Similar to accepting, we did not reach statistical significance. We can conclude that anger has no effect on sharing fake news. As we learned from framing theory, people subjected to anger are often willing to share content in order to spread the information among their friends [24]. This might mean we did not choose content strong enough to persuade our respondents to share it. Health related content we chose was not alerting in any way and it might have cause small willingness to share it. When it comes to fear, we expected respondents to be more willing to share fake news compared to a control group. Again, we do not have statistical significance to support such hypothesis and it shows fear did not create effect on sharing. We see a difference between our results and results from literature about emotional broadcaster theory, where fear plays a role in sharing interesting information [25]. Also, fear is a good stimulus for sharing as we want to alert our friends and let them know there is a danger to be aware of. Taking into consideration literature, we should face the fact that our content was not alarming enough for our respondents to share. The other reason might be that the emotion was not strong enough to override a default setting our respondents had towards sharing.

Regarding relationship between accepting and sharing fake news, we hypothesised

that people who scored higher on accepting the fake news will also score higher on sharing the fake news. As it shows from Pearson's correlation test, there is a strong positive correlation between accepting and sharing fake news $\text{cor}(\text{accept}, \text{share}) = 0.651$, with $p\text{-value} < 0.001$ we can confidently say there is a strong relationship between accepting and sharing fake news. This result is in line with the literature research we conducted where also only people who accept fake news share them with their friends [18].

We ran additional tests to see whether there were some demographic factors that influenced the decision making about accepting and sharing fake news. None of our correlation tests had any statistically significant relevance. Therefore we have not found any relationship between demographic factors and accepting of fake news. This is understandable, we have mentioned multiple times in this study that demographic factors does not seem to have influence on accepting fake news and it can happen to anybody, no matter the education level, age nor gender. These findings are also in line with current research, we just made sure it is same for Slovakia as well.

When it comes to sharing of fake news, we found very similar results as with accepting related to demographics. All of the correlations did not reach statistical significance, meaning sharing is also influenced by other than demographic factors, in line with current research in fake news [18].

We did not hypothesised about whether our respondents will accept fake news more than real news but it is pleasing to see that real news scored more about 0.5 point. This might influence the results of our hypotheses. In general, our respondents were not the most accepting towards fake news.

Even though our hypotheses about accepting and sharing fake news under emotions of anger and fear did not have statistical significance and therefore we did not estimate the behavior correctly, it is for good. We have learned people are more prompt to trust their opinions they were forming for a long time rather than rely on the emotion within the moment. This helped us understand the behavior online regarding fake news a little better and we know better now how to proceed with interventions. We know we must pay bigger attention to learned patterns rather than emotions or current states of mind. We know that health related content is not perceived as such dangerous content that it must be shared.

We think it might be beneficial to compare these results to results regarding different area of content, for example political to access the strength of this content and dive deeply into why respondents were not willing to accept not share the fake news. We might take a tight look at content presented and specify it more so we can hypothesise more precisely about outcome.

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