CHARLES UNIVERSITY PRAGUE

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The impact of behavioral biases on information consumption and trust during the COVID-19 pandemic

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DECLARATION

I declare that I have created the thesis by myself. All sources and literature used have been duly cited. The work was not used to obtain another or the same title. This declaration and consent will be signed by handwritten signature.

In Prague, on: 22/06/2023

Signature:

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INTRODUCTION

There is no denying our world is increasingly dominated by information. An enormous amount of information is printed, uploaded, shared and consumed continuously by an ever-growing number of people. Facing this fact, one of the great challenges of this era will be for us to be able to disentangle and form a judgment on that information in order to decide what to spend our limited time watching or reading, what to trust and what to discard. Many of the behaviors associated with these ultimately crucial decisions are still to be studied however: as information technologies develop and change at a very fast pace, so do our ways to behave towards them. More importantly, what are the consequences of our inclinations and mental states on assessing information? This thesis will aim to evaluate how the messenger bias and information overload impacted our way of consuming and trusting information during what was probably the event most mediatized and who produced the greatest masses of information ever recorded: the COVID-19 pandemic.

The first phenomenon examined is the messenger bias, which postulates that the same message conveyed by different sources will be received and understood differently based on the perceived credibility of those sources. The analysis of this specific bias is warranted by the fact that through the pandemic, habitual ways of behaving toward information and the news have changed drastically. As the number of infections and fatalities grew, our understanding of the disease seemed to be lagging behind, and conflicting information was often observed. As many geographical areas and countries adopted different measures, and as various actors of society took the stand, questions of legitimacy were often at the core of the debate. Understanding who should deliver information in order to "eliminate the noise" and avoid panic and generalized skepticism could help the successful transmission of information and their credibility in the public's eye. Would a doctor or an epidemiologist reassure, or does the number of specialists being publicly wrong crumbled people's trust in their expertise? Would a politician be more trusted than a journalist or a YouTuber during a global pandemic, and what would be the underlying heuristics behind valuing information in relation to who delivered it?

Additionally, the impact of the "information overload" or "infodemic" we witnessed will be studied as the sheer volume of information produced and made available increased dramatically. Information overload can be defined as the state of being overwhelmed by the amount or complexity of information available, making it difficult to identify relevant

information and leading to negative consequences including confusion, disengagement, stress, or the feeling that it is harder to find accurate and trustworthy information. It is no surprise that the climate of uncertainty and anxiety on health-related topics, and more generally the rapidly declining situation worldwide fueled our need to know more, at all times. Furthermore, as states entered into lockdowns and businesses closed, the time spent at home or jobless also played a role in increasing our information consumption.

This thesis aims to understand whether the increase in available information (resulting in information overload) and the messenger bias have impacted our trust in the information we were presented with during the pandemic. By testing specific hypotheses, we aim to determine the extent to which these factors have affected trust towards COVID-related information. To inform the above, a quantitative survey has been used as the main analytic tool. The survey aimed to assess respondent's level of information overload, as well as their trust levels towards information presented by specific messengers. Other relevant information such as habits of consuming information (frequency of consumption, favored medium) were collected for a more comprehensive understanding of the research questions.

A literature review will provide a theoretical framework for the notions of trust, information overload and messenger bias as well as their potential interrelationships. These concepts will be examined within the context of the COVID-19 pandemic, both in a general sense and with a specific focus on France, where respondents were recruited. The subsequent sections will detail the research methodology, survey design and methods used for data analysis and hypotheses testing. The findings will then be presented and discussed, taking into account the limitations of the study. Finally, concluding remarks will be offered to summarize the key insights and implications derived from the research.

1. THEORETICAL BACKGROUND

1.1 Information during the pandemic and implications for the public

A global pandemic is a textbook example of an extraordinary event. As the disease progressed, we witnessed governmental safeguards and international relationships being challenged. Some of our most important institutions were menacing to fall apart as their integrity was questioned. We were faced with ever-growing numbers of infections and fatalities, while simultaneously dealing with societal challenges on a massive scale. What also makes this event extraordinary beyond the magnitude of its impact, is how it has shed light on the difficulty to trigger and maintain positive collective action and avoid the dangers associated with general disbelief in institutions. Early research on the topic unveiled many complexities, as the different factors that can influence trust are various, context-specific and challenging to evaluate simultaneously.

Some have proposed the idea that the intensity of the pandemic might have triggered an effect similar to a "rally around the flag", which enhanced trust levels towards political institutions and political support overall (Schraff, 2020). Others attributed a spike in political trust during the first lockdown to a realization that governments were ready to make hard choices for the greater good (Bol et al., 2020). On the other hand, we observed how quickly this trust could break down and could potentially lead to the negative consequences associated with a "crisis of trust", for instance when officials were spotted while breaking the rules their government were putting in place (Fancourt et al., 2020). As for the consequences of a lack of trust in our institutions, they became evident when the pandemic settled and large parts of populations began to show "vaccine hesitancy". This attitude was flagged by the WHO as one of the 10 threats for global health in 2019 and caused worries in the medical community (World Health Organization, 2019). This brings light to the core of the issue: trust is a necessary component for successful and sustained collective action, however it is complex and dynamic and can easily show a tendency to fragility during crises. It is particularly crucial to understand how trust levels react to particular contexts and environments as they can evolve rapidly, especially during crises.

As the pandemic unfolded, a multitude of well installed habits drastically changed including our relationship with information. It isn't surprising that, facing an unknown disease, a great part of our daily lives has been impacted in ways we could not have predicted. The time spent at home as a result of lockdowns, the changes in work organization through remote working and various closing of business that resulted in parts of the population losing their jobs have

had a wide range of effects on the way we would typically behave in informing ourselves. In addition, the very existence of the disease had an important impact on our information consumption, including a huge increase in news consumption as most people felt that they needed them more than usual (Casero-Ripolles, 2020). Underlying this increase, the global trend in social media usage also accelerated dramatically with 4.2 billion users in 2021, versus 3.8 billion one year before, as social distancing and lockdown measures mechanically increased those figures (Rosen et al., 2022). In the space of a few months during the pandemic, the overall volume of information available and the desire to consume it had expanded massively.

Additionally, previously existing trends such as the spread of fake news seems to have persisted (Patwa et al., 2021), and in correlation with an ambient atmosphere of fear of contracting the COVID-19 have proven to be extremely dangerous. A famous case concerned former US president Donald Trump suggesting during an interview that "injections of disinfectant" in the lungs area were a solution to explore to treat the disease (Dartunorro, 2020), phrase that has led some companies and organizations to produce clarifying statements communicating that their products should never be used in the human body. In Iran, hundreds of deaths have been caused following a fake news stating that drinking industrial alcohol could cure COVID-19 infections (Karimi & Gambrell, 2020). The risks associated with these untrue "myths and rumours" even prompted the WHO to address it in their thirteenth situation report in February 2020, stating the existence of a *"massive 'infodemic' - an over-abundance of information, some accurate and some not - that makes it hard for people to find trustworthy sources and reliable guidance when they need it."* (World Health Organization, 2020).

Our societies will not stop producing more information. However, gaining an understanding of the mechanisms influencing our trust could provide tools to avoid the negative consequences of our new informational paradigm. In the next chapter, we will examine how the volume of information available and its complexity can influence trust.

1.2 Information overload and its impact on trust

The phenomenon of information overload was widely studied, primarily within the field of research in management and information. According to Roetzel (2018, p.480), *"Information (over-)load research peaked in the 1980s and 1990s; interest in this topic quieted down in the 2000s and languished in the 2010s."* Furthermore, he notes that as a consequence of the information technologies revolution (which are still evolving today) the information load of a

business manager has quadrupled twenty-five years after research on the topic had peaked. The rapid and widespread availability of information technologies across the globe, coupled with constant updates to match evolving societal and work habits, necessitates ongoing research to stay up-to-date. In the context of COVID-19, the need for trustworthy and reliable information became critical, highlighting the importance of trust in the information landscape. Let me consider a theoretical framework for understanding trust and its relationship with information overload, firstly by examining recent changes in the global information landscape and then their impact on trust within the context of the COVID-19 pandemic.

To cite a few of the most obvious changes, online newspapers are replacing the need for printed ones, car radios are disappearing to make space to smartphones connected via Bluetooth and video-based social medias are threatening TV channels. These developments involve hundreds of smaller changes, some of them related to new hardware technologies (touch screens and swiping for instance) and some existing within lines of code (algorithms offering different content to different people and at different times). I would argue that those evolutions have developed far beyond simply offering alternatives to the "informational scarcity"[1] of the 70s, when a country like France only offered 2 television channels until a third one was launched in 1973. More than simply increasing the amount of information available, it shaped our relationship with it: anyone can now create, share, react about virtually everything, all the time. My first assumption in light of the above is that the way we behave and consume information, as well as whether we trust it, is evolving along with the systems that make them available.

Acknowledging that our information consumption patterns and trust levels towards that information are dynamic have proven to be crucial during an event of the magnitude and length of the pandemic. Recent research has shown a high number of respondents (49% globally and as high as 76% in China) stating that it was hard to find reliable and trustworthy information about the virus and its effects (Bunker, 2020). Simultaneously, news consumption increased enormously, reaching 92% of Americans frequently accessing news about the pandemic (Casero-Ripolles, 2020). These very high readings on levels of skepticism and information consumption do raise a few worries. Given the rapidity at which our communications technologies have evolved since the internet revolution, it proved very hard for governments and organizations to control the never-ending flow of information coming at us instantaneously

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[1] This scarcity should be considered as relative, as we have traces of "information overload" affecting nobles and academics during ancients and medieval times – a regular person from the 70's undeniably dealt with much more information on a day-to-day basis than our ancestors (Roetzel, p.480).

and continuously. Furthermore, the question of limiting access or free-flow of information is a very tricky one, that could easily be abused, leading to many wrong outcomes and become a threat for our democracies. At scale, when most of humanity is facing an unprecedented crisis and simultaneously consumes information at a much greater pace, the potential consequences of the overload of available information becomes in turn greater.

Previous studies have uncovered many negative effects associated with information overload. For example, that information overload is likely to result in perceiving contradictions between sources, leading to confusion and impacting decision making processes (Hong & Kim, 2020). However, it is important to note that in many researches results were often somewhat divided due to the many external factors that could influence experiments. The multi-faceted nature of the concept has been extensively discussed in the literature, taking the form of many external and internal influencing factors. We can note for instance the type of task performed during experiments, and whether someone is considered an expert in the field he has to take a decision in. A typical example would be personal expertise: it is easier for experts to sort and rank information, as well as discarding what is not relevant (Buchanan & Kock, 2000). Furthermore, the characteristics of the information, its quality and quantity, as well as many personal factors such as personal skills, cognitive style and motivation which are all influencing the existence of information overload (Jackson & Farzaneh, 2012). It is important to note most of these specific factors were studied before the 2000's and the exponential development of information technologies, whose impact is unaccounted. Two important takeaways on the nature of information overload can be derived from the above literature: firstly, it is a multi-dimensional concept that requires to be understood within the bounds of its context and in relation with its numerous influencing factors. Secondly, it is likely affecting us all, and can be experienced as soon as we encounter an unusual amount of information or information that is beyond our regular scope of knowledge and expertise.

The question remains: how to cope with this large amount of information we are not fit to process? It appears that we naturally find the easiest way to make a judgement on it. Research has shown that heuristic processing (as opposed to systematic processing) was positively associated with information overload (Hong & Kim, 2020). Heuristic processing relies on heuristic cues (e.g., characteristics of source or arguments) while systematic processing involves "attempts to thoroughly understand any and all available information through careful attention, deep thinking, and intensive reasoning" (Chaiken et al., 1989 in Hong & Kim, 2020). In summary, when individuals are exposed to complex or over-abundant information, they are

likely to experience more confusion and their decision-making is impaired. Also, as a result, they are more likely to rely on heuristics or mental shortcuts to make judgements about information, including which to pick, and which to trust. In relation to the research question, a first hypothesis can be derived:

> H1: *The presence of information overload will have a negative impact on trust levels towards COVID-19 specific information.*

1.3 The role of trust in picking and valuing information

In today's digital age where our tools and platforms are tailored to our individual preferences, we are faced with the challenge of picking through a large range of sources and content. This situation warrants the necessity to critically judge information according to various factors, which would make it more likely to be relevant and trustworthy.

Recently, it became a crucial objective for big corporations involved in information technologies (social medias and others) to capture as much focusing time from their users as possible. In this paradigm, rational viewers need to expose themselves to the information that they require, and try to discard the rest as much as possible in order to save their limited resources of time and attention. Furthermore, this resource limitation means we have an incentive to ignore many stimuli, and pick only the one providing us with high expected benefits and low expected costs (Tsfati & Cappella, 2003). Trust then becomes a prerequisite for valuable information picking[2]. This translates into the hypothesis that as an information consumer, we need to trust the object of our attention and discard information we distrust. In the event of finding information about a disease, it is evident that the accuracy and credibility of the information we are looking for is of crucial importance. As mentioned previously, fake news about alternative treatments for instance can lead to very costly mistakes. To mitigate the risk, we usually rely on specific mediums which we deem trustworthy and reliable, thus less likely to waste our time and attention (or lead us to negative outcomes).

Deliberate information consumption then starts by deciding where we want to get our

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[2] "*Rational audiences choose to expose themselves to sources that will assist them in gaining accurate knowledge about the world, sources that will benefit, rather than hinder, their political decision making. That is why they should prefer trustworthy news sources.*" (Tsfati & Capella, p.509)

information from. However, even this initial step has an influence on the way we will perceive a given message. As pointed out by Turner in a 2007 paper[3], in the real world, self-selection applies and viewers decide which channel they want to get their news from. This can be decided upon according to political preference (with channels being admittedly conservative or liberal for instance), or more recent developments such as social media platforms targeting and favored by different age groups. To understand the impact of different mediums perception on trust, Turner (2007) experimented by presenting a similar message to respondents, but the channel from which it was supposedly originating was manipulated. As reported in his findings, the message displayed to participants was deemed biased by viewers regardless of their own ideology and to the perceived ideological bias of the channel (Fox News as conservative and CNN as liberal). This indicates the potential power of the messenger: regardless of the viewer's opinion and the content of the message presented, the way the messenger is perceived by the audience will have an impact on the receiver's perception of the message conveyed.

With the emergence of new media and as the COVID-19 pandemic unfolded, it became much harder to map out medias, agendas and biases. Again, a contextualized approach was favored by researchers: the steps leading to favoring a messenger over another are various depending on specific contexts and situations. During the pandemic, most people consumed information through different kind of medias (Igartua et al., 2020; Kostenko et al., 2021). This complicates the task of understanding the underlying reasons behind medium-picking and information consumption, as distinctions can be made among the mediums themselves (eg. Facebook and the World Health Organization website) and among the kind of media they are (eg. written online media and television). To add to this complexity, it is common to find identical content being shared across various places, but with alterations in formatting and presentation depending on the medium. For instance, a comprehensive news article may be shortened when shared as a social media post and be displayed along with a comments section. Each of these factors could influence our perception and likelihood of trusting information, before we even get into reading its content. In order to evaluate people's general trust in information, it is thus necessary to examine the current popularity and credibility attributed to various messengers, medias, and mediums.

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[3] *"Although viewers can be assigned to particular viewing conditions in the laboratory, self-selection operates in the real world. One manifestation of self-selection is that some liberals avoid watching FNC, and some conservatives steer clear of CNN." (Turner, p.456)*

As shown in the graph below, there is a clear trend of increasing distrust towards legacy media. It is most impressive in the case of TV and press, for which the respondents stating they had hardly any confidence in them respectively doubled and tripled in the last decades. Lack of confidence on the topic of medicine observed an increase in comparable proportions, from 6% to 13% during the peak in 2018. On medicine specifically, it needs to be pointed out that as the data collected is from the United States, it is likely that the social security ongoing public debate has strongly impacted the opinion in the recent years. Confidence on the scientific community however has barely shifted in the same timeframe, which points to the fact that in parallel of a growing distrust in legacy media and in medicine, trust in doctors and health specialists is still holding strong. A sharp decrease in distrust in medicine has been observed in 2021 along with the beginning of the vaccination campaign, however distrust in TV and press stayed roughly unaffected and continued to trend upwards.
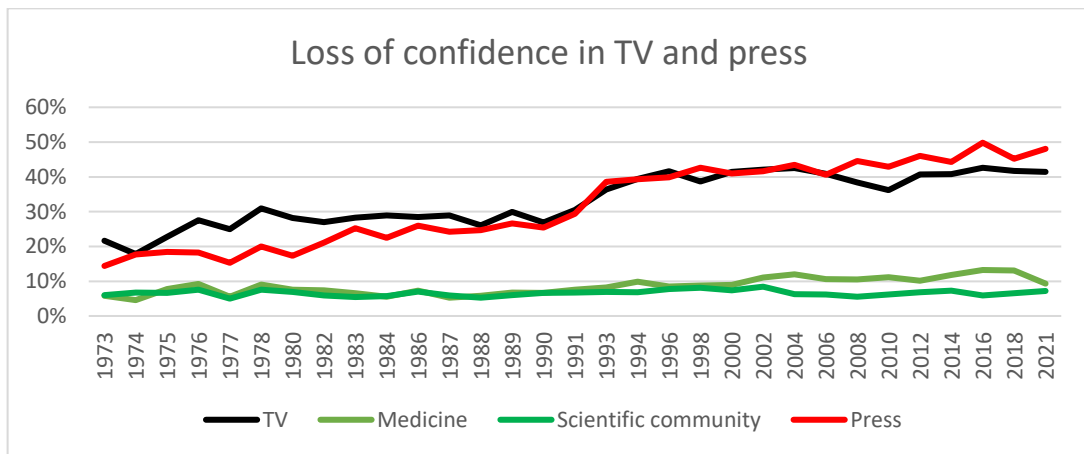

Fig.1: Proportion of respondents (%) reporting "Hardly any confidence" on specific medias and institutions, 1973-2021 GSS

It is interesting to note that those clearly increasing sentiments of distrust among the public are coinciding with the sharp increase in available information starting in the 1990's. The increase did not slowdown in more recent years, as new technologies allowed anyone with an access to internet to produce and display information. The popularization of those new messengers, in most cases not held by any kind of peer-to-peer review system or deontological concerns thus coincides with a sharp increase of skepticism towards legacy medias and institutions. Regarding distrust in health-related institutions, studies had already put forward that increased medical literacy in the public could be one of the reasons for lowered overall confidence in doctors and

health professionals[4] (Pescosolido et al., 2001). These findings echo back to the negative impact of information overload previously discussed, as increasing amount and complexity of health-related information could have influenced this growing distrust.

Concerning distrust in legacy media, there is no doubt that the skeptic viewer has now seemingly unlimited options in picking sources of information. Past studies have shown exactly that: people tending to be more skeptic of mainstream media tended to consume more of non-mainstream media, and less of mainstream media (Tsfati & Cappella, 2003). However, Tsfati and Capella's paper was published twenty years ago, and a great deal of change has happened since within the original distinction they made between mainstream and non-mainstream sources: the latter originally included radio shows that allow for listeners to call in and participate to debate along with online news, a classification that could easily be challenged in today's standards. As the range of available sources has expanded greatly, I would argue that the weighting of non-mainstream sources against the total amount of existing sources is increasing gradually with new trends such as user-generated content. In most recent times, we can also mention the advances of text-generating artificial intelligences that are instrumental to enabling the flooding of platforms in need of continuously creating new content.

Today, every major mainstream source of information is also present online, and radio shows would be pretty much relegated to a mainstream classification as they could be opposed to non-mainstream independent online podcasts for instance. For the present study, a more recent distinction between medias has been followed to reflect the changes in technology and news consumption habits, borrowed and amended from a study on public awareness and confidence during COVID-19 (Kostenko et al., 2021). This division of medias in four blocks and designed for health-related contexts separates professional information (World Health Organization, specialized health websites, ministry of health...), informal information (Face to face or digital conversations with family and friends, messaging apps…), social media or informal online sources and traditional media. It is necessary to acknowledge that the modern specific tailoring of media to individual usage means that many ways to classify medias could be imagined, as their content and attached meanings could easily overlap or prove contradictory.

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[4] *"Most prominently, the work of Haug and Lavin suggested that increasing medical knowledge in the public had combined with a greater skepticism to affect the professional power of medicine (e.g., Haug 1973, 1988; Haug and Lavin 1983; Lavin et al. 1987)."* (Pescosolido et al., 2001)

1.4 The messenger bias impact and relationship with trust

The messenger bias phenomenon implies that the credibility and characteristics of the messenger can influence how information is interpreted and evaluated by its receiver. Also, the many individual perceptions (as well as various environmental and societal factors) of credibility will impact acceptance and trust in different manners depending on the information presented. It is necessary to examine these factors in order to better understand the broad context in which information is transmitted and received.

Source credibility and the messenger bias are challenging topics to study as their components are influenced by and influencing each other's. The nature and context of the message, the messenger and the channel or medium through which information is conveyed are all crucial factors that have the potential to influence the receiver's trust. On the study of credibility, Self states: *"Credibility is a long-studied construct with a literature that is "plentiful, contradictory, and confused"* (Self, 1996, p.421). One of the main challenges in studying credibility and trust lies in measuring them effectively. In an introductory overview mentioning the criticism on the use of scales to measure credibility of messages and messengers, Roberts explained that although subject to criticism, these scales are still utilized because they effectively quantify abstract constructs and have been proven reliable and valid. Researchers use these scales as they haven't found a better alternative for measuring credibility (Roberts, 2010).

Interestingly, upon experimenting on numerous widely used items in these scales (is the messenger/message accurate? Is it fair? Is it biased?) Roberts have found that the item influencing the most both messenger and message credibility was trust (can this messenger/message be trusted?). This indicates not only that trust is an essential variable for credibility, but also that perception of messenger and message are intertwined. It is important to note that all the other items of the scales studied also shown some level of correlation in assessing credibility of a messenger and a message simultaneously. Perceived bias in a messenger would also make the message they convey appear biased, which was found to be also true within the context of delivering political news (Miller & Krosnick, 2000).

These findings make it clear that when studying credibility of a message, researchers are also dealing with its messenger's credibility and vice versa. In light of this context, I argue that to investigate differences in trust levels due to a messenger's credibility, either the messenger or the message should be manipulated. In the same fashion as a pioneering study on the influence

of source credibility (Hovland & Weiss, 1951), I think that choosing to present the same message but coming from a different source to separate groups of respondents would be the best way to assess the impact of the messenger bias. It is easy to think of who we would trust most on an individual level, but much more complex to generalize it to every context's specificity. As in the real world we often lack evidence to make a clear-cut decision on whether we value and trust a messenger, we again have to rely on heuristics influenced by various social factors to assess messenger's trustworthiness.

In their paper focusing on the scope of organizations, Menon and Blount have introduced a framework highlighting the importance of relationships (their quality and their nature) in connection with the way knowledge is transmitted and valued. Some of the concepts introduced include the fact that ideas birthed in an "in-group" will be heuristically evaluated as "good" information by their members without any kind of in-depth analysis (Menon & Blount, 2003). On the opposite, information and knowledge transmitted through "out-group" members (that can be enemies, or outsiders for instance) will equally be devalued[5]. Within organizations thriving for productivity, it is vital to ensure that the right information is passed down and valued as such: the relationship between the "knowledge messenger" and the "knowledge receiver" hence takes a strategic importance. Most of the points touched in their study relate to view of organizations based on this relational model, aiming to help successful communication between managers, employees and other actors.

Firstly, and in relation to the present study, my hypothesis is that like in organizations, the preexisting relationship between an information consumer and the messenger delivering the information impacts the value attributed to the information. Secondly, I claim that heuristic evaluations of different messengers within different contexts play a crucial role in information valuation, and can lead to higher levels of distrust in the message if the messenger is generally perceived as untrustworthy.

Research has shown that the public generally trusts medical doctors and scientists as credible sources of risk information (Frewer et al., 1996). The positive consequences of trust are very real: the perceived credibility of health-related information is positively associated with compliance with preventive measures and vaccination decisions. During the COVID-19 pandemic, trust in public health authorities and medical professionals has been crucial in

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[5] It is important to note the actor's location in one group or another is not static (p.173) – within the new media landscape and internet, we can imagine an even greater dynamicity.

shaping people's behavior and attitudes towards the disease. A study conducted in Finland found that distrust in sources providing information on COVID-19 was associated with unwillingness to engage in behaviors that protect against the disease (Soveri et al., 2021). Once again, this is a testimony to the fact that the credibility we grant to both messenger and message are intertwined. A lower level of trust towards a given source will impact the credibility of the message it delivers, potentially influencing the resulting behaviors adopted by the public.

Further research has shown similar findings even outside of the context of health crises, proposing an understanding of source credibility based on the messenger's perceived traits. A study found that expertise was essential to communicator's credibility, and that audiences would view trustworthiness as the motivation to be truthful (Fiske & Dupree, 2014). This study also concluded that people decide very quickly of others apparent intent, and symmetrically those that are seemingly on their side are deemed warm and trustworthy. This could be an explanation on why the scientific community, doctors, and researchers, who are experts in their fields and often seen as neutral actors working for the common good, are viewed as trustworthy sources of information. Of course, these findings do not deny the fact that specific messengers can be seen as trustworthy for other reasons, such as a television host that has a long history with viewers and gained their trust over time, and could definitely be seen as trustworthy for various reasons. However, this counter example is mitigated by the fact that new media has dramatically reshaped the information ecosystem in recent years, resulting in a much more dynamic landscape constantly offering new messengers and mediums.

On the other side of the popularity spectrum, there is a lot of distrust towards politicians, government officials, and journalists. A study conducted in 2018 have shown that politicians are considered dishonest much more often than honest (sometimes by a factor superior to three) across all communications contexts, ranging from public speeches to social media communications (Enli & Rosenberg, 2018). This finding is meaningful as it shows that messenger credibility can overcome medium popularity in the case of polarizing messengers. Media and journalists are also usually considered as untrustworthy sources of information, as evidenced earlier by the sharp decline in trust and popularity in the last decades. Another 2004 study found that an alarming number of Americans no longer trust the media to report the news fairly, another important item used in different credibility scales (Jones, 2004). It needs to be stated that trust and its underlying mechanisms are complex and can be ambiguous: Jones further states various factors that explain individual-level variation in media trust, and one key factor appears to be trust in government. This suggests that media's low credibility may result

from general political disbelief (Jones, 2004), in line with the fact that politicians and government officials are also generally deemed as untrustworthy.

Finally, the relationship between journalists, media outlets and the public has recently been complexified by several developments, some of them already discussed in earlier chapters. Internal and external evolutions have taken place at scale, including the growth of user-generated content and the pursuit of audience engagement at the cost of accurate reporting. This has, among other factors, contributed to a decline in trust towards journalists and legacy media as an institution.

Having identified messengers that are generally considered either trustworthy or untrustworthy allows me to formulate a second hypothesis:

> *H2: The messenger bias has a significant impact on trust levels, with respondents being more likely to trust COVID-19 related information from a trustworthy source compared to an untrustworthy source.*

1.5 The pandemic context in France

A striking example of how messenger credibility became an obvious challenge at the height of the pandemic in France was the work and person of Didier Raoult. The professor, physician and microbiologist specialized in infectious disease is holding an impressive list of scientific achievements, ranging from being awarded numerous scientific awards, having a bacteria genus named in his honor and being previously ranked as Europe's most cited microbiologist with more than 2,600 indexed publications and 200,000 citations to this day (Google Scholar). On the 16th of March 2020, he published the results of a trial that uncovered that an inexpensive drug (hydroxychloroquine) routinely used to combat malaria could speed up healing and decrease contagiousness of COVID-19 (Connexionfrance.com, 2020).

At this stage of the pandemic, the effect of this announce were massive: the French minister of health immediately refused to endorse the study on the basis that it was a standalone study that tested only twenty-four participants. However, great parts of the public opinion had already shifted on the professor's side, as the government was under fire after being criticized for their management of the pandemic. Throughout the following months, a heated debate was underlying every discussion around a possible cure for the disease and around the person of Didier Raoult: the message and the messenger were inextricably linked. His authoritarian

personality and methodology were pointed out by his critics, and his extensive expertise and career were cited by those defending the potential of his findings. The complex scientific content of the study was continuously discussed by non-experts from both sides, basing most of their beliefs on the messenger character. Many investigations followed this first mediatic rumble, which are still ongoing more than three years after the first publication of the trial. In that specific case, it would be hard to evaluate the impact the messenger's bias had, however I believe it has played a role in complexifying the deliverance of health-related news in the country throughout the pandemic.

France also faced several scandals and controversies that impacted the general social situation and public trust. In the early stages of the pandemic, the French minister of health publicly stated that masks should not be worn by the non-diseased population as their efficacy was not proven. Later and facing an increasing demand for protective equipment, he stated that a penury of masks was "not a topic", before a parliamentary investigation concluded that the French stock of respiratory masks decreased from two billions in the late 2000's to a hundred millions before the pandemic (Public Sénat, 2022). This exacerbated public concerns that the government was not telling the whole truth, and did not do the necessary to protect hospital and healthcare workers. Protests against lockdown measures and the instauration of a "health pass" proving vaccination status or non-infection often gathered hundreds of thousands of people across the country.

Vaccination was another polarizing topic, both as French people were Europe's most hesitant to get the vaccine as of April 2020[6] and as the government was heavily criticized about the slowness of the vaccination campaign[7]. Another scandal included officials and high-ranking administrators benefitting from "special favors" and getting vaccinated while part of the healthcare professionals at risk were still on waiting lists (Pair, 2021). In relation to the present study, the government was continuously struggling to have people adhering to recommendations and attempted to use different messengers to appeal to certain part of the population. The French president Emmanuel Macron reached out publicly to a duo of YouTubers very popular among the younger demographics (more prone to vaccine hesitancy and less likely to follow preventive measures), and challenged them to produce a video emphasizing the importance of following protective behaviors. The video quickly became viral

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[6] in relation with the number of deaths, hospitalizations, and reanimations of other European countries. Vaccine hesitancy kept growing in the next 6 months in France.
[7] Less than 1000 people vaccinated in France as of January 4th 2021, against more than 200000 in Germany and 85000 in Italy.

and cumulated 3 to 4 million of views per day after it was published (Lachasse, 2021). Although the impact this video had on its targeted demographic is hard to gauge, it is clear that the government had recognized the importance of picking the right messenger during this sensitive period.

Overall, the social situation in France during the pandemic was one of defiance, and proved to be hard to navigate for the institutions meant to communicate critical information and preserve public trust. As the sample of respondents used in this study was selected in France, it is important to keep in mind the various controversies and polarizing topics that have heavily influenced the public's opinion and trust of their government and institutions.

This chapter has explored the relationship between the messenger bias and trust, focusing on the specific French context and actors. It is an example of how the information presented to the public during the pandemic has influenced trust, both at the interpersonal and institutional levels. This raises questions about how our thought process (characterized by our ever-limited access to information), are affecting our decision-making process (trust), which will be examined in the next chapter.

1.6 Bounded rationality and trust

Scholars have proposed various definitions of trust, each emphasizing distinct aspects of this complex concept. One popular way of understanding trust is through a rational lens, where trust is seen as a calculated decision based on a rational assessment of the trustworthiness of others. In this perspective, trust is viewed as a strategic choice that individuals make in order to enable future positive outcomes. Rational trust is often associated with economic transactions and contractual relationships, where actors engage in exchanges based on their respective expectations and desired outcomes. The rational view of trust usually adopted in social sciences however requires to be nuanced: Herbert Simon's theory of "bounded rationality" recognizes that human decision-making is influenced by a number of limitations, including cognitive limitations, time constraints or the availability and quality of information (Simon, 1957).

When it comes to deciding whether to trust information or not, it is likely that these limitations are consistently present regardless of context. Our understanding and access to information are rarely definitive, and trust inherently involves a temporal element because when we trust, we essentially choose to believe in a certain likely outcome. However, it can be argued that these limitations exist on a broad scale, and that during the COVID-19 pandemic, most of these

elements were exacerbated. The overwhelming volume of information made it challenging to find trustworthy sources according to our regular heuristical framework of trust giving. Furthermore, the information we were seeking was often related to health and science, which increased the difficulty in understanding it at its core. This led us to rely on second and third-hand accounts that are more susceptible to manipulation or misunderstanding. The non-linear progression of the disease along with rapid and significant societal developments such as lockdowns, treatment advancements and economic consequences amplified the importance of the decisions we had to make. It also gave them a sense of finality, as they were often presented as directly impacting our near future with potentially life-threatening consequences.

Furthermore, the consequences of the pandemic evoked stronger emotional responses, further complicating the individual factors influencing trust. External factors, particularly the impact of social media usage and overall information consumption, amplified emotional reactions and associated negative outcomes. Research indicates that increased use of social media during COVID-19 corresponded to stronger emotional responses overall. Excessive exposure to online news for instance has been found to increase stress, however heavy social media users also displayed more trusting behaviors, potentially as a coping mechanism. This highlights the influence of modern technology and its role in shaping heuristic processing, as our current utilization of new media likely moderates numerous factors involved in decision-making (Jones et al., 2021).

In the rational framework, a common way to conceptualize the mechanism of trust is through a risk-reward model, where individuals weigh the risk of trusting against the potential rewards of the outcome. Once again, during crises like the COVID-19 pandemic, our perception of risk is significantly impacted. Environmental, social, and cultural factors play an important role in assessing risk and achieving a satisfactory level of rationality in order to make decisions. Research has demonstrated that specific factors related to institutional trust and distrust, such as trust in government and distrust in mainstream media, can influence our perception of risk in different ways. Higher trust in the government may produce a sense of control over the disease, reducing the frequency and intensity of both emotional and cognitive responses. Similarly, individuals who obtain information from non-mainstream sources were found to exhibit stronger emotional responses (worries) without necessarily having a stronger cognitively assessed perception of risk (Xu, 2021).

The commonly adopted rational view of trust thus needs to be nuanced by considering the limitations to our rational process. Decision-making is impacted by various factors, likely exacerbated during COVID-19. The increased volume of available information, especially in the health domain, and the non-linear progression of the pandemic have contributed to complexifying trust-related decisions. External and internal factors, such as social media usage and risk perception are influencing our emotional responses. Consequently, this impacts the mechanisms governing our decisions to trust or distrust as well as the way we use heuristics to facilitate our decision-making process.

The previous chapters have highlighted the complex interplay between information consumption, trust, messenger bias, and the challenges of information overload during the COVID-19 pandemic. A significant increase in information consumption happened due to factors such as lockdowns, remote work, and a general climate of uncertainty. Information overload results in many different consequences, including a difficulty to identify relevant and trustworthy information and impaired decision-making. To cope with the generally difficult context and increased amount of information, heuristical processing (as opposed to systematic processing) of information is prevalent. Trust plays a crucial role in selecting and valuing information, especially in the digital age, where a vast range of sources and content are available. Trust or distrust in a messenger or a medium significantly influences the perception of the presented information.

During the pandemic, trust has also been influenced by the messenger bias, where the perception of different messengers affects how information is received and judged. The credibility and expertise of different messengers plays a role in the way individuals perceive and assess the information they are exposed to, ultimately impacting the ensuing decision-making processes. Trust in institutions has shown both positive and negative fluctuations during the pandemic, highlighting the importance of the temporal factor. At different times, researchers observed a potential increase in trust due to a "rally around the flag" effect, or among individuals being generally trustful of their governments. However, trust can quickly decrease when the context changes or when a messenger's credibility is low. Additionally, the spread of fake news and misinformation linked to recent technological advances has further exacerbated trust issues.

The emergence of new media platforms and the COVID-19 pandemic have made it more challenging to make sense of our wide range of media and of their various agendas and biases. Different contexts and situations affect medium-picking and information consumption,

consequently impacting trust in the information presented. Legacy media, particularly television and press, have recently shown to be greatly distrusted by the public, while trust in the scientific community, doctors, and health specialists has remained relatively stable in comparison. In the next section, an overview of the research design and methods used to analyse the gathered data and test the hypotheses will be provided.

2. METHODOLOGY

Parts of the methodology aggregates methods from previous studies conducted both during and outside the context of the COVID-19 pandemic, on the topics of source credibility and information overload.

Information overload requires to be studied in context and in relation to the nature of information among other factors. Within the health domain, most information overload research has been done on the topic of cancer information especially. For this reason, I have adopted a similar approach to recent studies on information overload during COVID-19 (Breyton et al., 2022; Hong & Kim, 2020). These studies amended a widely used scale developed for research on cancer information overload (Jensen et al., 2014).

To measure the impact of the messenger bias, I have adopted a comparable approach to a landmark paper on source credibility (Hovland & Weiss, 1951) to investigate the influence of the source on respondent's trust levels. Two random groups of respondents were presented with the same information, coming from a manipulated source and were asked to rank their trust towards the information presented. See Appendix A for a full overview of the survey.

2.1 Research Design

Analysis will be performed using data collected from a survey distributed to two randomly selected groups of respondents. Both groups will answer questions on their level of trust towards COVID-19 specific information, with group 1 being presented with information coming from sources generally seen as untrustworthy and group 2 from sources generally seen as trustworthy. Both groups will also answer questions aiming to assess their level of information overload during COVID-19, and questions related to their frequency of information consumption and favored media. This approach allowed for a more comprehensive understanding of the research question and helps to identify potential differences in trust levels between the two groups based on their exposure to previously identified trustworthy or untrustworthy messengers as well as external factors potentially impacting trust or relationship with information.

Data Collection

The data collection method used for this study was an online survey shared through the social media platforms Facebook, Reddit and Twitter. After clicking on the survey link, respondents

were randomly redirected to one of the two surveys created for group 1 and 2 in order to have an even number of answers for both groups. The survey consisted of four blocks of questions, summarized here.

The Likert scale used in the questionnaire was the following:

1 – Strongly agree

2 – Tend to agree

3 – Tend to disagree

4 - Strongly disagree

Demographics

Age and gender of the respondents were collected.

Information usage

Four information were selected on the basis of media headlines or public statements occurring during the COVID-19 pandemic. The specific statements were chosen only if they concerned topics less likely to be polarizing and uncertain statements to mitigate the effect of strong personal opinions or hindsight bias. I avoided for instance statements about the effectiveness and usefulness of vaccines or lockdowns. Respondents were asked to answer with the level to which they trust that information on a 4-points Likert scale. They included the following:

"We do not think herd immunity is achievable because the virus will continue to mutate, escape the protection of vaccines and then infect people." (source)

"Avoiding using cash and opting for contactless payment methods will greatly reduce the spread of the virus" (source)

"Using UV lamps or other disinfection methods will effectively kill the virus on surfaces or in the air." (source)

"COVID-19 can potentially become a seasonal virus like the flu." (source)

Group 1 received questions from a source I previously identified as generally untrustworthy (television host, politician, journalist, government official) and group 2 received questions from a source identified as generally trustworthy (doctor, health specialist, member of the scientific community, scientist).

Information overload:

Respondents were asked to rank the degree to which they agree to six statements aiming to assess levels of information overload within the context of COVID-19 (see appendix A).

Sampling

The survey was conducted online to reach a larger sample size and for facility of data collection, and was limited to a single country in an attempt to reduce sample bias. It was distributed to a convenience sample of respondents who were recruited via social media platforms. The inclusion criteria for participants were that they were 18 years or older, living in France and had access to the internet. Upon clicking the link provided, respondents were randomly redirected to one of the two forms. The questionnaire was fully anonymous thus avoiding concerns related to data privacy and safety.

2.2 Data Analysis

To analyze the data and test the hypotheses, several statistical methods were employed. Data (per variable and group) was tested for normality using a Shapiro-Wilk test that evidenced a violation of the assumption of normality, thus non-parametric tests were used for analysis and hypotheses testing.

To explore the relationship between information overload and trust levels within each group (H1), Spearman's rank correlation coefficient (rs) was calculated to assess the strength and direction of the association between the two variables. To examine the difference in trust levels between group 1 and group 2 (H2), a Mann-Whitney U test was conducted. Additionally, the effect size r was computed to determine the magnitude of the difference in trust levels between group 1 and group 2.

Finally, additional Mann-Whitney U tests were performed to investigate the influence of information consumption frequency on perceived information overload and trust levels. The next chapter will focus on the analysis and presentation of the data collected from the survey, from an overview of the descriptive statistics to hypothesis testing and inferential statistics.

3. RESULTS

3.1 Descriptive statistics

Answers to the questionnaire were collected during the timeframe 22/03/2023 until 18/04/2023. A total of 178 questionnaires were submitted (89 for each group). Respondents ranged from 19 years old to 62 years old, with a median of 25 years old and a mean of 28 years old, much younger than the averages of French women (44 years old) and men (41 years old). They included a majority of women (59.6%) versus men (40.4%). Every question was mandatory and the form and associated replies could not be submitted unless it was complete. All 178 respondents agreed to the informed consent and submitted the form in its entirety. The table below summarizes the answers to the demographics block of the questionnaire.

Demographics			
Gender	Male	72	40.4%
	Female	106	59.6%
Age range	<20	8	4.5%
	20-24	56	31.5%
	25-29	80	44.9%
	30+	34	19.1%

Table 1. Demographics

Respondent's information sources and patterns

In Group 1, participants demonstrated diverse preferences for primary media sources during the pandemic. Among the respondents, the highest percentage (39.3%) favored traditional media, including press, TV, and radio. Social media and other internet sources were selected by 31.5% of participants. Health specialized media, such as WHO, specialized health websites, and ministry of health, emerged as the primary choice for 21.3% of respondents. A smaller proportion (7.9%) primarily relied on face-to-face conversations with family and friends, as well as messaging apps like Whatsapp and Telegram.

Similarly, in Group 2, respondents exhibited comparable diversity in their media usage patterns. The majority (50.6%) preferred traditional media, while social media and other internet sources were the primary choice for 22.5% of respondents. Health specialized media were preferred by 18.0% of respondents. Face-to-face conversations and messaging apps served as the primary media sources for 9.0% of respondents.

Regarding the frequency of information consumption, a significant majority of respondents in both group 1 (82.0%) and group 2 (83.1%) reported obtaining information on a daily basis or

multiple times a day. A smaller proportion (13.5% in group 1 and 15.7% in group 2) indicated accessing information a few times a week. Only a few respondents (4.5% in group 1 and 1.1% in group 2) reported obtaining information less than a few times a week during the pandemic.

Trust on specific information

On average, respondents rated their trust levels towards the information presented by the generally seen as untrustworthy source as 2.34 out of 4, while their trust levels towards the generally seen as untrustworthy source were rated 2.08 out of 4. This indicates a potentially significative decrease in trust levels among the respondents presented with information coming from an untrustworthy source, and likewise higher trust levels among respondents presented with information coming from a trustworthy source.

The statements themselves seemed to have impacted each group average trust levels in a symmetrical manner if we look at their respective ranking: "COVID-19 can potentially become a seasonal virus like the flu." received the highest trust levels for each group (G1 = 2.16, G2 = 1.99) which could be explained by the fact COVID has indeed proven to comeback somewhat seasonally during later parts of the pandemic. Similarly, "Using UV lamps or other disinfection methods will effectively kill the virus on surfaces or in the air." was reported as the least trusted statement for both groups (G1 = 2.62, G2 = 2.16). This could be a consequence of the fact disinfection methods were mostly discussed during very early stages of the pandemic when fear of infection was at its peak, and became a lesser concern subsequently.

The most comparable mean scores between the two groups concerned the fourth question "We do not think herd immunity is achievable because the virus will continue to mutate, escape the protection of vaccines and then infect people." (G1= 2.28, G2= 2.12) which further shows that statements on which respondents arguably had the most hindsight on (as France did not in fact reach herd immunity) reduced variance between groups mean scores.

Information Overload

Both groups of respondents exhibited relatively similar levels of perceived information overload (G1 = 2.06, G2 = 2.12), which are considered high on the scale used.

Overall, respondents that used social media as their primary source of information during the pandemic suffered from the highest levels of information overload (M = 1.95, n = 48) followed by those who favored health specialized media (M = 2.03, n = 35). Respondents that primarily used traditional media followed (M = 2.17, n = 80) and those favoring face to face and

interpersonal conversations with friends and family perceived information overload the least (M = 2.21, n = 15). However, the results of a Kruskal-Wallis test have shown the differences were not statistically significant (H (3) = 5.58, p = 0.13).

A sizeable and statistically significant difference between groups was observed for those primarily using social media with group 1 respondents perceiving higher levels of information overload (G1= 1.81, n = 35 and G2 = 2.27, n = 20, p = 0.007). Among respondents that favored traditional media as their main source of information, a noticeable but lower difference in levels of information overload was noted between groups (G1= 2.31, n = 35 and G2 = 2.09, n = 45, p = 0.06).

Regarding frequency of information, respondents who reported consuming information daily or multiple times a day during the pandemic reported the lowest levels of information overload (M = 2.03, n = 147). They were followed by those that declared consuming information a few times a week (M = 2.18, n = 26).

Inferential statistical tests were conducted to examine the significance and strength of the relationships between information overload, messenger bias, and trust levels, as well as to test the hypotheses. The results of these analyses will be presented in the next chapter.

3.2 Inferential statistics and hypotheses testing

Hypothesis 1

H1 states that the presence of information overload will negatively impact respondent's trust levels. Since the data violated the assumption of normality based on the results of a Shapiro-Wilk test, non-parametric tests were employed for hypotheses testing and analysis.

To explore the relationship between information overload and trust levels within each group, Spearman's rank correlation coefficient (rs) was calculated. In group 1, presented with information from an untrustworthy messenger, a weak negative correlation was observed between information overload and trust levels (rs = -0.186, p = 0.08). Although the p-value did not reach the conventional level (p < 0.05) it was rather low, indicating potential significance. This suggests a possible tendency for suffering from information overload to be associated with lower levels of trust in group 1.

In group 2, where participants were presented with information from a trustworthy messenger, a weak positive correlation was observed between information overload and trust levels (rs =

0.090, p = 0.4). The correlation coefficient indicates a minimal positive relationship between these variables. However, the p-value of 0.4 suggests that this association is not statistically significant.

These results imply that information overload may have different effects on trust levels depending on the credibility of the information source. While for group 1 respondent's information overload was weakly associated with reduced trust, in group 2 it showed a weak positive connection (meaning trust levels and information overload increasing along) but lacked statistical significance. Thus, hypothesis H1 is rejected. Further research with larger sample sizes could provide stronger insights into these relationships.

Hypothesis 2

H2 stated that trust levels would be significantly higher for group 1 (trustworthy source) compared to group 2 (untrustworthy source).

A Mann-Whitney U test was performed to compare the trust levels between group 1 and group 2. The results of the test revealed a significant difference in trust levels between the two groups (U = 2312.5, z = 4.79, p = 0.00001).

To complement the result, the effect size r was calculated to determine the magnitude of the difference in trust levels between the two groups. The computed r value was 0.36, indicating a medium effect size.

In summary, the results of the statistical analyses strongly support hypothesis H2, suggesting that trust levels were significantly higher in group 1 (trustworthy source) compared to group 2 (untrustworthy source). These findings show the important impact of the messenger bias on trust perceptions, with respondents demonstrating a greater likelihood to trust COVID-19 related information from a source perceived as trustworthy.

Information consumption frequency and perceived information overload

To investigate whether consuming information daily influenced respondent's perceived information overload during the COVID-19 pandemic, another Mann-Whitney U test was performed. The test compared the information overload scores between two sub-samples: individuals who reported consuming information daily (n = 139) and those who reported consuming information on a weekly or less frequent basis (n = 39). The results of the test indicated a significant difference in information overload scores between the two groups (U =

2093, z = -2.17, p = 0.03). These results suggest that there is evidence to support the notion that information consumption frequency has an impact on respondent's perceived information overload during the COVID-19 pandemic.

To further understand the direction and strength of the relationship between information consumption frequency and information overload, Spearman's rank correlation coefficient (rs) was calculated. The coefficient revealed a weak positive significant correlation between these variables, with (rs = 0.17). This means that individuals who reported consuming information daily demonstrated higher levels of information overload compared to those who consumed information less frequently, suggesting that a higher frequency of information consumption may have contributed to an increased sense of information overload among respondents.

However, the observed relationship should be interpreted with caution due to the sample size discrepancy between samples with a larger sample in the daily consumption group (n = 139) compared to the less frequent consumption group (n = 39).

Information consumption frequency and trust levels

To investigate the relationship between information consumption frequency and trust levels, Mann-Whitney U tests were conducted separately for group 1 and group 2. In group 1, with respondents exposed to an untrustworthy messenger, the comparison between those who consumed information daily and those who consumed it less often did not reveal a statistically significant difference in trust scores (U = 745.5, z = 0.12, p = 0.90).

Similarly in group 2, where respondents were exposed to a trustworthy messenger, there was no significant difference in trust scores in relation to information frequency compared to group 1 (U = 502, z = -0.87, p = 0.38).

These results suggest that the frequency of information consumption did not significantly influence trust levels within both groups during the COVID-19 pandemic.

4. DISCUSSION

4.1 Interpretation of results

Hypothesis 1

H1 aimed to test the impact of information overload on trust levels. Although the correlations between information overload and trust levels were not statistically significant in either group, the opposed nature of the results (negative association in group 1 and positive association in group 2) suggests that the messenger bias might play a role in moderating the relationship between information overload and trust. Although the analysis rejected H1, this unexpected result highlights the importance of studying the intricacies and factors influencing information overload and its potential impact on trust.

Previous research (outside of a crisis context) had shown how respondents subjected to higher cognitive loads had lower levels of trusts, as well as an increased likelihood to act impulsively (Samson and Kostyszyn, 2015). During the COVID-19 pandemic or other crises where information overload is prevalent, it wouldn't be surprising to observe similar effects. This finding suggests that the messenger bias might moderate the relationship information overload-lowered trust and potentially lower trust levels further in the case of information delivered by a less credible messenger.

On the other hand, some have argued that a higher deliberate exposure to information (which doesn't necessarily translate into information overload) could have positive consequences. Medical research has painted a complex picture of the potential effects of higher exposure to information in the health domain: a study conducted in 2020 using data collected during another infectious disease outbreak (the Middle East respiratory syndrome 2015 outbreak in Korea) have uncovered the relationship between higher exposure to social media and adopting protective measures. Researchers have found a correlation between using social media more frequently and a stronger emotional response (through fear and anger) leading to an increased adoption of protective measures (Oh et al., 2020). The fact that more frequent exposure to social media translates in stronger emotional responses overall could however potentially indicate other negative effects.

In the context of the overall research on the topic, it is interesting to note that I haven't been able to find any research proposing the opposite reaction, namely that information overload

could have any positive effect on trust levels. It is particularly meaningful as the global climate of trust in institutions is declining consistently for decades in parallel to the technological advances exposing us to greater volumes of information (see Fig.1).

Hypothesis 2

Hypothesis H2 examined the difference in trust levels between group 1 (trustworthy source) and group 2 (untrustworthy source). The findings strongly supported H2, indicating that trust levels were significantly higher in group 2 compared to group 1. The effect size was medium ($r = 0.36$), suggesting a noticeable impact of messenger bias on trust perceptions during the COVID-19 pandemic. These findings demonstrate the substantial influence of messenger bias on trust perceptions of COVID-19 related information. They highlight that individuals are much more inclined to trust information from a source they perceive as trustworthy, regardless of the content of the information they are presented with.

This emphasizes the importance of considering the potential impact of messenger bias when communicating information to the public during crises. As previous research findings have shown, the perceived credibility of information from medical professionals and scientists was linked to lower negative emotions and higher subjective knowledge of self-protective behaviors (Lep et al., 2020). As shown in Lep et al. study, this lower emotional response consequently influenced positively engagement in self-protective behaviors. This suggests that credible sources play a significant role in communicating information during epidemics, and highlights the need for a deeper understanding of communication channels. Involving medical professionals and scientists would also likely improve the effectiveness of public health messages. Especially during uncertain times where information is more abundant and more sought after, the credibility of the source is proving to be a strong determinant for trust.

Although the relationship between source credibility and trust levels had been researched extensively in the past decades, I believe that the influence of specific contexts coupled with the current information ecosystem have complexified the question greatly. It is challenging to think of the implications of this state of affairs because every actor and messenger serves different purposes, which can dynamically evolve depending on contexts. This highlights the importance of building bridges between institutions and important actors across different medias and mediums, as well as rationally understanding what they could bring to the table to allow the diffusion of trusted information effectively.

Frequency of information consumption and information overload

There was a weak positive correlation between information consumption frequency and information overload, indicating that as the frequency of information consumption increased, individuals potentially experienced slightly higher levels of information overload.

It is worth discussing the implications of this finding from its wording, as frequency of information consumption and information overload can appear to be obvious interconnected items. However, literature on the subject has extensively discussed the multifaceted nature of the concept, nuanced by many external and internal factors that may or may not lead to a heightened state of information overload. In relation to this finding, it needs to be emphasized that information overload can be perceived even by people that are not avid news-readers or daily users of every social media, especially within developed countries widely using technologies designed to expose individuals to more information. Its effects which research has found to be negative and one-sided should not be underestimated, especially within this rapidly evolving context.

In relation with the COVID-19 pandemic and the increased amount of information produced, it is safe to say that the constant influx from multiple sources can increase individual exposure irrespectively of people's personal habits. During crises, the general climate of stress and information seeking and sharing can easily overwhelm individuals involuntarily, increasing the likelihood of information overload. This implies that uncontrollable factors can contribute to feelings of overload and subsequently impact trust.

Once again, I was not able to find relevant research that would shine light on whether intentional exposure to information translates into increased information overload. The complexity of interpreting this finding lie firstly into the lack of relevant literature on the subject, as well as within the distinction between the concepts of deliberate and unintentional exposure to information. Again, I argue that our rapidly evolving technologic landscape and uses is having a great impact on our understanding of those concepts.

Interdisciplinary research would be required to gain a comprehensive understanding of information overload in our era, as no single field could provide a complete overview of this complex concept. The fields of information and data science, behavioral sciences, sociology and communication could all contribute greatly to understand the processing, interactive effects and societal aspects of information overload. By gathering the perspectives provided by these

disciplines, the multi-dimensional nature of the issue could be examined and ways to mitigate its negative effects could be investigated.

Frequency of information consumption and trust

The frequency of information consumption did not significantly influence trust levels within both group 1 and group 2. There was no significant difference in trust scores between individuals who consumed information daily and those who consumed it less often. However, the uneven distribution of information consumption frequency within the groups should be considered when interpreting these findings. Specifically, as the analysis had to be conducted for each group individually due to the survey design influencing the answers to trust questions, the sub-samples consisting of respondents not consuming information daily for each group was very low (group 1 n = 15, group 2 n = 16). Further research with larger sample sizes and a greater focus on the intricacies of consumption frequency and the specific nature of information could help providing a better comprehension of this relationship.

4.2 Limitations

This study is suffering from a number of limitations that need to be acknowledged. Firstly, as the questionnaire was provided online there was no way to ensure the serious involvement of respondents, their correct understanding of the questions as well as the potential influencing factors in their environment. Additional resources would have allowed to gather supplementary qualitative data, and gain a deeper understanding of subjective factors influencing trust formation in the context of perceived information overload and messenger bias. This would have helped in nuancing the focus points further and possibly exploring additional variables linked to the research question. Collection and analysis of supplementary demographic data could have uncovered other influencing factors linked to socio-economic status and personal expertise of respondents. These factors have likely been influencing trust in various messengers, as well as individual perceptions of information overload.

As the COVID-19 pandemic was also a social crisis, it introduced a level of polarization and strong beliefs on various topics for the public which might have had an impact on respondent's answers. This limitation was mitigated by the fact that the study was not conducted during the pandemic, although this might have introduced hindsight bias. A larger sample size, as well as introducing a systematic manipulation of information (types and formats) and messengers could

have allowed to gain a clearer picture of potential correlations and interactive effects affecting trust.

Additionally, as the research was based solely on quantitative data, having a larger sample size would have helped gain more confidence in the statistical results. The restrained sample size limits the generalizability of the findings, especially in regards to the analysis done on sub-samples (particularly the respondents that indicated not being daily consumers of information, n = 39 out of n = 178 respondents). Overall, a larger sample size could also have allowed to analyze more messenger and information types to nuance the results further.

Finally, the fact that the study was not conducted during the pandemic means that the findings need to be interpreted carefully and not generalized to behavior during crises. Conducting longitudinal research during the pandemic would have greatly helped in assessing the potential impact that the rapidly evolving circumstances may have had on trust levels and source credibility. This is especially relevant as there were many external factors emerging, evolving and disappearing during the pandemic. Intermittent lockdowns, changes in information consumption patterns, variations in institutional communication strategies, and of course the varying intensities of each of the disease's waves. Each of these factors brought its own set of circumstances and dynamics, which likely had effects on individual's perceptions and behavioral responses. The fact that the research was conducted after the pandemic however brings one positive aspect, as this study benefitted from the insights of many studies conducted during the pandemic which helped reaching a deeper understanding of the research question and facilitated preliminary research.

5. CONCLUSION

In this research I investigated the impact and relationships between information overload, messenger bias, and trust during the COVID-19 pandemic. My findings indicate that the messenger bias plays a significant role in influencing trust, as individuals tend to trust certain messengers much more than others regardless of the message presented. I observed that information overload could also affect trust, and could potentially be a mitigating factor depending on the credibility of the messenger delivering information. This last finding however lacked statistical significance and would require further research.

Studying the effect of information overload and bias induced by different messenger's communication during crises is of great importance partly due to the declining levels of trust globally in recent decades. As society becomes increasingly overloaded with information, it has led to negative outcomes and further eroded trust in institutions and between individuals. Understanding the mechanisms and consequences of information overload is crucial for addressing this issue and working towards creating ways to disseminate trustworthy communication, more likely to result in collective and positive action.

The rise of technology has drastically changed the way we perceive and process information. With the abundance of information available at our fingertips, individuals are constantly exposed to messages from various sources, making it challenging to filter, evaluate, and trust the information we encounter. This overload of information can lead to many negative outcomes including stronger levels of distrust regardless of the content of the information. During health crises and when accurate and reliable information is crucial for public health and safety, the implications of information overload become even more critical. The volume of information and its complexity coupled with the presence of fake and conflicting information creates a challenging environment for individuals to make informed decisions about what they should trust.

By further studying the topic, we could gain insights into the underlying factors that contribute to lower levels of trust. We could also develop a better understanding of the many factors influencing our thought processes, improving our ability for informed critical thinking. Interdisciplinary research would help gaining a global overview of these concepts, and would allow us to better assess and understand the potential impact of future technological progress impacting our relationship with information.

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