Misinformation Literature Review: Definitions, Taxonomy, and Models

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Abstract

This paper seeks to review definitions, taxonomy, and models of mis/disinformation from multidisciplinary perspective. With fast developing internet, social media and online platforms are key channels for people to communicate and exchange information. Mis/disinformation is being spread vastly at the same time. Especially during the outbreak of the pandemic COVID-19, false information found online has led to serious consequences. The term "infodemic" was created as a result people died from COVID-19 related misinformation. However, little agreement has been reached from different disciplines. Researchers coming from distinct fields have come up with various taxonomy and models to characterize mis/disinformation. Moreover, the definition of mis/disinformation, false information, or fake news are still ambiguous. Therefore, it is important to review the existing literatures of mis/disinformation to help battle the ongoing infodemic.

Keywords

1. Introduction

The development of social media platforms and communities online have brought people the most up-to-date information and connected one another. However, social media and online platforms have also exposed people to misinformation, which have already led to severe consequences. According to Vicario (2016), the World Economic Forum has listed Digital misinformation as a serious threat to our society [1]. Moreover, during the outbreak of COVID-19, World Health Organization has held conferences to combat "infodemic" that vastly produces and spreads misinformation online regarding COVID-19 (Brennen, Simon, Howard, and Nielsen, 2020) [2]. Researchers have argued that COVID-19 misinformation circulated online makes people feel less serious about the virus (Ingraham, 2020) [3]. Some misinformation could bolster fear, drive social disaccord, or even lead to the direct damage (Shahi, Dirkson, & Majchrzak, 2020) [4]. Therefore, people must identify, and combat misinformation vastly spread in our online community. To be able to do that, we need first to understand what misinformation is.

In this literature review, the primary focuses are reviewing definitions and different frameworks of false information and mis/disinformation. This paper will first identify definitions of misinformation or disinformation from different fields and provide a general definition. Then, it will summarize different types of false information and mis/disinformation from previous literature. Lastly, the paper will discuss different models regarding sources, mechanisms, and different measures of misinformation.

2. Definitions

Many researchers from different disciplines have provided definitions for misinformation and distinguished between misinformation and disinformation. According to Chou et al. (2020), the author from the public health field defined misinformation as "false or inaccurate information regardless of intentional authorship." In this definition, misinformation is simply referred to any sort of information that is false [5]. It does not matter if the author provides the misinformation incautiously or with intent. Thai, Wu, and Xiong (2020) from data science discipline categorized misinformation as unintentionally spread misinformation and intentionally spread misinformation to make clear of the author's intent [6]. Moreover, from the science field, the authors used the term "disinformation" to replace "intentionally spread information" and defined it as "a specific type of misinformation that is intentionally false." Disinformation is considered as a subcategory of misinformation (Scheufele & Krause, 2019) [7].

However, in the field of communication, the authors made a distinction between misinformation and disinformation. Tandoc, Lim, and Ling (2018) defined misinformation as "the adverting sharing of false information," whereas disinformation is "the deliberate creation and sharing of information known to be false." The authors emphasized that the difference between misinformation and disinformation is the author's intent. Lastly, there are research articles that provide interdisciplinary definitions of misinformation and disinformation [8]. Southwell, Thorson, and Sheble (2018) also considered disinformation as a type of misinformation with the author's intent to mislead [9]. This definition aligns with the ones provided by Scheufele & Krause (2019) from the science journal. Waldle and Derakhshan (2017) also provided an interdisciplinary definition that misinformation is "when false information is shared, but no harm is meant," and made it distinct from disinformation [7] [10].

3. Types of False Information and Mis-/Dis-information

Previous literature has attempted to identify different types of misinformation. Many researchers have used various terms, such as false information, mis/dis-information, and fake news. Although all terms above aim to address false or misleading content, they are still slightly different. This section will summarize several taxonomies of the terms above and discuss why we should refrain from using the term "fake news." Waldle (2017) puts misinformation and disinformation in seven categories from the least harmful to most harmful to mass audiences: satire and parody, false connection, misleading content, false context, imposter content, manipulated content, and fabricated content. False connection happens when the headlines or captions do not match the content, whereas false contact is the content is being spread with false contextual information. Manipulated content is different from fabricated content because manipulated content happens when genuine information is manipulated while fabricated content is the creator making up new content that is 100% false [11].

Satire and parody are the least harmful type of mis- and dis-information because it has no intention to cause harm, but it could potentially cause misunderstanding. However, Southwell, Thorson, and Sheble (2018) discussed whether satire and parody should be considered a type of mis-/dis-information. The authors argued that satires' creator does not intend to mislead the audience; therefore, satires should not be considered disinformation. As for misinformation, although satire could lead to the audience misunderstanding the content, Southwell, Thorson, and Sheble (2018) encouraged us to think about "what ought to be" in a satire. Although the audiences may misread the satire temporarily by its literal meaning, the satire authors usually express their demands of political or social change, which does not fit the definition of misinformation. Southwell, Thorson, and Sheble (2018) also made a distinction between satire

and self-proclaimed satire websites that place misleading information in jokes. The latter one should be considered as disinformation as it intentionally misleads the readers [9].

In the article written by (Zannettou, Sirivianos, Blackburn, & Kourtellis, 2019), the authors provided a taxonomy of false information. The definition of false information overlaps with mis- and dis-information; however, false information also extends to propaganda and conspiracy theories. The authors provided eight types of false information: fabricated, propaganda, conspiracy theories, hoaxes, biased or one-sided, rumors, clickbait, and satire news. Similar to the taxonomy provided by Waddle (2017), fabricated contents and satire news are considered to be both mis-/dis-information and false information. Different from Waddle (2017), Zannettou, Sirivianos, Blackburn, & Kourtellis (2019) considered propaganda as a special instance of fabricated content that has a political context. Conspiracy theories are a type of false information that tries to explain a situation "by invoking a conspiracy without proof". Moreover, hoaxes are the false or inaccurate information is presented as legitimate facts, and biased or onside is when the story is extremely biased toward one person or party. The authors also defined rumors as stories that are ambiguous and unconfirmed. Lastly, clickbait refers to the use of misleading headlines on websites [11] [12].

The types of false information provided by Zannettou, Sirivianos, Blackburn, & Kourtellis (2019) are similar to different types of fake news in the articles suggested by Tandoc, Lim, and Ling (2018) and Benedictine University (2020). Tandoc, Lim, and Ling (2018) provided six types of fake news: news satire, news parody, news fabrication, photo manipulation, advertising and public relations, and propaganda. Unlike taxonomies provided by other articles, Tandoc, Lim, and Ling (2018) introduced advertising and public relations as one type of fake news and defined it as the false content created by public relations companies to sell or promote a product [8] [12]. Furthermore, Benedictine University (2020) provided four types of fake news on the university website, including fake or false content circulating on social media platforms. These websites have misleading and unreliable information, clickbait, and satire and comedy sites [13]. Although some types of fake news addressed the ones mentioned in mis-/dis-information and false information, fake news is rather complicated and ambiguous. Previous literature, such as the article written by Molina, Sundar, Le, and Lee (2019), have pointed out the problem of saying fake news. First, Molina, Sundar, and Le (2019) may not refer to false information because politicians have weaponized this term and extents the falsehood to non-news content, such as comments that they dismiss. Second, both articles suggested that the intent is not clear in the fake news, and misinformation and disinformation could indicate the author's intent more clearly [14].

4. Models of Misinformation

Researchers from previous literature have come up with different models to explain the source, spread mechanism, and reasons for mis- and dis-information. First, Molina, Sundar, Le, and Lee (2019) have proposed a model for online fake news detection. The detection taxonomy is determined by language characteristics and linguistic properties. The model first differentiates between real news and fake news to better identify different types of fake news. The model identified seven categories of misinformation detection, including false news, polarized content, satire, misreporting, commentary, persuasive information, and citizen journalism. Commentary and citizen journalism are included in the misinformation detection model because the information was often created by freelancers and citizens. Moreover, some of these reports are not verified and inaccurate [14]. Second, Rubin (2019) came up with a model called disinformation and misinformation triangle, which adopts a model from pathology and epidemiology to explain how misinformation is spread. The three elements of the model are susceptible host, a virulent pathogen, and conducive environment. According to Rubin (2019),

virulent pathogen refers to any mis- and dis-information found online. Susceptible host refers to susceptible newsreaders. The fact that only a few news readers will use tools to fact-check every piece of news they read makes them more susceptible to pervasive fake news online. The last element is conducive environments, in which the author argued that the nature of the online network enables mis- and dis-information spread rapidly [15].

Third, Zannettou, Sirivianos, Blackburn, and Kourtellis (2019) suggested that different false information actors create and spread false content to mass audiences. These actors are bots, criminal/Terrorist organizations, activist or political organizations, governments, hidden paid posters, state-sponsored trolls, journalists, useful idiots, "True Believers" and conspiracy theorists, individuals that benefits from false information, and trolls. The authors showed that some of the actors are overlapped with one another. For instance, bot networks could come from criminal organizations to disseminate disinformation, and hidden paid posters are paid to spread false information by political persons. Moreover, useful idiots are the online users who read false information without knowing the organization's goals, while "True believers" are the people who think false information is true [12].

The fourth model is proposed by Waldle (2017), in her article Information Disorder. The author showed three elements of information disorder, including agent, message, and interpreter. The agent mentioned by Waldle (2017) aligned with false information actors suggested by Zannettou, Sirivianos, Blackburn, and Kourtellis (2019). When analyzing the message of mis- and dis-information, Waldle (2017) showed that we need to pay attention to the duration, accuracy, legality, imposter type, and message target. Interpreters of misinformation are also important in terms of what actions have been taken (ignored, shared in support, or shared in opposition). Moreover, Waldle (2017) introduced three phases in the information disorder model: creation, (re)production, and distribution. The author emphasized that we should analyze mis- or dis-information from these three phases. The intents and goals of the people who create the content are fundamentally different from those who reproduce and distribute false content. Lastly, Zhou and Zhang (2004) provided a misinformation ontology and approach misinformation in a holistic style. The ontology includes types of misinformation, motivation, source/target, communication channel, content, start/end date and time, evidence, and confidence. There are several similarities observed in Walder (2017) and Zhou and Zhang (2004). The source mentioned in Zhou and Zhang (2004) is similar to the agent among three information disorder elements mentioned by Walder (2017). Start/end date and time were also brought up by Waldle (2017) as a measure in the message element [11] [12]. In the end, Zhou and Zhang (2004) introduced confidence as one category in the misinformation ontology that focuses on the level of confidence when people evaluate misinformation [16].

The notion of confidence is also brought by previous literature in the science field. Scheufele & Krause (2019) have discussed why people have different levels of confidence when making judgments about a piece of misinformation and what it means for citizens to be misinformed. The authors proposed two answers that people are susceptible to misinformation is due to a lack of understanding of science or holding beliefs that are inconsistent with the best available science. Scheufele & Krause (2019) suggested that there are great differences across US citizens regarding their knowledge about scientific facts; their knowledge is "strongly related to individuals' level of formal schooling and courses completed." Also, people have relatively low epistemic knowledge that they often are not able to provide a correct description of a scientific article. These factors make people more susceptible to science-related misinformation online. The other main reason people fall for misinformation is holding beliefs inconsistent with the best available science. Scheufele & Krause (2019) mentioned that people might hold a willful rejection of expert consensus and even enforce certain conspiratorial views of an event, which makes them more difficult to accept the scientific facts. The model discussed in Scheufele & Krause (2019) is also reflected in the recent research study on COVID-19 misinformation.

Brennen, Simon, Howard, and Nielsen (2020) mentioned that 17% of the COVID-19 related claims found online are related to conspiracy theories. Also, 59% of the posts on twitter are active false reports without direct warning labels in the sample. The authors argue that COVID-19 related misinformation is so pervasive is the result of the absence of sufficient information provided by health authorities [2] [7].

5. Conclusion

Many previous research studies from different disciplines have been defined, categorized, and provided models for mis- and disinformation. However, there is little agreement or inter-discipline on the terms and models used in mis-/dis-information. Researchers use different terms, including fake news, false information, or information disorder, to address the issue of misinformation; however, the meaning of these terms is not entirely the same. As a result, the taxonomy and models proposed by researchers vary greatly and cover different aspects of misinformation. The inconsistency of the framework on misinformation posts a great challenge for the present world when misinformation becomes so pervasive in our community. Researchers from different fields must agree on the terminology, definitions, and frameworks of misinformation to help people become prepared and battle the misinformation online.

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