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# VULNERABILITY TO DISINFORMATION IN OLDER AGE<sup>1 2</sup>

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## *abstract*

*Disinformation poses a significant challenge to contemporary society, as it has the potential to undermine the stability of democratic systems, put public health at risk, and undermine the credibility of science. We explore the question of whether certain groups of people are especially exposed to disinformation and, in particular, we focus on older people. We examine the purported impact of cognitive and linguistic factors, such as source amnesia and the need for consistency, the decline of pragmatic skills in recognizing intentions and decoding figurative language, as well as motivational factors like the need for affiliation. Taken together, these empirical data suggest that there may indeed be specific vulnerabilities associated with older age. This hypothesis calls for finding ways to protect a category of people who already suffer from numerous other vulnerabilities.*

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## *keywords*

*disinformation, aging, cognitive biases, heuristics, pragmatics*

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2 The present paper was written by both authors. However, it is possible to attribute section 2 and subsections 3.1 and 3.3 to Cristina Meini; subsection 3.2 to Martina Rosola; and sections 1 and 4 to the two of them.

## 1. Introduction

It is now widely recognized that disinformation poses a significant challenge to contemporary society, to the point that, according to many, it has the potential to undermine the stability of democratic systems, put public health at risk, and undermine the credibility of science (Allcott and Gentzkow, 2017; Benkler, Faris, and Roberts, 2018; Van Bavel et al., 2021). The phenomenon has roots in ancient times, as historical instances of distorted information, such as the false donation of Constantine, have had tangible and enduring effects. However, in the era of mass media, the Internet, and social media, the issue has gained exceptional relevance. Firstly, almost everyone is capable of manipulating images and texts with simple software (not to mention AI-related tools), making them available in formats that closely mimic traditional media formats. And these texts and images can be placed on perfectly designed and apparently very authoritative (or even institutional) sites. Furthermore, Internet makes dissemination exceptionally rapid, and profiling algorithms are able to deliver information on specific topics to those who are most sensitive to them (Mustafaraj and Metaxas, 2017)<sup>1</sup>.

Even older people make use of the Internet, as attested by Petrovčič et al.'s (2023) recent survey. For this reason, it becomes interesting to see whether older people are particularly vulnerable to disinformation due to some of their recurring psychological peculiarities. There are some significant cues pointing in this direction.

*Inter alia*, data concerning a prominent case study, namely the 2016 U.S. elections, suggest that older people might be more susceptible to fake news than the general population (Grinberg et al., 2019; Guess et al., 2019).

A brief remark before we get into the heart of the topic. In this paper, we will use the expression “older adults” as a synonym of the more ageist expression “the elderly” (cfr. WHO, 2021, p. xx). According to the WHO definition, people aged 65 or older are included in this category, although some empirical research worth considering focuses on slightly younger people (e.g., Adaji, 2023; Chun Wong et al., 2021).

The paper is organized as follows. We propose a definition of the two of the most serious forms of disinformation: fake news and conspiracy theories. After a brief overview of the main cognitive biases that expose all individuals to both kinds of disinformation, we will examine

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<sup>1</sup> Noticeably, although social platforms accelerate the spread of both true and false news, humans are more likely than computers to spread false news (Vosoughi et al., 2018, for an analysis of the distribution of true and false stories on Twitter).

some peculiarities of older individuals, then expanding the investigation to the linguistic-pragmatic and motivational-affiliative dimensions, which also seem to exhibit peculiarities in the older age group. Overall, the identified elements could contribute to making older individuals more vulnerable to disinformation, indicating a potential path for empirical research to thoroughly investigate a highly complex issue.

Before about 2015, the term ‘Fake news’ referred to a type of communication, such as political satire, that simply blurred the boundaries between fiction and reality without any intention to change the epistemic environment or people’s behavior (Holbert, 2005). However, with the widespread proliferation of disinformation in the political realm in recent years, the term has now come to signify intentionally fabricated news, strategically planted in the media, particularly on social media platforms, presented in the guise of traditional reporting and serving various purposes (Rubin et al., 2015; Silverman, 2016; Mustafaraj and Metaxas, 2017; Allcott and Gentzkow, 2017; Rini, 2017).

Refraining from entering into a detailed analysis that would be beyond the scope of this discussion, we will adopt Michel Croce and Tommaso Piazza’s (2021) definition, which emerges from their articulated analysis of the role of falsehood:

By asserting/implicating that P, a subject S is asserting/implicating a piece of fake news if and only if (i) S’s assertion/implication that P is meant to address a large enough audience (ii) in the guise of news; (iii) P is asserted/implicated either with the intention to deceive one’s audience or with no concern with P’s truth; and (iv) S does not think that P is supported by the evidence (p. 54).

Unlike other authors (e.g., Rini, 2017), Croce and Piazza, along the lines of Jaster and Lanius (2018), observe that on many occasions the crucial element of the notion is not falsehood, but disregard for the truth. Sensationalist news can be disseminated with the unique goal of catching attention and inducing people to generate clicks and visit specific Web pages (Silverman and Alexander, 2016). Moreover, sometimes fake news can be literally true while conveying false information through conventional or conversational implicatures (Jaster and Lanius, 2018). To take their example, an utterance such as ‘After the refugees arrived, 47 burglaries occurred in the village’ (Jaster and Lanius, 2018: 210) is literally true but pragmatically implicates an unjustified causal relationship.

The other disinformation structure we want to consider, although certainly related to fake news, must be distinguished from it. We are referring to conspiracy theories. Bob Brotherton, an influential psychologist who has extensively studied the phenomenon, provides a definition of conspiracy theory as

An unverified and implausible assertion that significant events are the result of a secret plot carried out by a group of powerful individuals driven by sinister intentions (Brotherton and French, 2014, p. 238; see also Brotherton, 2017).

Unlike fake news, conspiracy theories aim to construct alternative maps of reality, shaped by specific narrative patterns. While conspiracy theories may incorporate individual instances of disregard for the truth, using them as links in a chain of flawed arguments, they transcend these elements to form a broader framework.

## 2. Definitions

### 3. Vulnerability to disinformation in older age

#### 3.1 Cognitive factors

The literature on the psychological features that make people of *all ages* vulnerable to disinformation is extensive and continuously evolving. Some characteristics of human reasoning, in particular, the tendency to resort to cognitive shortcuts (*heuristics*), expose us all to fallacious conclusions that we tend to confirm rather than seek to falsify, as definitively shown by Amos Tversky and Daniel Kahneman's (1974) prolific paper. To limit ourselves to some of the biases that could affect the creation and spread of disinformation, let us mention:

- 1) the *conjunction fallacy*: we tend to overestimate the correlation between two co-occurring events, to the point of erroneously judging that the combination of two events is more probable than either one alone (Tversky and Kahneman, 1983; Brotherton and French, 2014). For instance, we tend to assume that a politically active young woman is more likely to be a feminist bank employee than just a bank employee, although this is clearly incorrect as the set of feminist bank employees is a subset of that of bank employees;
- 2) the *intentionality bias*: we tend to overestimate agentivity and see intentionality even in inanimate objects or in aleatory events (Rosset, 2008; Douglas et al., 2016). To provide a couple of examples, we easily see agentivity in the movement of leaves. And when someone accidentally bumps into us, we tend to immediately assume that she purposely did it, perhaps thinking they meant to be rude or confrontational;
- 3) the *illusion of explanatory depth*: we tend to show a disproportionate self-confidence in explaining complex phenomena, starting with the functioning of rather complex objects such as a bicycle or even a zip (Vitriol and Marsh, 2018);
- 4) the *proportionality bias*: we tend to assume that macroscopic events must have macroscopic causes behind them (McCauley and Jacques, 1979). It is because of the proportionality bias that we shake the dice more vigorously when we have placed a bet on a specific number's outcome;
- 5) the *need for closure* (jump to conclusions): we make overconfident probabilistic judgments based on minimal data, such as a handful of dice rolls (McKay et al., 2006);
- 6) the *halo effect*: a single positive/negative trait of a person influences our judgment of that person's other traits and behavior (Thorndike, 1920). For example, when we meet someone (especially a male) who is physically attractive, we tend to unconsciously assume that he is also intelligent.

One can easily understand how such fallacies can favor the endorsement of disinformation and even the emergence of conspiracy theories. To give just a couple of examples, how could someone as important as Lady Diana have been the victim of a trivial car accident? The proportionality bias conspires against this simplistic hypothesis. Likewise, the need for closure leads some to perceive the death of two vaccinated people as the ultimate evidence of vaccine danger, easily fueling beliefs in a conspiracy behind the vaccination campaign. And the exceptional speed of information dissemination characteristic of the Internet arguably exacerbates these phenomena, hindering more thoughtful reasoning in favor of automatic and poorly controlled inferential processes (Evans, 2008; Kahneman, 2003 for a distinction between two modes of reasoning that refers to the functioning of two distinct inferential systems).

These cognitive traps universally affect people, but could become more insidious in older age due to a physiological weakening of higher executive functions (Vecchi and Cornoldi, 1999; see also Cavallini et al., 2003) and their closely connected attentional capacities. The direct and causal influence of increased vulnerability to cognitive biases on susceptibility to disinformation is a hypothesis that would merit empirical evaluation.

Yet, the literature has long highlighted more specific weaknesses that are somehow recurrent in older age and that may have an impact on the reception and dissemination of

disinformation. A first peculiar fragility affects the recollection of information sources (e.g., Schachter et al., 1991; Johnson et al., 1993; Siedlecki et al., 2005; Simons et al., 2004): many older people can still acquire and retain information, without, however, being able to recall where, when, or how they learned it. Obviously, being unable to trace information back to its sources makes people more vulnerable to disinformation. Consider an individual who struggles to discern whether a piece of information I originates from reliable sources, such as institutional sites, authoritative publishers and journals, or individuals with recognized authority and reputation (see Goldman, 2019). Arguably, this person is at risk, especially when the news is not blatantly absurd, of being unable to exercise proper *epistemic vigilance* (Sperber et al., 2010), which involves according the appropriate level of confidence to information; even if she was initially cautious about I, over time the oblivion of the source is likely to weaken her vigilance and lead her to subscribe to (and disseminate) I. Therefore, although remembering sources is by no means an infallible defense against disinformation, it is undoubtedly useful, particularly in a world where disinformation is generally packaged very carefully (Rini, 2017). More specifically, we believe that forgetting the sources exposes individuals to the danger of believing fake news. Unlike conspiracy theories, which often adhere to recurrent plotlines that can be more easily recognized and rejected even for older people (assuming that they have no significant cognitive impairments and are not already under the plot's influence), fake news often presents contents that, despite originating from non-authoritative sources, may appear credible in their own.

As Brashier and Schacter (2020) observe, though, source amnesia alone cannot account for the greater susceptibility of older people to fake news. While the authors focus on media illiteracy, we argue for an explanation that takes into account further pragmatic and motivational characteristics of older age.

### 3.2 Pragmatic factors

Pragmatics can be defined as “the contribution of context to language understanding” (Levinson, 1983, p. 31); it includes practical aspects relating to the interaction with interlocutors, such as evaluating the appropriateness of a speech intervention or drawing inferences to understand what the speaker meant with what they said. The pragmatic aspects of language have been grouped into three categories (Fox, 1969): verbal, paralinguistic, and nonverbal aspects.

Verbal aspects comprise topic selection and turn-taking; paralinguistic aspects include vocal intensity, quality, and prosody; nonverbal aspects encompass gestures, facial expressions, and eye gaze. Mastery of all these aspects is essential to correctly understand others and properly participate in a linguistic exchange. For instance, being able to correctly select a topic and respect conversational turns enables one to make appropriate speech interventions. A good competence in some aspects, moreover, protects one from disinformation.

Take, for instance, prosody. Emotions get communicated through prosody and correctly identifying emotions is fundamental to properly grasping what is being said. Furthermore, recognizing emotions can be key in understanding the speakers' intentions, including the intention to deceive or disregard the truth. Since, as stated above, disregard for the truth is a defining feature of fake news, being able to realize such an attitude on the part of the speaker may protect one from fake news and disinformation, more broadly. Older people, however, are less able at recognizing the emotions expressed in speech (Ruffman et al., 2008). Such a suboptimal pragmatic competence, though, exposes them to fake news.

A caveat, however, is called for: prosody is clearly only a feature of vocal communication, hence its lapse solely affects the interpretation of speech and not of written texts. Therefore,

this impairment increases the vulnerability of older adults with respect to disinformation spread through oral communication, voice recordings, and videos, but not through, e.g., newspaper articles. Crucially, this does by no means affect a negligible proportion of (dis)information, given the pervasiveness of videos, either on TV or internet.

Nonverbal pragmatic skills serve also as a defense to disinformation. In particular, facial expressions also provide important cues concerning the emotions conveyed by the speaker. Once again, recognizing emotions can help one realize the intent to deceive and, thus, protect from malicious attempts at disinformation. Older people, though, cannot resort to this resource because their ability to interpret facial expressions is reduced (Ruffman et al., 2012).

Moreover, the ability to interpret gestures is crucial to correctly understanding what's being said insofar as gestures can be used to convey figurative meaning. Figurative language is characterized by the need to infer its meaning and it includes irony, sarcasm, idioms, proverbs, and metaphors. The latter is especially important due to its pervasiveness, as notably pointed out by Lakoff and Johnson (1980). They contend that it's not possible to clearly distinguish literal and figurative meaning, as the latter is ubiquitous. In this perspective, there are few if any instances of purely literal communication. Although they don't discuss the language used in disinformation specifically, there's no reason why it should be an exception. According to Lakoff and Johnson, indeed, the pervasiveness of figurative language is due to a general feature of language and does not depend on a specific characteristic that may or may not be present in the context of disinformation.

Crucially, “[o]lder adults are more likely to ignore gesture in conversation than younger adults” (Messer, 2015, p. 3; see also Kita, 2009; Cornejo et al., 2009; Cocks et al., 2011; Cohen and Borsoi, 1996). As mentioned above, older adults more than younger people tend to disregard gestures, which can be used to convey figurative meaning. As a result, older adults' ability to interpret figurative language is reduced compared to younger adults'. To the extent that figurative language is present in disinformation too, this means that older adults may have a harder time understanding the message conveyed. In particular, older adults may stick to the literal interpretation of sentences containing metaphors or idioms, without understanding their metaphoric meaning. This is what has been found in pathological populations (Papagno 2001; Papagno et al., 2003; Amanzio et al., 2008 for patients with Alzheimer's disease, and Monetta and Pell, 2007 for patients with Parkinson's disease) and in older adults with a low level (less than 10 years) of education (Champagne-Lavau et al., 2012). Importantly, then, education may serve as a protective factor. More broadly, cognitive reserve (i.e., the degree of reinforced neural networks and additional synapses), lifestyle, and demographic factors may counterbalance the impairment of pragmatic language ability in older adults, preserving a level sufficient to decode information correctly for longer (Scarmeas and Stern, 2003).

As for the paralinguistic aspect of prosody, nonverbal aspects, do not feature in written communication. They are further absent in voice recordings as gestures, facial expressions, and eye gaze belong to the visual delivery of speech, only available in face-to-face conversations and videos. Figurative meaning, instead, figures in both oral and written modalities. Thus, although deficits in paralinguistic and nonverbal abilities only increase older peoples' vulnerability to *oral* or *video* disinformation, their frailty on figurative meaning (as well as the cognitive weaknesses mentioned in subsection 3.1) also affects *written* communication.

So, pragmatic abilities are crucial to correctly decode information and, above all, to recognize the other's intention to deceive. As several studies show, however, a pragmatic decline due to physiological aging affects older people (see Messer, 2015 for an overview). Such a deterioration of pragmatic ability makes older people, we argue, more vulnerable to disinformation.

One, paradoxical, exception is provided by the ability to understand the interlocutor's *communicative* intention. This capacity is essential to understand what's being said or implicated, so it's really fundamental to comprehend a communication. If, however, the communication is false and deceitful, not grasping it might protect one from the risk of disinformation. Recall Jaster and Lanius' (2018) example 'After the refugees arrived, 47 burglaries occurred in the village': in this case, deriving the implicature of relevance is crucial to understanding the false problematic meaning, namely that there's a causal relationship between the arrival of the refugees and the burglaries. Not being able to get the implicated information would actually shield one from the falsity conveyed through the utterance.

To recap, pragmatic competence is crucial to understanding what's said and implicated and older adults' difficulties with pragmatic aspects such as prosody and figurative meaning seem to make them especially vulnerable to disinformation. However, when disinformation is spread through pragmatic implicatures, the inability to grasp the speaker's communicative intention might actually turn out to be an advantage and in fact protect older people from disinformation. Empirical research is needed to clarify these aspects in all their complexity and interrelation.

Alongside cognitive bias and pragmatic decline, we are persuaded that motivational factors play an important role in determining a specific vulnerability of older people to disinformation. We'll delve into it in the next subsection.

### 3.3 Motivations

In this final section, we move towards psychological dimensions that are not only cognitive, but also overtly motivational. This is - we believe - a necessary step to account for vulnerability to disinformation in general and - *a fortiori* - specifically in older age. Indeed, as remarked by many authors (see *inter alia*, Galeotti and Meini, 2022), cognitive weakness alone can hardly account for the whole problem of vulnerability to disinformation, neither for the general population nor, more specifically, for older people.

Disinformation rarely strikes indiscriminately; rather, it tends to impact individuals who are more receptive to it. Right-wing voters sincerely believe the falsehoods propagated by Trump, Fox News, and other right-wing U.S. sources, while liberals are less prone to falling for such claims and quickly recognize their absurdity. Similarly, *ceteris paribus*, fakes spread by no-vaxers or climate-deniers mostly affect people who are highly skeptical of science as opposed to those who trust it. This is known as the selective effect of disinformation: disinformation does not affect all people equally, but tends to have a stronger impact on those who are more susceptible to its message because of their existing beliefs, cognitive biases, or other factors.

Therefore, an extremely interesting question is whether vulnerability to disinformation significantly depends on people's peculiar needs (for a positive answer to this question, see Loria and Meini, 2023). More specifically: are there any reasons to believe that older people have specific needs that could increase their vulnerability to disinformation?

Certainly, there are objective needs that render certain categories of people vulnerable to disinformation throughout, independently of their life stage: economic, social and cultural needs, such as in cases of low income, low education, or social discrimination due to their ethnicity (Crocker et al., 1999) or income (Uscinski and Parent, 2014). These kinds of difficulties, which not infrequently coexist, may even be one of the main factors of vulnerability in many cases. Nevertheless, other peculiar elements seem to intervene in older age. In fact, we suspect that older people become constitutively (namely, apart from clinical conditions and pathologies that could intervene and worsen the situation) more vulnerable to disinformation due to the increased weight of some specific needs. Here, we are interested in

observing the implant of two factors: the need for consistency and the reduced socialization that is typical of this stage of life.

The first relevant aspect of cognitive processing concerns narrative coherence. The structure of disinformation in general, and of conspiracy theories in particular, tends to have high degrees of coherence, at the expense of correspondence to reality: all facts are strictly interconnected and packaged in perfect plots, where everything is perfectly explained without uncertainty or blind spots. Or, to put it better, when some potential dark spot remains, strong powers are immediately invoked.

A strict narrative coherence can be particularly reassuring in situations of personal vulnerability and disorientation, when it ultimately contributes to fostering one's self-image. Therefore, it is not surprising that individuals grappling with psychological distress often seek to compensate by looking for coherent information. For example, Conway et al. (2004) describe the intrusions of flashbulb memories<sup>2</sup> in patients suffering from post-traumatic stress disorder. Flashbulb memories are often false but highly coherent with people's self-image and as such useful to favor psychological stability. What we want now to suggest is that coherence has a high value also in older age, when it has the potential of restoring a more integrated self-image by instilling a sense of intimate solidity that is invaluable in a phase of life often characterized by insecurity and fragility due to loneliness and to the approaching of death.

Let us turn to a second motivational factor affecting people's reaction to disinformation. Older age is often associated with social isolation: distant or neglectful families, losses and debilitating illnesses among peers, or the withdrawal from work itself often create discomfort and isolation (Grundy, 2006; Baars, 2017; Casey and Holmes, 1995). Conversely, social networks, including the Internet, provide new opportunities for dialogue, exchange and acquisition of information: on the Internet, older people can connect with distant old friends and family members, receive medical treatments from experts through telemedicine, and, more generally, stay in touch with the world.

However, once one steps outside this controlled social circle, the Internet also exposes all its risks.

In online communities, as in any other context that facilitates new connections, it is natural to seek affiliation with people who share our interests, thus creating and fostering *ingroups* (Tajfel, 1970; Tajfel and Turner, 2004). Particularly in a global community like the Internet, where millions of individuals may never physically meet or form genuine friendships but instead focus solely on group interests, this phenomenon tends to be exacerbated. To borrow the apt expression coined by Nguyen (2020), it is easy to fall into *epistemic bubbles* and *echo chambers*. Unlike epistemic bubbles, that form spontaneously when an interest group *de facto* (namely, unintentionally) neglects alternative viewpoints, in echo chambers epistemic isolation results from the active discrediting of external knowledge and its witnesses. In echo chambers, fallacious arguments are typical, as are tendentious and ridiculous re-descriptions of others' arguments. In short, they are the ideal *locus* of fake news and conspiracy theories.

In the Internet's echo chambers, polarization is intentionally generated, and dissent is morally stigmatized, thereby reinforcing the social identity of the ingroup. While it is easy to feel protected and in good company when everyone thinks the same things and discusses pleasantly *good* things, leaving an ingroup has a high emotional cost. Echo chambers, thus, seem the ideal place of comfort for those who feel lonely. Not only affiliation and the sharing

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<sup>2</sup> Flashbulb memories are persistent and particularly vivid memory traces that are typically linked to traumatic events. Typically, people retain not only the trace of the event itself, but also the personal context, i.e., where they were or other personal details, at the time they became aware of the events.

of ideas are comforting in themselves, but they are also the place of (re)constitution of the social self, that is, of that public face that is recognized as a fundamental part of personal identity (James, 1890; Marraffa and Meini, 2024). During a stage of life when individuals may be grappling with a diminished psychological sense of self, such as when they realize they no longer remember the sources of their knowledge (as mentioned above) and are also facing substantial changes in their physical bodies (physical self, or ‘material self’, following James), the opportunity to regain a distinct social role becomes particularly meaningful and valuable. Conspiracy theories offer powerful social roles and valuable opportunities for appreciation and recognition.

As previously mentioned while hypothesizing other specific factors contributing to vulnerability to disinformation in older age, we underscore that our hypotheses need to undergo empirical research. Specifically, only dedicated tests will be able to verify whether a true causal correlation exists between the two specific needs examined (need for coherence and need for affiliation) and actual vulnerability to disinformation, respectively.

While the features of contemporary information allow for the spread of fake news and conspiracy theories, older people appear to be more vulnerable to disinformation. We identified several factors exposing older people especially: source amnesia and the need for consistency, loneliness and the consequent need for affiliation, and the decline in the ability to recognize the other’s emotions and intentions, and to decode figurative language. We argued that these factors contribute to people believing in fake news and conspiracy theories and that they make older people especially vulnerable to these two especially serious forms of disinformation given that these factors affect, on average, older adults more than the general population. We also highlighted a paradoxical protective effect of the pragmatic decline associated with aging. Further research is needed to empirically determine the actual weight of the different factors we examined in exposing or, on the contrary, protecting older people from disinformation. If such studies were to confirm our hypothesis that older people are more vulnerable to disinformation, then we’d have good reasons, we believe, for devoting specific attention to this segment of the population in tackling the issue of disinformation.

#### 4. Conclusions

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