

Do Fake News Catch Our Attention? A Study of Visual Attention Applied to the Consumption of Fake News About COVID-19 in Brazil

Diogo Rógora Kawano and Tiago Nunes Severino

The development of technologies aimed at people's daily communication allows for greater access to information. However, much of this content is the result of disinformation campaigns. Despite efforts to combat fake news, how people read content to identify false messages and make decisions is still not well understood. This study aims to use eye-tracking technology to identify and understand differences in the reading patterns of fake news and real/authentic news sources. Therefore, an experiment was conducted with 23 participants, who had their ocular behavior data measured while watching two types of content in the Brazilian scenario: real news and artificially produced news (fake news). The main results suggest differences and similarities in the way that people read and pay attention to content elements, such as headlines, main text, images, and news sources. The importance of using eye tracking in new studies aimed at combating disinformation is verified.

Keywords: eye-tracking, fake news, health communication, visual attention, Brazil

The development of new forms of digital communication and the gradual expansion of Internet access and connection speeds have significantly increased the opportunities for people to interact in the digital environment (Castells, 2017). Facebook has approximately 2 billion active users (Data Report, 2022). Meanwhile, Instagram currently has 1.5 billion users. TikTok, a rival platform, is gaining popularity, with over 1 billion people using it globally. At least 80 percent of Brazil's 200 million inhabitants use WhatsApp daily (Matsue, 2021).

These platforms have favored the distribution of unique content, including family, professional, and commercial (e-commerce) interactions, as well as entertainment and information content. According to Data Senado (2019), 98 percent of Brazilians who frequently use the Internet use a cell phone as their primary access device. Respondents also stated that they had already decided who they would vote for based on information gathered from social media (54%).

Specifically, fake news has become a major source of concern in the news industry, as the aforementioned dynamics facilitate the spread of this content. In March 2020, the pandemic caused by the SARS-CoV-2 created a high demand for information among Brazilians. The pandemic caused a serious health crisis in the country, resulting in the deaths of over 700,000 people¹ (Brasil, n.d). During this time, ill-informed content on the seriousness of COVID-19, its symptoms, prevention methods, and aspects related to the effectiveness of the vaccines that arrived in Brazil became widespread on social media or was published on the Internet, indicating a serious problem in terms of not only communication but also public health.

However, although there have been studies on fake news in Brazil, empirical research on understanding the consumption of this type of information and the differences from the consumption of genuine news in the context of COVID-19 in Brazil is scarce. The present study aims to use an eye-tracking methodology to identify and understand the differences in the pattern of viewing fake news and authentic news on COVID-19.

The first section of this study provides a brief history of fake news and Brazilian reality. Next, we discuss how media and information literacy

¹ Deaths until October 4, 2022

(MIL) can help mitigate the effects of fake news, and then we present the eye-tracking methodology and previous studies that used this tool to study the theme. The remaining sections detail the study's results and conclusion.

Fake News: Historical Context and the Brazilian Reality

Fake news is defined as false information propagated through communication, whether in a traditional or digital format, with the intent of instilling fear, generating financial effects, inciting political and social unrest, or opposing a statement with which its creator disagrees. This statement is consistent with Kalsnes' (2018) understanding of the term. Kalsnes (2018) also mentions that one of the concerns about fake news is that the volume of false content polluting the debate on socially relevant topics can affect democracy itself.

The concept of fake news is associated with what was previously classified as a rumor, gossip, lie, or misinformation because it lacks veracity and, in many cases, circulates without being able to identify who produced it (Meneses, 2018). Gordon Allport and Leo Postman (1953) investigated the causes of unconfirmed information dissemination in their book *The Psychology of Rumor*. They began by affirming that rumor is always a problem, but especially during times of crisis. One example was the rumor that Hitler would die within the next six months, which spread throughout England in 1942. The soothsayer would have made the prediction. According to the researchers, this type of story persists and spreads because of its bizarre aspects, which make it easy to repeat. The importance of the character in question and the wish that it is true are also important considerations. Some people may find the rumor plausible (Allport & Postman, 1953).

This study distinguishes between rumor production and the spread of lies from conversation to conversation. False content circulated as news is intended to deny the truth and win a public debate with opposing viewpoints. Therefore, the creation and sharing are part of an ideological war (Alves & Maciel, 2020).

Gelfert (2018, p. 90) emphasizes that “the falsification of news has been around for a long time and all the technological advances, from the

telegraph of the 19th century to the contemporaneity in media algorithms, has launched new possibilities of fabrication” of this type of material. However, according to Gelfert (2018), this phenomenon is not novel. In fact, since the inception of printed newspapers, fanciful or inaccurate reports were often the subject of publication in the press. From the 17th to the 19th centuries, newspapers frequently reported on mythical shipwrecks, sea monster discoveries, and bizarre cases.

The difference between early journalism and modern journalism is that today, journalism is based on principles, such as objectivity, exemption, and plurality, to validate content publication. Wardle and Derakshan (2017) argue that the term “fake news” has a set of inaccuracies and should be replaced with “disinformation.” The expression refers to false content that can appear in videos, satires, deliberately false translations, and other digital materials, as well as in news. Therefore, the authors categorize the processes associated with fake news as follows: incorrect information (false connections and erroneous content); disinformation (false, doctored, manipulated, and fabricated content); and bad information (leaks, harassment, and hate speech).

According to the authors, the content that achieves the best propagation results plays with the receiver’s emotions and instills feelings of superiority, anger, or fear. These characteristics encourage the spread of these messages, resulting in a sense of community among those who identify with each discourse. Moreover, Wardle and Derakshan (2017) stated that the use of emotion facilitates the rapid dissemination of disinformation content and serves as a defense against content produced by verification agencies, which are dedicated to verifying authentic news and debunking wrong, false, or inaccurate information.

Alzamora and Andrade (2019) highlight the transmedia nature of fake news: “the circulation of false or distorted content (...) favors the development of points of contact between related actions, stimulating the passage from engagement through adherence to activist engagement” (pp. 119–120). They argue that because social networks are digital spaces for relationships, they also serve as a platform for sharing beliefs. In this way, experiences, tastes, and a vast network of information shape opinions, including political and social views.

Table 1. *Summary of key aspects related to fake news.*

Authors	Expression	Prominent aspect
Allport and Postman (1953)	Rumor	An issue of particular importance during times of crisis
Wardle and Derakshan (2017)	Fake news	Not limited to news. Can be categorized into wrong information, disinformation, and bad information
Gelfert (2018)	Falsification of news	Century-old process that encompasses various technologies
Kalsnes (2018)	Fake News	Affects the debate on topics relevant to society
Alzamora and Andrade (2019)	Fake News	Strengthens the risk of activist participation, with a prominent role for social networks

Source: Prepared by the authors.

Fake news has become especially prevalent in Brazil during the COVID-19 pandemic. Since March 2020, when the World Health Organization and local governments issued a high alert for the disease, false content has rapidly spread via WhatsApp and other social networks, such as Facebook and YouTube.

Barcelos and colleagues (2021) discovered 329 fake news stories by June 2020. The main stories focused on vaccines (20.1%), epidemiology and statistics (number of cases and deaths (19%), and prevention (16%). The fake materials also addressed, among other topics, the effect of the pandemic on the economy, which was discussed in reports on the closure of large chain stores; xenophobia and racism against Chinese people; and virus behavior when researching methods to eliminate SARS-CoV-2.

In another analysis based on data available up to September 2020, Falcão and Souza (2021), in addition to categorizing the most common types of fake news about COVID-19, point out that, in Brazil, fake news depicted President Jair Bolsonaro as a kind of sounding board, when he called the disease a “little flu” in an official radio and television address. Along with this statement, the discourse that the disease was a “fantasy” discouraged

social distancing and isolation. On April 20, 2020, the president made a controversial statement: “I am not a gravedigger.” This sentence was uttered when asked about the increase in disease-related fatalities. With hospital bed occupancy increasing, the president encouraged his followers to enter hospitals and verify the capacity during a live Facebook event. The Federal Government also directed the army to dispatch chloroquine to hospitals across the country for early disease treatment, a procedure that health experts opposed.

Fake news is not a Brazilian peculiarity. All over the world, fake news about COVID-19 has been disseminated. What stands out in Brazil is the fact that much of the false information about the disease was spread by the president himself, Jair Bolsonaro, and his supporters. This adds even more seriousness to the phenomenon of fake news in the country, as Bolsonaro occupies the position of head of state and achieves great visibility—including on the national radio and television network. (Falcão & Souza, 2021, p. 67.)

The spread of fake news and the president’s speeches affected Brazil’s vaccination nation. According to Galhardi and colleagues (2022), people wanted to choose their vaccine brand in at least 70 percent of Brazilian municipalities, and 53.1 percent of people refused to take the Coronavac vaccine. The researchers specified that President Bolsonaro’s refusal to be vaccinated and his distrust of the immunizer produced by a Chinese laboratory fueled opposition to Coronavac. The statements were made when Brazil’s death toll reached 200,000 in January 2021.

It is important to note that the president’s speech, as a head of state, appeared to validate the fake news that circulated at the time, making it difficult for the public to recognize the erroneous or inaccurate nature of the information. For example, in October 2021, Facebook and WhatsApp groups reported that people contracted AIDS after receiving two doses of the vaccine. Bolsonaro brought up the subject during a live Facebook event the same month, asking his followers to look for the text containing the false information online. The transmission file was later deleted by the platform (Struck, 2021).

MIL Contributions to the Fight Against Fake News

Wardle and Derakshan (2017) identify 34 initiatives that technology companies, governments, schools, and civil society can support in the fight against false, misleading, or untrue content. Measures include regulating online advertising to prevent funding for web pages and channels that disseminate this type of content, ensuring high ethical standards in the media, and establishing clear criteria for changing algorithms on web platforms.

The authors also make recommendations in the field of MIL, suggesting the development of resources to promote MIL and educate the public about disinformation. For Wardle and Derakshan (2017), teaching people about image manipulation's form and power is important. They present a Stanford University study in which even qualified researchers and students were misled by information available on fake pages bearing official logos, names, and website appearances.

MIL requires training that can provide citizens with technical and theoretical knowledge to understand how the media works, how information is distributed throughout the nation, and how digital resources are used to create content. MIL aims to position the individual as a potential creator and producer of information. MIL teaches individuals about discourse analysis, information source analysis, editorial viewpoints of news vehicles, data collection, and independent media.

According to Soares (2011), communication and education projects allow young people to expand their vocabulary and cultural repertoire while also developing communication skills. Such opportunities can be found within the school through discipline-related projects or outside projects that emphasize the importance of putting information and media at the center of the school and academic debate.

The key term for understanding media literacy's potential is "critical thinking." According to Sayad (2019), one of the current educational challenges is developing the ability to critically read information in the context of the digital universe. He recalls that popular education and ecclesial movements in Latin America have been discussing the interrelationship between media and education since the 1950s. However, disseminating fake news has increased its urgency in recent years. Sayad

(2019) emphasizes the importance of subject-specific teacher training to fully promote MIL, as well as digital resources in schools and a curriculum organization capable of meeting these objectives.

Barros (2019, p. 23) lists several measures implemented in Brazil to promote MIL in order to combat fake news, such as the inclusion of MIL aspects in the National Curricular Common Base, a document that guides schools across the country on the content to be covered in each grade for the respective years of basic education. Teaching students to analyze news and photos published on the Internet and social networks is a mandatory item in schools. According to the researcher, “for the student to analyze the media, it is necessary for him to develop the ability to be a researcher and to position himself critically” (Barros, 2019, p. 23).

Another measure mentioned by Barros that combines communication and education in the perspective analyzed here is from the Instituto Palavra Aberta. Instituto Palavra Aberta is a civil society organization that defends free expression as a fundamental right and advocates, among other things, training for elementary school teachers to promote skills in how to “access, analyze, create and participate in the informational environment and media in all formats —from print to digital” (Palavra Aberta, 2022). The institution also offers lesson plans, a media education guide, and guidelines for implementing work in schools.

Grossi and colleagues (2021) discuss developing in students a “healthy skepticism” capable of raising doubts about specific contents as they critically read the information in front of them. These authors elaborate on a proposal for implementing activities in basic education that can help identify fake news. The test entails examining the nature of the information, the date of publication, textual genre, authorship, and the structure of the text; reading the entire news; observing the coherence between parts of the text; considering the objective of the news; noting if the facts are plausible; seeking additional sources of information; and using other sites to determine the veracity.

Eye-tracking: Possibilities for Understanding the Consumption of Fake News

Eye-tracking is a method of data collection and analysis in which hardware records the participant's eye movements during a given visualization of a scene, which can be a static or dynamic stimulus. This capture, which is usually made by webcams or equipment based on infrared sensors, can be used to identify some metrics about the participant's visual attention (Wedel & Pieters, 2008).

Some of the data generated include (i) the number of fixations within an area of interest (AOI)², (ii) the time a person fixed their gaze on a communication element (title, image, or news source information), (iii) the viewing order of scene elements, and the time until the first fixation within an AOI.

Regardless of the various possible metrics, there appears to be a consensus in the literature that such metrics help to bring important information from the communication process that would not otherwise be possible, because there are limitations and other cognitive biases (Kahneman, 2012) that make it difficult for a person to estimate, via self-report, how long an item in a message was observed.

In addition to quantitative metrics, the methodology supports qualitative data analysis by observing individualized or grouped heatmaps or scanpaths among individuals, as illustrated in Figure 1.

² Region demarcated by the researcher within a stimulus, from which ocular behavior metrics are obtained.

Figure 1. Scan path of a research participant, indicating the path of eye movements on one of the research sites



Note. Reprinted from *Children's exposure to and perceptions of online advertising* (p.337), by Sandberg, Gidlöf, and Holmberg (2012).

The importance of this type of data in communication and other areas of social science has increased the use of ocular behavior in various areas of knowledge in recent years (Kawano, 2019). The 1980s saw the first use of eye-tracking technology in advertising studies (Kroeber-Riel, 1984).

Eye-tracking technology can help understand how people read and consume information, particularly for health-related messages. In the case of fake news within this theme, understanding whether there are behavioral differences and where they occur from an attentional standpoint can provide clues that deepen knowledge about the phenomenon and eventually help create strategies for citizens' literacy about disseminating and detecting this type of content.

Furthermore, as shown below, using eye-tracking in conjunction with traditional research methodologies can effectively contribute to this

process. The following section discusses previous studies that used the tool to study the topic of fake news, with different objectives.

Previous Studies

Despite the scarcity of scientific literature on fake news and eye behavior (eye-tracking) in health communication, some recent research works demonstrate how methodology can contribute to a more comprehensive understanding of the subject.

Sümer and colleagues (2021) conducted a study in which 25 participants were asked to observe a series of content that could be true or fake news. In addition to declared measures like the perceived credibility scale, the authors compared data on total viewing time, fixations, and saccadic movements between two variations of the same news and found that fake content had higher values for the three metrics they analyze. Because the experiment simulated a content format on social networks, the results aid in understanding how eye behavior can indicate the nature of specific news and readers' cognitive and interpretation processes.

Meanwhile, Wojdyski and colleagues (2019) conducted a slightly different experiment, using eye-tracking methodology and presenting four scientific news items as either fake or genuine. News items were not obtained from known sources to account for the source effect. Furthermore, half of the participants were warned that the information presented could be false. One of the most significant findings was that early warning increased the correct rating of fake news.

Simko and colleagues (2019) simulated a social networking environment (Facebook) and presented participants with a feed that included both fake and authentic news. By using eye-tracking technology to study the stated perceptions of 44 participants, the researchers discovered that the research volunteers who rated the news correctly gave lower values of visual attention to the news title, whereas the volunteers who made the most mistakes in the same rating focused on the news headline for the longest period. No statistically significant differences were found in visual attention for other elements of the content, such as the image and the first paragraph of the news.

These results corroborate the considerations of Hansen and colleagues (2020). The authors conducted a study with 55 participants, who were asked to examine more than 100 news headlines that could be false or authentic. Hansen and colleagues (2020) show that, as one of the main results, fake news headlines received less visual attention than real news headlines, and that this difference was statistically significant. Furthermore, researchers used the data to create a model that predicts the veracity of news based solely on eye behavior metrics such as total viewing time, number of fixations, average fixation time, and first fixation time, with an accuracy of approximately 63 percent. Bozkir and colleagues (2022) investigated a less trivial metric in this field of study: the number of saccadic regressions. Saccadic regressions are eye movements directed at an AOI located before the participant's current fixation point, which may indicate confusion or misunderstanding of the content. In this regard, the authors discovered that participants made more regression eye movements when confronted with fake news than when reading real news.

Finally, Šuminas and Jastramskis (2020) conducted a study to determine how knowledge about MIL influences young people to consume true or false/fake information. To accomplish this, the authors divided the participants into two groups: journalism students with prior MIL knowledge and advertising students without the same level of MIL knowledge. Eye-tracking technology allowed for a clear distinction between the two groups. Journalism students focused more on key elements that indicate credibility, such as authorship data, image caption, and source. This distinction between the groups was evident in the initial reading of the content and subsequent readings, in which the readers read the content with greater attention and depth.

Methodology

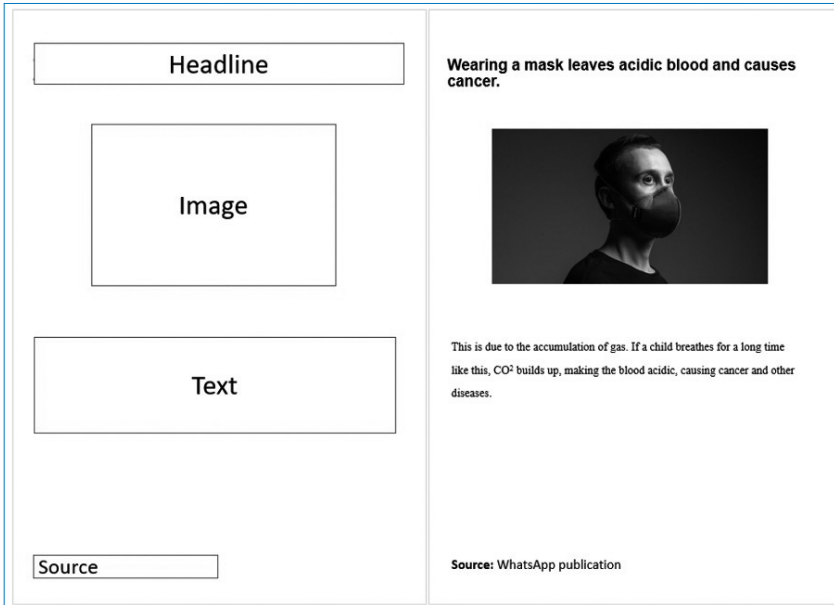
Data were collected at the Laboratory of Technologies in Communication and Applied Neuroscience (LTCN&NA) of the Federal Institute of Southern Minas Gerais, which is equipped with an Eye Tribe® eye-tracker. The study included 23 volunteers, 13 men and 10 women (mean age = 26.1 years, SD = 10.3). We used the following exclusion criteria: (1) a documented history of neurological problems, and (2) uncorrected vision issues. The study's conditions and objectives were based on the informed consent form, which was explained and signed before the experiment began.

The experiment was developed using OGAMA® version 5.0.1 software and then pretreated with LTCN&NA Eye-tracker DB®. The images were displayed on a 17-inch LCD monitor located 65 cm away from the participants. The eye-tracker was placed below the monitor that displayed the experiment. The ambient light conditions were controlled and maintained consistently. The stimuli were presented as follows: Each participant read four of eight possible pieces of news, presented in random order; half were real, and the other half were fake news (Appendix I and II).

All the news stories focused on COVID-19 in Brazil (e.g., the disease's severity, quarantine's effectiveness, and vaccine problems). The fake news items were extracted from messages and publications shared in Facebook or WhatsApp groups between March 2020 and May 2022. The original news items were sourced from the Estado de Minas news portal. After reading the entire content, participants were asked to rate each news item on a 5-item Likert scale, answering the question "How credible do you rate this news?", as described by Sümer and colleagues (2021).

To improve control over the experimental variables, each news item was redesigned with the same layout and visual identity (simulating an online news item), as shown in Figure 2. Four areas of interest (headline, main text, image, and source) were defined for eye-tracking analysis using the metrics compete fixation time (CFT) and number of regressions.

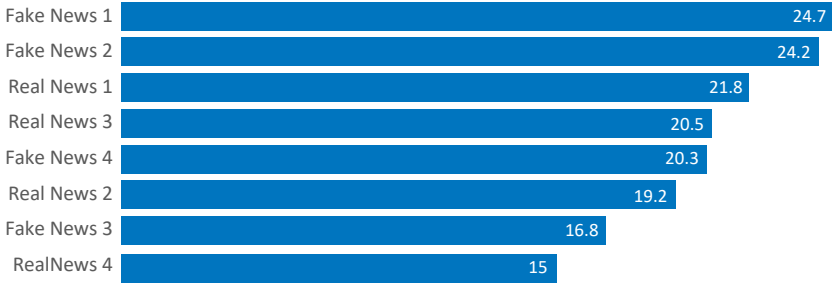
Figure 2. *Layout and an example of stimulus*



Source: Authors' own elaboration.

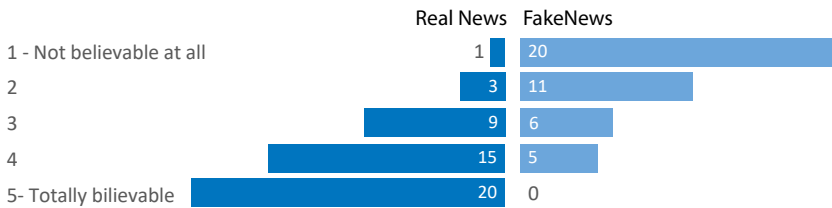
Results and Discussion

The results of the study are presented below. Note that after inspecting the data obtained with eye-tracking, which revealed poor information accuracy, one participant's data was removed from the ocular behavior analysis. The first two figures represent general and descriptive data. Figure 3 depicts the preliminary analysis of reading time for each of the eight news items used in the study. As shown, the average reading time ranged from 15 to 25 seconds. Despite this, there was no discernible difference between the two types of content (real news and fake news).

Figure 3. *Reading: Total reading time (s)*

Source: Authors' own elaboration.

Taking the declared scale of five points, where 1 indicated “not believable at all” and 5, which measured “how credible the news was,” we observed that, in general, the number of ratings of true news in higher scores (4 or 5, very credible) was higher when compared to fake news, which were concentrated in lower evaluations, with 74 percent between grades 1 and 2 in the latter case.

Figure 4. *Total number of evaluations according to type of content*

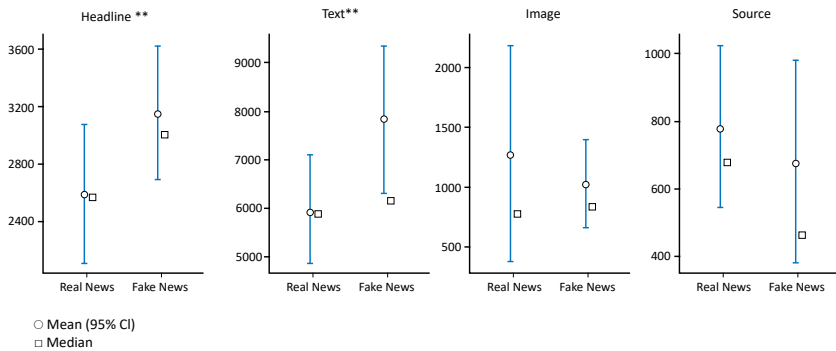
Source: Authors' own elaboration.

Complete Fixation Time

The CFT is the amount of time, in milliseconds, that each participant focused on one of the analyzed elements: headline, text, image, or source. Thus, higher values in this variable indicate greater levels of visual attention. Given the nonsupposition of normality in data distribution, the Wilcoxon nonparametric test was performed on paired samples, except for title data, which had a normal distribution. FIELD (2009) used the paired t-test in this case.

The tests showed that fake news received significantly more attention than real news concerning the headline (Median: fake news = 3,158 ms, SD = 1,434 ms vs. Median: real news = 2,585 ms, SD = 1,484 ms, $t = -2.09$, $p < .05$, two-tailed test) and the main text (Median: fake news = 6,155 ms vs. Median: real news = 5,909 ms, $W = 207$, $p < .01$, two-tailed test) at a significance level of $\alpha = 5\%$, as indicated in Figure 5. No statistically significant difference existed between the “text” and “image” content types.

Figure 5. Complete fixation time (CFT; ms) between real news and fake news



Note. ** Indicate significant differences.

Source: Authors’ own elaboration.

The results found by Sümer and colleagues (2021) that show more fixations on fake news than real news partially align with the data. However, in this study, we divided the metrics by news element to provide greater detail and control. The lack of verification of differences in visual attention given to “images” is also consistent with the observations made by Simko and colleagues (2019). In contrast to the results confirmed here, Hansen and colleagues (2020) found lower rates of visual attention paid to fake news headlines. The latter results support the notion that additional studies are required to deepen knowledge in the field.

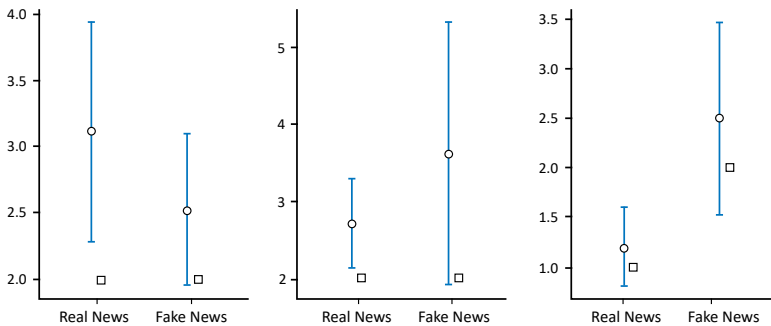
Finally, because the size and layout of the elements analyzed in this study were changed, the possible effects identified by Pieters and Wedel (2004) were somewhat controlled, allowing the variations in visual attention to be attributed solely to the content of the messages analyzed.

Number of Regressions

A regression in ocular behavior indicates that the research participant reexamined a specific aspect of the news item. The news headline, for example, may be read once or several times. As a result, a higher number of regressions can indicate whether a person is unsure or if he analyzes the content more carefully.

Given the lack of normality in the data distribution and the observed independence between groups in regressions, the nonparametric Mann–Whitney U test (FIELD, 2009) was used. At a significance level of $\alpha=5\%$, the results showed that the “source” in fake news received a higher number of regressions (median = 2.0) compared to real news (median = 1.0), with a significant difference between groups ($U = 1.50, p < .05$, two-tailed test), as shown in Figure 6. The other three items (headline, text, and image) showed no difference between the two types of content.

Figure 6. Number of regressions between real news and fake news



Note. ** indicates significant differences. The data had no dispersion, so the regression graph to images was absent. *Source:* Authors' own elaboration.

Bozkir and colleagues (2022) discovered more regressions in fake news without regard for content elements. Furthermore, the data provide pertinent information for the context of fake news, indicating that all items, except the source, are viewed similarly for this ocular behavior metric. On the contrary, the news source appears to be an important reference for people when determining whether a news item is fake. This “source” element is frequently absent in the daily circulation of misleading content.

According to Šuminas & Jastramskis (2020), another aspect that can be considered for future studies is controlling participants and segmenting the analysis based on MIL knowledge. Including data that assess the effect of visual attention given to fake news on short- and long-term memory, similar to Carvalho's (2013) studies in the context of advertising content, may also be an option for deepening knowledge in this area.

Conclusion

This research aimed to identify and understand the differences in viewing patterns of fake news versus real news regarding COVID-19. The results showed that people read fake news content differently, particularly as observed by eye-viewing behavior metrics. These differences were observed in the higher number of fixes and visits to the source and regressions to the fake news title. Furthermore, the eye-tracking methodology proved useful and feasible for understanding how people behave when confronted with various news items circulated in Brazilians' daily lives.

One of the study's limitations is the restricted topic (COVID-19), which prevents us from knowing whether such differences occur in other subjects of public interest, such as education and economics. Moreover, the study was conducted only a few months after these news items were published for operational reasons. This time interval may have resulted in the news being read in a different context than if it had been analyzed in real time. Future studies that address this process in subjects other than health and different social settings (whether in Latin America or other continents) are encouraged and can help to validate the processes described here.

Acknowledgements and financing:

The authors gratefully acknowledge the support of the Federal Institute of Education, Science and Technology of southern Minas Gerais (IFSULDEMINAS).

References

- Allport, G., & Postman, L. (1953). *Psicologia del rumor* [Psychology of the rumour]. Pisque.
- Alves, M. A. S., & Maciel, E. R. H. (2020). O fenômeno das fake news: Definição, combate e contexto [The phenomenon of fake news: Definition, combat, and context]. *Internet e Sociedade*, 1(1), 144–171. <http://hdl.handle.net/1843/44432>
- Alzamora, G. C., & Andrade, L. (2019). A dinâmica transmídia de fake news conforme a concepção pragmática de verdade [The transmedia dynamics of fake news according to the pragmatic conception of truth]. *Matrizes: Universidade de São Paulo, Agencia USP de Gestao da Informacao Academica (AGUIA)*, 13(1), 109–131. <http://doi.org/10.11606/issn.1982-8160.v13i1p109-131>
- Barros, S. E. T. O. (2019). *Processo de ensino-aprendizagem no combate ao fake news: análise comparativa de iniciativas disponíveis on-line de alfabetização midiática para escolas* [Teaching and learning process in combating fake news: Comparative analysis of available online media literacy initiatives for schools]. Curso de Pós-Graduação em Mídias e Educação. Ifsuldeminas, Passos.
- Bozkir, E., Kasneci, G., Utz, S., & Kasneci, E. (2022). Regressive saccadic eye movements on fake news. *Eye Tracking Research and Applications Symposium (ETRA)*. <https://doi.org/10.1145/3517031.3529619>
- Brasil. (n.d). Coronavírus Brasil [Coronavirus Brazil]. *Saúde*. <https://covid.saude.gov.br>
- Barcelos, T. N., Muniz, L. N., Dantas, D. M., Cotrim Junior, D. F., Cavalcante, J. R., & Faerstein, E. (2021). Análise de fake news veiculadas durante a pandemia de COVID-19 no Brasil [Analysis of fake news disseminated during the COVID-19 pandemic in Brazil]. *Revista Panamericana de Salud Pública*. Pan-American Health Organization, 45. <http://doi.org/10.26633/RPSP.2021.65>
- Castells, M. (2017). *O poder da comunicação* [The power of communication]. 2nd ed. Paz e Terra.
- Data Report (n.d). *Digital 2022 Global Overview Report*. <https://datareportal.com/reports/digital-2022-global-overview-report>.

- Data Senado (2019). Redes sociais, notícias falsas e privacidade de dados na internet [Social networks, fake news, and data privacy on the internet]. *Senado*. <https://www12.senado.leg.br/institucional/ouvidoria/publicacoes-ouvidoria/redes-sociais-noticias-falsas-e-privacidade-de-dados-na-internet>
- Falcão, P., & de Souza, A. B. (2021). Pandemia de desinformação: As fake news no contexto da Covid-19 no Brasil [Pandemic of misinformation: Fake news in the context of COVID-19 in Brazil]. *Revista Eletrônica de Comunicação*, 15, 1, 55–71.
- Galhardi, C. P., Freire, N. P., Fagundes, M. C. M., de Souza Minayo, M. C. S., & Cunha, I. C. K. O. (2022). Fake news e hesitação vacinal no contexto da pandemia da COVID-19 no Brasil [Fake news and vaccine hesitancy in the context of the COVID-19 pandemic in Brazil]. *Ciência and Saúde Coletiva*, 27(5), 1849–1858. FapUNIFESP (SciELO). <http://doi.org/10.1590/1413-8123202275.24092021>
- Gelfert, A. (2018). Fake news: A definition. *Informal Logic*. University of Windsor Leddy Library, 38(1), 84–117. <http://doi.org/10.22329/il.v38i1.5068>
- Grossi, M. G. R., Leal, D. C. C. C., & da Silva, M. F. (2021). Educação midiática, cultura digital e as fake news em tempos de pandemia [Media education, digital culture, and fake news in times of pandemic]. *Educação em Revista*, 22(esp2), 179–198. <http://doi.org/10.36311/2236-5192.2021.v22esp2.p179>
- Hansen, C., Hansen, C., Simonsen, J. G., Larsen, B., Alstrup, S., & Lioma, C. (2020). Factuality checking in news headlines with eye tracking. In: *Proceedings of the 43rd international ACM SIGIR conference on research and development in information retrieval*. <https://doi.org/10.1145/3397271.3401221>
- Kalsnes, B. (2023). Fake news. *Oxford research encyclopedia of communication*. <https://oxfordre.com/communication/view/10.1093/acrefore/9780190228613.001.0001/acrefore-9780190228613-e-809>
- Kahneman, D. (2012). *Rápido e devagar: Duas formas de pensar* [Fast and slow: Two ways of thinking]. Objetiva.
- Kroeber-Riel, W. (1984). Effects of pictorial elements in ads analyzed by means of eye movement monitoring. *Advances in Consumer Research*, 11, 591–596.
- Le Voci Sayad, A. (2019). Educação midiática e pensamento crítico: Antídotos contra a desinformação [Media education and critical thinking:

- Antidotes against misinformation]. In: Costa, C.; Blanco, P. *Liberdade de expressão: Questões da atualidade*. Eca-Usp. <https://repositorio.usp.br/directbitstream/235ffa7a-d574-4583-a5bc-1cadd83c505c/002942046.pdf#page=9>
- Matsue, C. (2022). 80% dos brasileiros utilizam o WhatsApp para se comunicar com as marcas, aponta pesquisa [80% of Brazilians use WhatsApp to communicate with brands, according to research]. *Valor Investe*. <https://valorinveste.globo.com/objetivo/gastar-bem/noticia/2021/09/16/80percent-dos-brasileiros-utilizam-o-whatsapp-para-se-comunicar-com-as-marcas-aponta-pesquisa.ghtml>
- Meneses, J. P. (2018). Sobre a necessidade de conceptualizar o fenómeno das fake news [On the need to conceptualize the phenomenon of fake news]. *Observatorio (OBS*)*, 12(4), 37–53. <https://doi.org/10.15847/obsOBS12520181376>
- Palavra Aberta (ND). *O que defendemos* [What we advocate]. <https://www.palavraaberta.org.br/sobre-o-instituto/o-que-defendemos>
- Sandberg, H., Gidlöf, K., & Holmberg, N. (2012). Children’s exposure to and perceptions of online advertising. *International Journal of Communications*, 21–50.
- Simko, J., Hanakova, M., Racsko, P., Tomlein, M., Moro, R., & Bielikova, M. (2019). Fake news reading on social media: An eye-tracking study. *Proceedings of the 30th ACM conference on hypertext and social media*, 10, 221–230. <https://doi.org/10.1145/3342220.3343642>
- Soares, I. O. *Educomunicação: O conceito, o profissional, a aplicação: Contribuições para a reforma do ensino médio* [Educommunication: The concept, the professional, the application: Contributions to the reform of high school]. São Paulo: Paulinas
- Struck, J. P. (2021). Facebook apaga live em que Bolsonaro relaciona vacina à AIDS [Facebook deletes live stream in which Bolsonaro links vaccine to AIDS]. <https://www.dw.com/pt-br/facebook-exclui-live-em-que-bolsonaro-relaciona-falsamente-vacina-a-aids/a-59615104>
- Sümer, Ö., Bozkir, E., Kübler, T., Grüner, S., Utz, S., & Kasneci, E. (2021). FakeNewsPerception: An eye movement dataset on the perceived believability of news stories. *Data in Brief*, 35, 106909. <https://doi.org/10.1016/J.DIB.2021.106909>
- Šuminas, A., & Jastramskis, D. (2020). The importance of media literacy education: How Lithuanian students evaluate online news content cre-


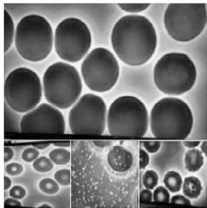
dibility. *Central European Journal of Communication*, 13(2), 230–248. [https://doi.org/10.19195/1899-5101.13.2\(26\).5](https://doi.org/10.19195/1899-5101.13.2(26).5)



Wardle, C., & Derakhshan, H. (2017). *Information disorder: Toward an interdisciplinary framework for research and policy making*. Council of Europe Report. <https://rm.coe.int/information-disorder-reportnovember-2017/1680764666>

Wedel, M., Pieters, R., & Liechty, J. (2008). Temporal dynamics of scene perception: Goals influence switching between attention states. *Journal of Experimental Psychology. Applied*, 14(2), 129–138

Wojdyski, B. W., Binford, M. T., & Jefferson, B. N. (2019). Looks real, or really fake? Warnings, visual attention and detection of false news articles. *Open Information Science*, 3(1), 166–180. <https://doi.org/10.1515/opis-2019-0012>

Appendix I–Fake News

<p>Uso de máscara deixa sangue ácido e causa câncer.</p>  <p>Isso se dá pelo acúmulo do gás. Se uma criança ficar respirando por muito tempo assim, há acúmulo de CO², tornando o sangue ácido, ocasionando câncer e outras doenças.</p> <p>Fonte: Publicação – WhatsApp</p>	<p>Translation</p> <p>The use of a mask makes the blood acidic and causes cancer.</p> <p>This is due to the accumulation of gas. If a child breathes like this for a long time, there is an accumulation of CO₂, making the blood acidic, causing cancer and other diseases.</p> <p>Source: Publication–WhatsApp</p>
<p>Vacinas contra COVID-19 intoxicam células sanguíneas</p>  <p>A imagem mostra nanopartículas estranhas logo após a injeção. O corpo nunca pode desintoxicar-se disso. Essas nanopartículas eventualmente entrarão em todas as células do seu corpo.</p> <p>Fonte: Publicação – Facebook</p>	<p>Translation</p> <p>COVID-19 vaccines intoxicate blood cells</p> <p>The image shows strange nanoparticles soon after the injection. The body can never detox from this. These nanoparticles will eventually enter every cell in your body.</p> <p>Source: Publication–Facebook</p>

<p>Companhias aéreas da Espanha e Rússia alertam vacinados para não voar</p>  <p>Em diferentes partes do mundo, as companhias aéreas agora aconselham pessoas que foram vacinadas a não voar, após a “morte” de pilotos devido à vacina.</p> <p>Fonte: Publicação - Facebook</p>	<p>Translation</p> <p>Airlines from Spain and Russia warn vaccinated citizens not to fly</p> <p>In different parts of the world, airlines are now advising people who have been vaccinated not to fly, following the “death” of pilots due to the vaccine.</p> <p>Source: Publication - Facebook</p>
<p>CDC dos EUA registra 12 mil mortes relacionadas a vacinas contra covid-19</p>  <p>Mais da metade das mortes relacionadas a vacinas nos Estados Unidos é de pessoas que tomaram um dos imunizantes desenvolvidos contra a covid-19. Os dados são do Centro de Controle e Prevenção de Doenças do país.</p> <p>Fonte: Revista Oeste</p>	<p>Translation</p> <p>CDC in the USA records 12 thousand deaths related to vaccines against COVID-19</p> <p>More than half of the deaths related to vaccines in the United States are those of people who took one of the immunizers developed against COVID-19. The data are from the country’s Center for Disease Control and Prevention.</p> <p>Source: Revista Oeste</p>

Appendix II—Real News

Cansaço pós-covid: por que fadiga pode durar mais que curso da doença



Passados quase dois anos desde a chegada ao Brasil, a ciência determinou que a SARS-CoV-2 causa uma doença sistêmica que pode afetar diferentes áreas do corpo simultaneamente.

Fonte: Estado de Minas

Não vacinados têm chance cinco vezes maior de morrer pela COVID-19



Pessoas que não tomaram a vacina contra a COVID-19 têm uma chance cinco vezes maior de morrer pela doença do que aquelas que já tomaram ao menos três doses do imunizante.

Fonte: Estado de Minas

Translation

Post-COVID fatigue: why fatigue can last longer than the course of the disease

Nearly two years after its arrival in Brazil, science has determined that SARS-CoV-2 causes a systemic disease that can simultaneously affect different areas of the body.



Source: Estado de Minas

Translation

Unvaccinated have five times higher chance of dying from COVID-19.

People who have not taken the COVID-19 vaccine have a fivefold greater chance of dying from the disease than those who have taken at least three doses of the vaccine.

Source: Estado de Minas

<p>Jovem trata COVID com ivermectina e pode precisar de transplante de fígado</p>  <p>Paciente desenvolveu hepatite medicamentosa após tomar o remédio por uma semana para tratar a infecção leve pela COVID-19. Parcela de médicos vem receitando o remédio no enfrentamento inicial da doença.</p> <p>Fonte: Estado de Minas</p>	<p>Translation</p> <p>A young person treats COVID with ivermectin and may need a liver transplant</p> <p>The patient developed drug-induced hepatitis after taking the medication for a week to treat a mild infection by COVID-19. A segment of doctors has been prescribing the remedy in the initial confrontation of the disease</p> <p><i>Source:</i> Estado de Minas</p>
<p>Stanley Gusman, apresentador da TV Alterosa, morre de COVID-19</p>  <p>O apresentador da TV Alterosa Stanley Gusman morreu em decorrência de complicações da COVID-19. O comunicador, estava internado em estado grave em Nova Lima, na Grande BH.</p> <p>Fonte: Estado de Minas</p>	<p>Translation</p> <p>Stanley Gusman, the TV Alterosa presenter, dies of COVID-19</p> <p>TV Alterosa presenter Stanley Gusman died from complications from COVID-19. The broadcaster was hospitalized in serious condition in Nova Lima, in the Greater BH area.</p> <p><i>Source:</i> Estado de Minas</p>