

# Framing of Information, Psychological Distance, and Belief in Health Related Information under Time Pressure in Older Adults

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The time of pandemics could be described by the overflow of health-related news in media, but also the rise of researches concerning it. However, there is still a lack of information about message characteristics which effect belief in it, besides older people are underrepresented in these studies. Belief in fake news is especially dangerous for older people, not only because fake news usually promotes dangerous behavior (e.g. do not seek COVID-19 vaccination), but also because older people are the ones who are most likely to share fake news on social media in such way helping to spread them. The aim of the study was to estimate the influence of information framing and psychological distance on belief in health-related information under time pressure in older adults. Study was based on representable sample of 50 years and older Lithuanians. In total 505 participants took part in the study. 200 (30.6 %) were men, 305 (60.4%) were women. Participants ranged in age from 50 to 94 with the mean age of 66.27 (SD = 11.24). Study was a between-subject design experiment. Belief in health-related news information served as a dependent variable, Framing of Information and Psychological Distance as independent variables, also age, gender and education were control variables. Participants were presented with eight fake and eight true news headlines about vaccination and COVID-19 in the form of social media posts for 7 seconds and had to evaluate their belief in these headlines. Results indicate, that neither psychological distance (country of living vs. other EU country), nor information framing (positive vs. negative) have any influence on overall belief in health-related information in older adults. Even though gender and education were not related to overall belief in news, a significant positive correlation between age and belief in health-related information was found. Our research prove that older people become more truth biased with age.

**KEYWORDS:** fake news, older people, psychological distance, positive framing, negative framing.

In recent years the spread of fake news has become one of the most concerning challenges in modern society. The increase of this phenomena is related to the crisis of public communication and various threats to existing social and health care system. For example, fake news related to COVID-19 vaccines encoured public resistance to vaccination and therefore could have fatal consequences in some cases (Lee et al., 2022). Recent evidence shows that fake news tends to become more viral than true information, especially in the case of political and health related information. The problem of recognizing fake news is getting worse with the age of media consumers. Usually older people have the idea, that all media is truthful, therefore tend to believe

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## Abstract

## Introduction



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and share fake news more than younger ones (Pehlivanoglu et al., 2022; Guess, Nagler, Tucker, 2019). This has an adverse impact on individuals and a society in general, as it deliberately leads to acceptance of false beliefs that are shared to push forward specific agendas.

The phenomenon of fake news is not new. There is evidence that biased information used to discredit views and values have always been a part of human society, therefore fake news may have always existed. However, fake news has attained an unprecedented influence and reach due to the current changes in our media ecosystem (Baptista & Gradim, 2020). The topic of fake news has become especially relevant in the context of crisis, such as global health threat, for example the COVID-19 pandemic (Lee et al., 2020; Corbu et al., 2021). The COVID-19 pandemic had an adverse effect on people's lives not only because of its impact on health and the economy, but also because of the disruption in the flow of information. For example, in recent years conspiracy theories based on COVID-19 not only became more prevalent, but also tended to be more accepted by consumers (Enders et al., 2020).

Recent literature on COVID-19 misinformation has majorly focused on examining factors that affect people's belief in information related to a pandemic. Mostly psycho-social characteristics of the believer (sociodemographic characteristics, cognitive abilities, previous expectations) and health behavioral intentions were analyzed in previous studies. For example, studies show that belief in fake news was positively associated with riskier activities, optimistic view to the threat of the virus, and reluctance to governmental intervention to manage the spread of the disease through various means like wearing masks, keeping safe distance and etc.. Negative associations were found between belief in fake news and adherence to public health guidelines such as contact tracing, social distancing, testing, and vaccination against the virus (Enders et al., 2020; Juanchich et al., 2021; Roozenbeek et al., 2020). The negative effects of false news concerning COVID-19 were especially hazardous for older people, because they were in a higher risk to be hospitalized or even die from COVID-19.

Even though health intentions and characteristics of believers are important in understanding the problem of fake news, it is crucial to investigate other aspects of persuasion. Furthermore, previous studies stress the importance of message characteristics itself (Bryanov & Vziatysheva, 2021). Framing of information and psychological distance were described as main factors which influence the belief in fake news (Jaffé & Greifeneder, 2020; Jaffé & Greifeneder, 2021). Therefore, the aim of the current study was to estimate the influence of information framing and psychological distance on belief in health-related fake news information under time pressure in older adults.

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## Belief in fake news

In recent years, fake news has become a well known term used to describe a variety of disinformation practices used both by the traditional media, and whole digital environment. Currently, there is still a lack of consensus on what exactly we call fake news. Nevertheless, according to Pennycook & Rand (2021), fake news can be defined as a news content published online that aesthetically resembles genuine legitimate mainstream news content, but is fictional or highly inaccurate. Also, it can be referred to as false or fabricated news. The term fake news is mostly used to refer to the articles with fake content, created with the intent to deceive (Baptista & Gradim, 2020). To understand fake news as a form of deceitful content, it is important to differentiate between related concepts. The false content or false news may be a result from a journalistic error in verifying its sources, therefore with no deliberate intent to deceive consumers (Nielsen et al., 2017). The very word "fake" is what makes a difference, as it refers to the intention to deceive

(Lazer et al. 2018). Misinformation is defined as information that is false, inaccurate, or misleading. However, it does not necessarily need to be created deliberately to mislead. Misinformation is associated to accidental inaccuracies (Pennycook & Rand, 2021).

In modern society threats emerging from fake news are heavily debated and the effects of fake news have gained growing interest among researchers. Existing research on the effects of fake news addresses several issues including distrust in the media (Littau & Stewart, 2015), political inefficacy, alienation, and cynicism (Balmas, 2014). These effects are often related to disruptive impact on the outcomes of elections and for skewing democratic public debate, fueling propaganda and violence (McGonagle, 2017).

One of the most concerning aspects of influence of fake news are health related beliefs and behavior among consumers (Melchior & Oliveira, 2021). There is no consensus among researchers on the severity of the effects, however studies show, that there are unconscious effects on consumers' behavior (Bastick, 2021). This fact becomes extremely concerning taking into account, that there is data suggesting, that fake news is shared more and spreads faster than true information, even after fact-checking (Shin, 2018; Corbu, 2021).

To improve the understanding of proneness to these threats, it is crucial to identify factors underlying tendencies to believe fake news and tendencies to disbelieve true news. Previous studies have identified different factors that influence whether individuals believe in fake information.

Firstly, the belief in news is associated with socio-demographic factors. Studies show, that age, education, sex, and political affiliation predict understanding of "fake news" and the ability to identify different types of misinformation when presented with screen shots from social media posts (Bedard & Schoenthaler, 2018; Blanco-Herrero et al., 2021). According to Blanco-Herrero and others (2021), higher level of skepticism was observed among women and young people. Few specific differences were based on education level, family income, and political ideology. Beauvais (2020) points out, that low educational level and knowledge are associated with tendency to trust false information.

Secondly, cognitive factors, such as confirmation bias, political partisanship, prior exposure and intuitive thinking play an important role in identifying true information (Beauvais, 2020). Bronstein and others (2019) add to the existing evidence pointing out the role of analytic cognitive style, that may partially explain these individuals' increased willingness to believe fake news. Various psychological factors, including attraction to novelty and high emotional state, also help to predict the ability to discern reliable information (Beauvais, 2020). Studies linked heightened emotionality at the outset of the study to the greater belief in fake news (Martel et al., 2020). According to Sindermann and others (2021), intelligence and personality traits may be also linked to fake and true news discernment. The importance of digital literacy has been identified as well. Data showed that higher digital literacy protects against believing fake news (Beauvais, 2020; Bryanov & Vziatysheva, 2021).

As previously noted, studies show that message characteristics also play an important role. According to Jaffé & Greifeneder (2020) one of the possible explanations to why individuals judge information to be true or false is framing. Authors point out, that the negativity bias in judgments of truth refers to the phenomenon when the same message is more likely to be judged as true when framed negatively compared to positively. According to Hilbig (2009, 2012), content-wise identical statements are more likely to be judged true when framed negatively. Thus, there is a negativity bias in judgments of truth. This phenomenon is explained by the negative information (compared with positive information) having a greater impact on human cognition, affect, and

behavior, in general, meaning that “bad effect is stronger than good effect”. The effect has been linked to cognitive and behavioral factors. It is argued that negative life events usually have greater influence compared to positive life events, as even a single negative major life event can lead to detrimental psychological effects (e.g. post-traumatic stress disorder), whereas multiple positive events do not influence individuals in such a sufficient manner. In addition, negative cases attract more attention and are perceived as more informative. Perhaps, because they are rarer and more threatening. Moreover, various studies show that negative statements are more likely to attract attention, be elaborated and believed as true (Jaffé & Greifeneder, 2019). However, not all studies provide proof to the negativity bias in judgments of truth (Hilbig, 2009, 2012) and instead show associations with a positivity bias. Authors argue that individuals’ expectations or psychological distance may play a crucial role in the negativity bias (Jaffé & Greifeneder, 2019).

Construal level theory (Trope & Liberman, 2010) makes new predictions about the emergence of a negativity bias in truth judgments because it predicts how individuals process information, and more specifically, how different elements of information are weighted. Psychological distance provides some explanation to why individuals accept the message as true (Kwon et al., 2022). Psychological distance refers to a subjective perception of what is close or far away from the self, here, and now, where the “self” serves as a reference point to proximities in terms of social, spatial, and hypothetical (Trope & Liberman, 2010). Everything that is not at this point of zero distance is said to be more or less psychologically distant (e.g. issues related to another country are more psychologically distant than issues related to one’s own country). Studies show that psychological distance to the threats of COVID-19 has an impact on the way misinformation evolves through word-of-mouth, especially when it comes to who is responsible for the pandemic and why the world is in the current situation. Evidence in support of this reasoning showed that the mental salience of positive outcomes of an action increases along with social distance and that framing persuasive messages in terms of gains compared to losses becomes more powerful when participants make judgments for socially distant entities (Nan, 2007).

According to Jaffé & Greifeneder (2020), there is a significant association between frame and distance, indicating that there is a descriptive trend for a negativity bias in conditions of proximity, however in conditions of distance a positivity bias is observed. This suggests that psychological distance may impact the negativity bias in truth judgments (Jaffé & Greifeneder, 2020).

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## Methods

### Participants

Study was based on representable sample of 50 years and older Lithuanians. In total 505 participants took part in the research. 200 (30.6 %) were men, 305 (60.4%) were women. Participants ranged in age from 50 to 94 with the mean age of 66.27 (SD = 11.24). Place of residence were as follows: 9.5% (N = 48) lived in Vilnius, 14.7% (N = 74) lived in another big town of Lithuania (Kaunas, Klaipėda, Šiauliai, Panevėžys), 42.2% (N = 213) lived in a center of district, 20.6% (N = 104) lived in a small town and 13.1% (N = 66) lived in a village. 10.7% (N = 54) of participants responded having a higher university education, 32.3% (N = 163) – special secondary, technical, or other higher education, 42.2% (N = 213) – secondary or professional education, 11.3 % (N = 57) – basic or incomplete secondary education and 3.6% (N = 18) – primary education. 96.2% (N = 486) considered their nationality as “Lithuanian”, 1.8% (N = 9) as “Polish”, 1% (N = 5) as “Russian” and 1% (N = 5) as “Belarusian”.

## Materials and procedure

Study was a between-subject design experiment. Belief in news served as a dependent variable, Framing of Information and Psychological Distance as independent variables, also age, gender and education were control variables. We presented participants with eight fake and eight true news headlines about vaccination and COVID-19 in the form of social media posts that all have been generated for this research using statistical factual data and associative pictures. Both fake and true news headlines were checked to see if they accurately match/not match current statistical data (i.e. data from official national websites) at the time of the study. For example, a true headline was “Out of all Lithuanians who had Pfizer vaccines, 96 percent are safe from being hospitalized due to COVID-19 delta variant”, and a similar fake headline was “Out of all Lithuanians who had Astra Zeneca vaccines, 50 percent are safe from being hospitalized due to COVID-19 delta variant”. To create time pressure news headlines were shown to participants for only 7 seconds and after that participants were asked questions about the headline. The selection of 7 second time limit was based on previous studies (Bago, Rand, & Pennycook, 2019), and a pilot study (Mikuličiūtė, Jurkuvėnas, Pakalniškienė, & Ivleva, 2022).

Headlines differed regarding psychological distance and valance. Psychological distance was manipulated by making a statement about participants home country where experiment was performed (i.e. Republic of Lithuania) or reformulating it for another similar but distant country (i.e. Czech Republic). Czech Republic was chosen because of similarity of statistical data regarding vaccination and COVID-19 statistics. For example, a fake statement regarding proximal country was “Pfizer vaccines that are used in Lithuania are 90 percent effective in protecting against any COVID-19 variant” an equivalent statement about distant country was “Pfizer vaccines that are used in Czechia are 90 percent effective in protecting against any COVID-19 variant”. Valance was manipulated by framing the message in a positive or negative manner (Hilbig, 2009). For example, a true positively framed statement read “99.9992 percent of people who live in Lithuania did not experience neurological disorders as a side effect from Johnson & Johnson’s vaccines”, and a negatively framed headline was “0.0008 percent of people who live in Lithuania did experience neurological disorders as a side effect from Johnson & Johnson’s vaccines”. All participants were assigned randomly to one of four groups based on distance and valance.

After reading news headlines participants were asked the following question: “How accurate is the information in the previously shown headline?”. They responded by choosing one answer: 1—Very likely that it is true, 2—Likely that it is true, 3—Somewhat likely, 4—Somewhat unlikely that it is true, 5—Unlikely that it is true, 6—Very unlikely that it is true. In case a subject was not able to provide an answer value of 3.5 was entered, that happened in 2.78 percent of cases. Usually, participants commented that they can’t guess because they were not able to read a headline. The order of headlines was randomized using Latin squares. No significant differences ( $p > 0.05$ ) were found between sequences of Latin squares regarding dependent variable. General score of belief in news was calculated by adding all answers to news headlines. The reliability coefficient was measured using Cronbach alpha. Overall reliability ( $\alpha = 0.724$ ) was average. Finally, participants were asked to provide demographic information about their age, gender, and educational level.

The data was collected over 5 months period (from October, 2021 to February, 2022). The period of data collection was pandemic time. Even though the total lockdown was over, pandemic restrictions were applied at the national level.

## Results

Participant average score by question ranged from 3.82 (SD = 1.42) to 4.21 (SD = 1.42) (1—Very likely that it is true; 6—Very unlikely that it is true), so answers in general tended to have bias toward messages not being true. There were significant differences ( $p = 0,005$ ) in a between item comparison as measured by repeated measures ANOVA. Most notably one true headline (no. 15 - stating that 50 percent of population is vaccinated at the time) stood out as being frequently answered as unlikely to be true as measured by Bonferroni post hoc test.

To investigate the effect of Framing of information and Psychological distance on belief in news we first performed Mann-Whitney U Test on individual items (Table 1). Only significant difference was based on valance of headline and the 10<sup>th</sup> headline stated – “Delta variant which is spreading in Lithuania is not responsible for 10 percent of all COVID-19 cases in the last month”, this headline stated in a negative way was – “Delta variant which is spreading in Lithuania is responsible for 90 percent of all COVID-19 cases in the last month”.

**Table 1**

Belief in news in Proximal vs. Distant and Positive vs. Negative experimental groups based on between-subject design

	Item #	Median (IQR)		U (Z)	p	Median (IQR)		U (Z)	p
		Proximal	Distant			Positive	Negative		
FAKE	1	4 (2)	4 (2)	28918,5 (-0,397)	0,691	4 (2)	4 (2)	27990 (-0,998)	0,318
	2	4 (2)	4 (2)	28442 (-0,708)	0,479	3,5 (2)	4 (2)	28425,5 (-0,711)	0,477
	3	4 (2)	4 (2)	26532,5 (-1,973)	0,048	4 (2)	4 (2)	28110,5 (-0,924)	0,355
	4	4 (2)	4 (2)	28543,5 (-0,65)	0,516	4 (2)	4 (2)	28075 (-0,952)	0,341
	5	4 (2)	4 (2)	29232 (-0,193)	0,847	4 (2)	4 (2)	28240,5 (-0,84)	0,401
	6	4 (2)	4 (2)	28222 (-0,862)	0,389	4 (2)	4 (2)	28703 (-0,536)	0,592
	7	4 (2)	4 (2)	29123,5 (-0,265)	0,791	4 (2)	4 (2)	29404 (-0,071)	0,943
	8	4 (2)	4 (2)	27807,5 (-1,132)	0,258	4 (2)	4 (2)	28470,5 (-0,687)	0,492
TRUE	9	4 (2)	4 (2)	29347 (-0,117)	0,907	4 (2)	4 (2)	27469 (-1,351)	0,177
	10	4 (2)	4 (2)	29226,5 (-0,197)	0,844	4 (2)	4 (2)	24194 (-3,523)	<,001
	11	4 (2)	4 (2)	29065,5 (-0,304)	0,761	4 (2)	4 (2)	28401,5 (-0,735)	0,462
	12	4 (2)	4 (2)	29105,5 (-0,277)	0,782	4 (2)	4 (2)	28728,5 (-0,518)	0,605
	13	4 (2)	4 (2)	28360 (-0,77)	0,441	4 (2)	4 (2)	27917 (-1,055)	0,292
	14	4 (2)	4 (2)	28758,5 (-0,505)	0,614	4 (2)	4 (2)	29441,5 (-0,046)	0,963
	15	4 (2)	4 (3)	26816,5 (-1,788)	0,074	4 (2,75)	4 (2)	27962,5 (-1,023)	0,306
	16	4 (2)	4 (2)	28883 (-0,423)	0,672	4 (2)	4 (2)	28322,5 (-0,785)	0,432

Note: \*p value significance with Bonferroni correction for multiple comparisons is at  $p < 0.003$

We aimed to estimate the interaction between framing of information and psychological distance in general belief in news concerning COVID-19. Two-way ANOVA revealed no main effects (both for framing of information  $p > 0,05$  and psychological distance  $p > 0,05$ ) and no interaction effect ( $p > 0,05$ ) when overall average of belief in news was used.

Finally, we aimed to analyze how age, gender and education are related to belief in overall news. T test mean comparison between male and female genders revealed no significant differences ( $p > 0,05$ ). Also, educational level was not related to belief in news in general ( $p > 0,05$ ). However, there was a small but significant relation between age and belief in news in general ( $r = -0,14$ ,  $p < 0,01$ ).

The aim of current study was to estimate the influence of information framing and psychological distance on belief in health related information under the time pressure in older adults.

To our knowledge, this is the first study which estimates the influence of psychological distance on overall belief in health related information (both true and fake). Even though previous studies imply, that psychological distance plays an important role in making people believe in presented information (Jaffé & Greifeneder, 2020) they do not specify its effect on true and fake news. Findings of current study show, that psychological distance does not influence belief in news – neither in true nor in fake. One possible explanation for that could be the theme of all headlines presented to research participants. Since all headlines were concerning COVID-19 and vaccination, moreover the research itself was carried out in time of pandemics, therefore theme and circumstances could have triggered anxiety and distress to research participants. As the pandemic was worldwide this could explain why information concerning Czech Republic could be felt as psychologically close as information concerning Lithuania, keeping in mind that these two countries are the part of European Union and share a lot of similarities (e.g. country size or close historic past). Besides, both these countries are western, educated, industrial, rich and democratic (WEIRD) (Muthukrishna et al., 2020), COVID-19 statistics and vaccination rates were very similar at the estimation period and therefore could be perceived by research participants as very similar.

On the other hand, Wee-Kheng and Chun (2022) in their study compared people's motivation to share fake news concerning COVID-19 (low psychological distance) and celebrity's rumors (high psychological distance), and found that the main emotion leading to fake news concerning COVID-19 (but not celebrity rumors) sharing, was worry. Besides, correlations between poor fake news detection and both trait and state anxiety were found in another study (Escol`a-Gasc`o et al., 2023). Strong anxiety interferes with the efficiency of decision making, because it is mostly based on heuristics and System I work (Hartley & Phelps, 2012). This leads to conclusion, that anxiety concerning COVID-19 combined with time pressure, relies on System I work, and therefore decisions are so low in efficiency, that psychological distance apparently does not play a role.

The assumption that negative framing is related to higher belief in health related news was not confirmed with only one exception. The headline, which stated: "Delta variant which is spreading in Lithuania is not responsible for 10 percent of all COVID-19 cases in the last month" was more considered as true, when it was framed in negative versus positive way. It is worth to mention, that results of previous studies are mixed. Several factors accounting for these conflicting results are described. First, Jaffe and Greifeneder (2020) states, that the impact of positive or negative framing depends on the content of the information. Negative framing has high impact in political communication, because people perceive politicians telling negative information as sharing

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## Discussion

news and therefore more truthful. Framing studies dealing with health messages show much more mixed results. Even though a tendency is in favor of negative framing (Yi-Ting & Weng-Tink, 2021; Jihyun, Su Hyun, Jung Guk, 2020; Donova, Jalleh, 2000), different framing effects on different aspects on human behavior could be found. Negatively framed versus positively framed messages are more efficient promoting healthier life style (Rosenblatt et al., 2018), but has no impact on obtaining flu shots (McCaul, Johnson and Rothman, 2002) or on misinformation about COVID-19 acceptance (Greene & Murphy, 2021). Second, involvement is an important factor. Donovan and Jalleh (2000) in their study about infant vaccination found, that positive framing is superior to negative framing for low-involved respondents (women without children and not pregnant), but there was no framing effect for high-involved respondents (women with an infant or pregnant). Besides, the impact of negative – positive framing depends on age. Studies demonstrate the age related positivity effect in health care messages: older people rate positive messages (vs. negative) as more informative compared to younger ones (Shamaskin et al., 2010). Our study included all three factors mentioned above: health related information (virus and vaccination), high involvement (country wide immunization carried out by the government at the time of the research) and older participants (50 years and older), therefore all these factors could have counterbalanced each other's effect and no differences between positive and negative framing groups could be found.

Finally, we aimed to analyze how sociodemographic characteristics, such as age, gender and education, are related to belief in overall news. Only one significant positive correlation between age and belief in overall news (despite the fact they are true or false) was found. This finding confirms previous studies saying that truth bias is growing with age. Older adults are slightly less accurate than younger adults in detecting lies (O'Connor, Lyon, Evans, 2019), because of the positivity bias that occurs lately in life where older adults tend to favor more positive stimuli and perspectives (Luoung, Charles & Fingerman, 2011). Socioeconomical selectivity theory posits that this motivation to seek out positive emotions is a result of older adults' more limited time perspective as they are nearing the later stages of lifespan (Carstensen, 1993; Carsten, Issacowitz, & Charles, 1999). Thus, this shift of time perspective may help to explain why older adults held a strong truth bias and tend to believe in overall news more than younger ones.

In conclusion, our study confirmed the pool of research, which state that information framing does not influence belief in fake news concerning health, especially viruses and vaccination. Further research on psychological distance is needed, because our study showed that Republic of Lithuania and Czech Republic were perceived as very similar during the pandemics. Emotions, such as anxiety, should be included in further studies of psychological distance as well, because emotions could moderate the perception of distance. Older people should get much more attention in further studies as the population of European Union is getting older (Eurostat, 2022) and hazardous fake news are widely spreading around the world. The fact that people become more truth biased with age, means that more and more citizens become affected by deliberately false information and this can be crucial to their health or even life, as in the case of vaccination.

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## Conclusions

- » Psychological distance, while comparing country of living (Republic of Lithuania) and other EU country (Czech Republic), has no influence on overall belief in health related information in older adults.
- » Information framing (positive vs. negative) has no influence on overall belief in health related information in older adults.



- » There is no interaction between psychological distance (country of living and other EU country) and information framing on belief in health related information in older adults.
- » No correlations between overall belief in health related news, gender and education were found.
- » There is a significant positive correlation between overall belief and age: people become more truth biased with age.

### Disclosure Statement

Authors declare that they have no competing financial, professional, or personal interests from other parties.

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